Operator bases in effective field theories with sterile neutrinos: $d \leq 9$

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ABSTRACT: We obtain the complete and independent bases of effective operators at mass dimension 5, 6, 7, 8, 9 in both standard model effective field theory with light sterile right-handed neutrinos (νSMEFT) and low energy effective field theory with light sterile neutrinos (νLEFT). These theories provide systematical parametrizations on all possible Lorentz-invariant physical effects involving in the Majorana/Dirac neutrinos, with/without the lepton number violations. In the νSMEFT, we find that there are 2 (18), 29 (1614), 80 (4206), 323 (20400), 1358 (243944) independent operators with sterile neutrinos included at the dimension 5, 6, 7, 8, 9 for one (three) generation of fermions, while 24, 5223, 3966, 25425, 789426 independent operators in the νLEFT for two generations of up-type quarks and three generations of all other fermions.

Contents

1 Introduction

The Standard Model (SM) is an important achievement of human understanding of the micro-world, which has been examined at various high energy experiments with very high precision. Since that, more and more attention has been drawn to search for new physics beyond the SM but not find any new resonances yet. In this case, effective field theory (EFT) providing a systematical framework to parameterize various new physics

and describing physical systems below the scale of the new physics, has witnessed great progress in recent years. The first and famous achievement of the EFT is the Fermi theory. Nowadays, with only the SM degree of freedom included, the standard model effective field theory (SMEFT) [1–9] provides an EFT framework above the electroweak scale while all SM particles remain massless. The SMEFT contains all the SM fields to construct the effective Lagrangians and respects the SM gauge symmetry $SU(3)_C \times SU(2)_W \times U(1)_Y$. After integrating out the massive gauge bosons $W^\pm$, Z, the top quark t and the Higgs boson h, the low energy effective field theory (LEFT) [10–13] describes all possible physics below the electroweak scale, regarding to the gauge symmetry $SU(3)_C \times U(1)_{EM}$.

The neutrino oscillation experiments have shown evidence that neutrinos are massive, yet the left-handed neutrinos in the SM do not acquire the Dirac mass terms via the Yukawa interactions like other fermions in the SM. One natural solution to this is to add the right-handed neutrinos to the SM and generate the Dirac mass terms after electroweak symmetry breaking, in which the massive neutrinos are Dirac-type and the lepton number is conserved. On the other hand, Majorana mass terms are naturally there since the right-handed neutrinos are the SM gauge singlet and thus sterile to the SM, which violate the lepton number, and the neutrinos are Majorana neutrinos. If the newly-added right-handed neutrinos are heavy, above the TeV scale, for example, then they should be integrated out above the electroweak scale, and the SMEFT and LEFT frameworks are still valid. However, if the right-handed neutrinos are light, such as the sub-GeV or KeV sterile neutrinos, which could be dark matter candidate, see ref. [14] for a review, so that they can not be integrated out at the electroweak scale or even at lower energy scale, the standard model effective field theory with right-handed neutrinos (νSMEFT) and low energy effective field theory with right-handed neutrinos (νLEFT) are needed to describe various new physics effects. The construction of effective operators involving the right-handed neutrinos in the νSMEFT has been considered at the dimension 5 to 7 in literature [15–18]. In the νLEFT, the complete set of operators involving the right-handed neutrinos up to dimension 6 has been listed in ref. [19], and the lepton-number-violating subset of them has been listed in ref. [20].

With the light sterile neutrino included, νSMEFT operators would modify different kinds of physical processes and at the same time, give rise to new signatures compared to the SMEFT operators. It has been applied to investigate various sterile neutrino production processes at the LHC [21, 22], and also appears in various exotic decay processes, such as the Higgs exotic decays [23], sterile neutrino decays [24, 25], leptonic radiative decays [16, 26], coherent neutrino scattering experiments and beta decays [20, 27–29]. In particular, in the neutrino-less double beta decay processes, the sterile neutrinos would induce new kinds of long-range neutrino potential [30]. However, we expect that if the dimension-9 operators in the νSMEFT dominate, just like the dimensional-9 contributions in the SMEFT, it would induce new types of short-range potential, and thus give rise to additional contribution to both the short-range and long-range processes. Furthermore, in the proton decay processes, if the sterile neutrinos exist, it would induce new types of exotic decay processes as discussed in ref. [31]. We expect the higher dimension of operators, the lower of the cutoff scale in the proton exotic decay processes. Therefore, the higher dimensional operators in the νSMEFT which contribute to the proton decay processes, would also be accessible to the collider

searches in which the cutoff could be around the TeV scale. Overall, writing down the higher dimensional operators would be useful to investigate various processes involving in sterile neutrino, especially the baryon and lepton number violation processes, in which new physics effect might be reachable by the future colliders.

To avoid over-counting or miscounting of operators, it's important to work with a complete and independent basis of operators. The traditional method to list the independent operator basis is to consider all possible operators, then to restrict them with equation of motion (EOM), Fierz identities, and integration by parts (IBP) repeatedly, but the complexity of this method increases exponentially when it comes to higher dimensions. Compared with the traditional method, our method to obtain the complete bases automatically generate the independent structures [5, 7, 12], without the need of EOM and IBP relations. Furthermore, since spin $\leq \frac{1}{2}$ massive particles do not affect the amplitude-operator correspondence which we used in the massless cases, the method can still be applied in both the νSMEFT and νLEFT.

In this work, we introduce a systematical method to list the operator bases of the νSMEFT and νLEFT for a given dimension, which has been applied to SMEFT and LEFT [5, 7] to guarantee its correctness. Based on the amplitude-operator correspondence, we list the independent Lorentz invariant structure, equivalently, the amplitude basis as functions of spinor-helicity variables, generated via semi-standard Young tableaux (SSYTs) construction. More details can be found in [5, 7, 32]. The method still holds when the massive Majorana neutrinos are taken into account, since the Majorana fermions and Dirac fermions have the same wave function in the two-component spinor formalism. Then the gauge structures are also obtained in terms of invariant group tensors. The Littlewood-Richardson rule allows us to construct a set of singlet Young tableaux of the gauge group indices from the constituting particles, which induces the basis of gauge group factors. Finally, taking the direct product of gauge structures and Lorentz invariant produces the independent flavor-blind amplitudes. Afterwards, the symmetries of the identity particles are expressed by symmetries of flavor indices. We obtain the final results as the independent basis of flavor-specified operators with definite permutation symmetries.

In this paper the operator bases in νSMEFT and νLEFT at dimension 5 to 9 are written explicitly as the key results. In νSMEFT, at dimension 5, the only violation pattern of operators involving sterile neutrinos N is $(\Delta B, \Delta L) = (0, \pm 2)$, while there are $(0, \pm 4)$, $(\pm 1, \pm 1)$ at dimension 6 and $(0, \pm 2)$, $(\pm 1, \mp 1)$ at dimension 7. The violation patterns at dimension 8 are the same as that at dimension 6, and there are additional $(0, \pm 6)$, $(\pm 1, \pm 3)$ at dimension 9 compared to violation patterns at dimension 7. In νLEFT, the only violation pattern of operators involving sterile neutrinos N is $(\Delta B, \Delta L) = (0, \pm 2)$ at dimension 5, and violation patterns at dimension 6, 7, 8 are the same, which are $(0, \pm 2)$, $(0, \pm 4)$, $(\pm 1, \pm 1)$, $(\pm 1, \mp 1)$. There are additional $(0, \pm 6)$, $(\pm 1, \pm 3)$, $(\pm 1, \mp 3)$ at dimension 9 compared to violation patterns at dimension 6, 7, 8. Table 3–5 contain the useful statistics of operators in νSMEFT and table 6–7 give the statistics for νLEFT.

This paper is organized as follows. Section 2 first briefly reviews the massive spinor helicity amplitudes and amplitude-operator correspondence, then discusses our notations to construct operators, especially similarities and differences between Dirac neutrinos and Majorana neutrinos. Section 3 introduces the method of obtaining operator bases.

Independent Lorentz and gauge structures can be determined by Young tableaux, and flavor specified operators are obtained after inner product decomposition. Section 4 and section 5 list high dimension operators involving right-handed neutrinos up to dimension 9 in νSMEFT and νLEFT respectively. Section 6 is our conclusion.

2 Operators in spinor-helicity formalism

Amplitude-operator correspondence that connects the local on-shell amplitude to the operator producing such amplitude has been extensively used in enumerating operator bases for different kinds of effective field theories [5, 7, 32–37]. Since our method of operator construction relies on the amplitude-operator correspondence, we will briefly introduce the spinor-helicity formalism and discuss the amplitude-operator correspondence first in this section. Then we present the building blocks and operator basis under circumstances where the neutrinos are Dirac or Majorana type.

2.1 Spinor helicity amplitudes

We start by briefly reviewing relevant notation in the massive spinor-helicity formalism developed recently in ref. [38], which could be applied to both the νSMEFT and νLEFT in this work. Momenta in the four dimension space-time can always be presented in terms of functions of two spinors, such that

$$p_{\alpha\dot\alpha} = p_\mu \sigma^\mu_{\alpha\dot\alpha} = \begin{pmatrix} E + p_3 & p_1 - ip_2 \\ p_1 + ip_2 & E - p_3 \end{pmatrix} = \lambda^I_\alpha \tilde\lambda_{\dot\alpha I}, \quad p_\mu = \frac{1}{2}\tilde\lambda_{I\dot\alpha}\bar\sigma^{\dot\alpha\alpha}_\mu\lambda^I_\alpha, \tag{2.1}$$

where $\alpha, \dot\alpha$ are the $\mathrm{SU(2)}_L \times \mathrm{SU(2)}_R$ Lorentz indices, I denotes the $\mathrm{SU(2)}$ little group indices for massive particles, which can be omitted for massless particles. The Lorentz invariant brackets of the $\mathrm{SU(2)}_L \times \mathrm{SU(2)}_R$ group are defined as

$$\langle i^I j^J \rangle := \lambda^{I\alpha}_i \lambda^J_{j\alpha} = \lambda^I_{i\alpha}\epsilon^{\beta\alpha}\lambda^J_{j\beta} = -\langle j^J i^I \rangle, \qquad [i^I j^J] := \tilde\lambda^I_{i\dot\alpha}\tilde\lambda^{J\dot\alpha}_j = \tilde\lambda^I_{i\dot\alpha}\epsilon^{\dot\alpha\dot\beta}\tilde\lambda^J_{j\dot\beta} = -[j^J i^I]. \tag{2.2}$$

Here the 2-index Levi-Civita symbols are used to raise and lower the indices, defined as

$$\epsilon^{12} = -\epsilon^{21} = \epsilon_{21} = -\epsilon_{12} = 1, \quad \lambda^{\alpha I} = \epsilon^{\alpha\beta}\lambda^I_\beta, \quad \lambda_{\alpha I} = \epsilon_{IJ}\lambda^J_\alpha, \quad \tilde\lambda^{\dot\alpha I} = \epsilon^{\dot\alpha\dot\beta}\tilde\lambda^I_{\dot\beta}, \quad \tilde\lambda_{\dot\alpha I} = \epsilon_{IJ}\tilde\lambda^J_{\dot\alpha}. \tag{2.3}$$

$$\lambda^{I\alpha}\lambda^J_\alpha = -m\epsilon^{IJ}, \quad \tilde\lambda^I_{\dot\alpha}\tilde\lambda^{J\dot\alpha} = m\epsilon^{IJ}, \quad \lambda^I_\alpha\lambda_{\beta I} = m\epsilon_{\alpha\beta}, \quad \tilde\lambda^I_{\dot\alpha}\tilde\lambda_{\dot\beta I} = m\epsilon_{\dot\alpha\dot\beta}. \tag{2.4}$$

For massless fermion and gauge boson, the correspondences between the massless wave function and the helicity spinors follows

$$\epsilon^\mu_{i,+} = \frac{\langle\eta|^\alpha\sigma^\mu_{\alpha\dot\alpha}|i]^{\dot\alpha}}{\sqrt{2}\langle i\eta\rangle}, \quad \epsilon^\mu_{i,-} = \frac{\langle i|^\alpha\sigma^\mu_{\alpha\dot\alpha}|\eta]^{\dot\alpha}}{\sqrt{2}[i\eta]}, \quad u^+ = \begin{pmatrix} 0 \\ \tilde\lambda^{\dot\alpha} \end{pmatrix},$$

$$u^- = \begin{pmatrix} \lambda_\alpha \\ 0 \end{pmatrix}, \qquad \bar v^+ = \left(0,\ \tilde\lambda_{\dot\alpha}\right), \qquad \bar v^- = \left(\lambda^\alpha,\ 0\right), \tag{2.5}$$

where η is the reference spinor parametrizing the gauge redundancy since its value does not affect on the full amplitude. Notice that we adopt the in-coming momentum convention for all momenta, therefore only $u, \bar{v}$ appear as the in-coming fermions and anti-fermions. $\{\pm\}$ show the helicities of the particles. For massive fermions, the following forms are taken

$$u^I = \begin{pmatrix} \lambda_\alpha^I \\ \tilde{\lambda}^{\dot{\alpha}I} \end{pmatrix}, \quad \bar{v}^I = \begin{pmatrix} \lambda^{\alpha I}, & \tilde{\lambda}_{\dot{\alpha}}^I \end{pmatrix}. \tag{2.6}$$

With the above replacement rules, the on-shell amplitudes can be written as functions of helicity spinors

$$\mathcal{A}(\cdots, \epsilon_i, p_i, u_j, p_j, \cdots) = \mathcal{A}(\cdots, \lambda_i, \tilde{\lambda}_i, \lambda_j, \tilde{\lambda}_j, \cdots) \tag{2.7}$$

Therefore, the on-shell amplitude should contain the following building blocks for massless and massive particles of different helicities and spins respectively

helicity h massless particle with spinor variables $(\lambda, \tilde{\lambda})$: $\quad \mathcal{A} \supset \begin{cases} \lambda_{\{\alpha\}}^{r-2h} \tilde{\lambda}_{\{\dot{\alpha}\}}^r, & h \leq 0 \\ \lambda_{\{\alpha\}}^r \tilde{\lambda}_{\{\dot{\alpha}\}}^{r+2h}, & h \geq 0 \end{cases}$
$$\tag{2.8}$$

spin S massive particle with spinor variables $(\lambda^I, \tilde{\lambda}^I)$: $\quad \mathcal{A} \supset \left(\lambda_{\{\alpha\}}^{r+2S-n} \tilde{\lambda}_{\{\dot{\alpha}\}}^{r+n} \right)^{\{I_1 \cdots I_{2S}\}},$
$$0 \leq n \leq 2S \tag{2.9}$$

where r could be any positive integer, and $\{\cdot\}$ denotes totally symmetric indices.

2.2 Amplitude-operator correspondence

According to the amplitude-operator correspondence introduced in refs. [5, 7, 32–37], it is straightforward to convert any local operators to the on-shell amplitudes using the spinor-helicity formalism introduced above. Firstly, it is necessary to translate the fields in an operator into representations of the $\mathrm{SU}(2)_L \times \mathrm{SU}(2)_R$ group, following eq. (2.1) and eq. (2.5)

$$\gamma^\mu = \begin{pmatrix} 0 & \sigma_{\alpha\dot{\alpha}}^\mu \\ \bar{\sigma}^{\mu\dot{\alpha}\alpha} & 0 \end{pmatrix}, \qquad \Psi = \begin{pmatrix} \xi_\alpha \\ \chi^{\dagger\dot{\alpha}} \end{pmatrix}, \qquad \Psi_M = \begin{pmatrix} \zeta_\alpha \\ \zeta^{\dagger\dot{\alpha}} \end{pmatrix}, \tag{2.10}$$

$$\Psi_\mathrm{L} = \frac{1-\gamma_5}{2}\Psi = \begin{pmatrix} \xi_\alpha \\ 0 \end{pmatrix}, \quad \Psi_\mathrm{R} = \frac{1+\gamma_5}{2}\Psi = \begin{pmatrix} 0 \\ \chi^{\dagger\dot{\alpha}} \end{pmatrix}, \tag{2.11}$$

$$D^\mu = \frac{1}{2}D_{\alpha\dot{\alpha}}\bar{\sigma}^{\mu\dot{\alpha}\alpha}, \qquad F_\mathrm{L}^{\mu\nu} = \frac{1}{4}F_{\mathrm{L}\alpha\beta}\epsilon_{\dot{\alpha}\dot{\beta}}\bar{\sigma}^{\mu\dot{\alpha}\alpha}\bar{\sigma}^{\nu\dot{\beta}\beta}, \quad F_\mathrm{R}^{\mu\nu} = \frac{1}{4}F_{\mathrm{R}\dot{\alpha}\dot{\beta}}\epsilon_{\alpha\beta}\bar{\sigma}^{\mu\dot{\alpha}\alpha}\bar{\sigma}^{\nu\dot{\beta}\beta}, \tag{2.12}$$

where ξ, χ and ζ are left-handed Weyl fermions, Ψ and Ψ_M denote Dirac and Majorana fermions respectively. $F_{\mathrm{L/R}} = \frac{1}{2}(F \mp i\tilde{F})$ are the chiral basis of gauge bosons which has definite helicities for the bosons. The for the bilinear fermion fields, we take the following

rules to obtain the on-shell amplitudes

$$\bar{\Psi}_1\Psi_2 = \bar{\Psi}_{L1}\Psi_{R2} + \bar{\Psi}_{R1}\Psi_{L2} \qquad \rightarrow \qquad \bar{v}_1^I u_2^J = \lambda_1^{\alpha I}\lambda_{2\alpha}^J + \tilde{\lambda}_{1\dot{\alpha}}^I\tilde{\lambda}_2^{\dot{\alpha}J} = \langle 1^I 2^J\rangle + [1^I 2^J], \tag{2.13}$$

$$\bar{\Psi}_1\gamma_5\Psi_2 = \bar{\Psi}_{L1}\Psi_{R2} - \bar{\Psi}_{R1}\Psi_{L2} \qquad \rightarrow \qquad \bar{v}_1^I\gamma_5 u_2^J = [1^I 2^J] - \langle 1^I 2^J\rangle, \tag{2.14}$$

$$\bar{\Psi}_1\gamma^\mu\Psi_2 = \bar{\Psi}_{R1}\gamma^\mu\Psi_{R2} + \bar{\Psi}_{L1}\gamma^\mu\Psi_{L2} \quad \rightarrow \quad \bar{v}_1^I\gamma^\mu u_2^J = \langle 1^I|\sigma^\mu|2^J] + [1^I|\bar{\sigma}^\mu|2^J\rangle, \tag{2.15}$$

$$\bar{\Psi}_1\gamma^\mu\gamma_5\Psi_2 = \bar{\Psi}_{R1}\gamma^\mu\Psi_{R2} - \bar{\Psi}_{L1}\gamma^\mu\Psi_{L2} \quad \rightarrow \quad \bar{v}_1^I\gamma^\mu\gamma_5 u_2^J = \langle 1^I|\sigma^\mu|2^J] - [1^I|\bar{\sigma}^\mu|2^J\rangle, \tag{2.16}$$

$$F_{L\mu\nu}O^{\mu\nu} = \frac{1}{4}\lambda_\alpha\lambda_\beta\left(O^{\mu\nu}\sigma_\nu\bar{\sigma}_\mu\right)^{\alpha\beta}, \qquad\qquad F_{R\mu\nu}O^{\mu\nu} = \frac{1}{4}\tilde{\lambda}_{\dot{\alpha}}\tilde{\lambda}_{\dot{\beta}}\left(O^{\mu\nu}\bar{\sigma}_\mu\sigma_\nu\right)^{\dot{\alpha}\dot{\beta}}, \tag{2.17}$$

where eq. (2.5), (2.6) are used, and from which the correspondences between a single spinor variable and chiral fermion can be directly identified:

$$\lambda_i^I \rightarrow \psi_i = \Psi_{Li}, \bar{\Psi}_{Ri} \text{ or } \Psi_{Mi}, \quad \tilde{\lambda}_i^I \rightarrow \psi_i^\dagger = \bar{\Psi}_{Li}, \Psi_{Ri} \text{ or } \bar{\Psi}_{Mi}. \tag{2.18}$$

Furthermore, for a massive particle, when multiple spinors are present, the pair of spinor helicity variables $\lambda_i^J\tilde{\lambda}_{iJ}$ with contracted little group indices can be translated into derivative acting on particle i yielding the following correspondences:

$$\lambda_i^I\left(\lambda_i^J\tilde{\lambda}_{iJ}\right)^n \Leftrightarrow D^n\psi_i, \quad \tilde{\lambda}_i^I\left(\lambda_i^J\tilde{\lambda}_{iJ}\right)^n \Leftrightarrow D^n\psi_i^\dagger, \tag{2.19}$$

while for the massless particles, the correspondence remains the same as in refs. [5, 7, 12, 32–37]:

$$\lambda_i^{n+2}\tilde{\lambda}_i^n \Leftrightarrow D^n F_{Li}, \quad \lambda_i^n\tilde{\lambda}_i^{n+2} \Leftrightarrow D^n F_{Ri}, \tag{2.20}$$

$$\lambda_i^{n+1}\tilde{\lambda}_i^n \Leftrightarrow D^n\psi_i, \quad \lambda_i^n\tilde{\lambda}_i^{n+1} \Leftrightarrow D^n\psi_i^\dagger. \tag{2.21}$$

There are two comments in order. First, the additional interactions with more gauge bosons generated by covariant derivative are not taken into account, because our amplitude operator correspondence applies to local amplitudes only. These vertices are not gauge invariant, and only contribute to parts of non-local gauge invariant amplitude. Second, the IBP relation in operator construction is equivalent to the momentum conservation in on-shell amplitudes. Therefore the IBP redundancy is taken care of via manifesting momentum conservation, which will be treated in the next section.

2.3 Building blocks: Majorana verse Dirac neutrinos

The building blocks of νSMEFT and νLEFT are shown in tables 1 and 2 respectively. Regarding the building blocks of νSMEFT, we choose all fields to be left-handed. For example, we choose $N_{\mathbb{C}\alpha}$ (and its Hermitian conjugate $N_{\mathbb{C}}^{\dagger\dot{\alpha}}$) instead of $N^{\dot{\alpha}}$ to be the building block. The SM neutrinos ν_α form a $SU(2)_W$ doublet L_α along with electrons e_α, while the right-handed neutrinos are singlets of $SU(2)_W$. Thus, we present the leptons as (chiral) Dirac spinors in our result:

$$l_L = \begin{pmatrix} L_\alpha \\ 0 \end{pmatrix}, \quad N_R = \begin{pmatrix} 0 \\ N_{\mathbb{C}}^{\dagger\dot{\alpha}} \end{pmatrix}, \tag{2.22}$$

Fields	$\mathrm{SU}(2)_l \times \mathrm{SU}(2)_r$	h	$\mathrm{SU}(3)_C$	$\mathrm{SU}(2)_W$	$\mathrm{U}(1)_Y$	Flavor	B	L
$G^A_{\mathrm{L}\alpha\beta}$	$(1,0)$	-1	$\mathbf{8}$	$\mathbf{1}$	0	1	0	0
$W^I_{\mathrm{L}\alpha\beta}$	$(1,0)$	-1	$\mathbf{1}$	$\mathbf{3}$	0	1	0	0
$B_{\mathrm{L}\alpha\beta}$	$(1,0)$	-1	$\mathbf{1}$	$\mathbf{1}$	0	1	0	0
$L_{\alpha i}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	$\mathbf{2}$	$-1/2$	n_f	0	1
$N_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	$\mathbf{1}$	0	n_f	0	-1
$e_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	$\mathbf{1}$	1	n_f	0	-1
$Q_{\alpha a i}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{3}$	$\mathbf{2}$	$1/6$	n_f	$1/3$	0
$u^a_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\overline{\mathbf{3}}$	$\mathbf{1}$	$-2/3$	n_f	$-1/3$	0
$d^a_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\overline{\mathbf{3}}$	$\mathbf{1}$	$1/3$	n_f	$-1/3$	0
H_i	$(0,0)$	0	$\mathbf{1}$	$\mathbf{2}$	$1/2$	1	0	0

Table 1. The field content of the νSMEFT, along with their representations under the Lorentz and gauge symmetries, where $N_{\mathbb{C}}$ denote the right-handed neutrinos. The representation under Lorentz group is denoted by (j_l, j_r), while the helicity of the field is given by $h = j_r - j_l$. The number of fermion flavors is denoted as n_f, which is 3 in the standard model. Their global charges, baryon number B and lepton number L are also listed. All of the fields are accompanied with their Hermitian conjugates that are omitted, $(F_{\mathrm{L}\alpha\beta})^\dagger = F_{\mathrm{R}\dot\alpha\dot\beta}$ for gauge bosons, $(\psi_\alpha)^\dagger = (\psi^\dagger)_{\dot\alpha}$ for fermions, and $H^\dagger$ for the Higgs, which are under the conjugate representations of all the groups.

Fields	$\mathrm{SU}(2)_l \times \mathrm{SU}(2)_r$	h	$\mathrm{SU}(3)_C$	$\mathrm{U}(1)_{\mathrm{EM}}$	Flavor	B	L
$G^A_{\mathrm{L}\alpha\beta}$	$(1,0)$	-1	$\mathbf{8}$	0	1	0	0
$F_{\mathrm{L}\alpha\beta}$	$(1,0)$	-1	$\mathbf{1}$	0	1	0	0
ν_α	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	0	n_ν	0	1
$N_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	0	n_ν	0	-1
e_α	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	-1	n_e	0	1
$e_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{1}$	1	n_e	0	-1
$u_{\alpha a}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{3}$	$2/3$	n_u	$1/3$	0
$u^a_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\overline{\mathbf{3}}$	$-2/3$	n_u	$-1/3$	0
$d_{\alpha a}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\mathbf{3}$	$-1/3$	n_d	$1/3$	0
$d^a_{\mathbb{C}\alpha}$	$\left(\frac{1}{2},0\right)$	$-1/2$	$\overline{\mathbf{3}}$	$1/3$	n_d	$-1/3$	0

Table 2. The field content of the νLEFT. The numbers of neutrino flavors, electron flavors, u-type quark flavors and d-type quark flavors are denoted as n_ν, n_e, n_u and n_d respectively with $n_\nu = 3$, $n_e = 3$, $n_u = 2$ and $n_d = 3$ in νLEFT.

where l_L and N_R are four-component chiral Dirac fields with $L_\alpha = \left(\nu_\alpha, e_\alpha \right)^T$ two-component $\mathrm{SU}(2)_W$ doublet. For the building blocks of νLEFT, where the $\mathrm{SU}(2)_W$ symmetry is broken, the notation which writes neutrinos changes to

$$\nu_{\mathrm{L}} = \begin{pmatrix} \nu_\alpha \\ 0 \end{pmatrix} \tag{2.23}$$

$$N_{\mathrm{R}} = \begin{pmatrix} 0 \\ N_{\mathbb{C}}^{\dagger\dot\alpha} \end{pmatrix}. \tag{2.24}$$

It is an interesting question as whether the neutrinos are of Dirac type or of Majorana type. Since the neutrinos are neutral after the electroweak symmetry breaking, they are generically Majorana fermions. All massive fermions consist of two-component spinors with Majorana masses, whilst a pair of them can be written as a Dirac fermion if and only if there is an SO(2) global symmetry

$$\mathcal{L} \supset -m\xi_1\xi_1 - m\xi_2\xi_2 + h.c., \qquad \begin{pmatrix} \xi_1 \\ \xi_2 \end{pmatrix} \xrightarrow{\mathrm{SO}(2)} \begin{pmatrix} \cos\phi & -\sin\phi \\ \sin\phi & \cos\phi \end{pmatrix} \begin{pmatrix} \xi_1 \\ \xi_2 \end{pmatrix}. \tag{2.25}$$

In our case, the left-handed neutrino and a right-handed counterpart could be their complexification

$$\nu = \xi_1 + i\xi_2 \quad N_{\mathbb{C}} = \xi_1 - i\xi_2, \qquad \mathcal{L} \supset -m\nu N_{\mathbb{C}} + h.c. \tag{2.26}$$

The SO(2) symmetry becomes an opposite phase shift for $\nu \to e^{i\phi}\nu_L$ and $N_{\mathbb{C}} \to e^{-i\phi}N_{\mathbb{C}}$ that can be identified as the lepton number $\mathrm{U}(1)_L$.[1] Therefore, from the EFT point of view, any $\mathrm{U}(1)_L$ violating effect could result in the breaking of the SO(2) symmetry. Since the unbroken SO(2) allows us to combine the neutrinos into a Dirac fermion as

$$\nu_D = \begin{pmatrix} \nu_L \\ N_R \end{pmatrix}, \qquad \mathcal{L} \supset -m\bar\nu_D\nu_D, \tag{2.27}$$

we conclude that the Dirac neutrino is just a notation allowed by the existence of an exact $\mathrm{U}(1)_L$ symmetry, hence the question is replaced by whether the $\mathrm{U}(1)_L$ violating operators are turned on in the νSMEFT. Once they are turned on, we get the Majorana neutrino, whose four-component form is

$$\nu_M = \begin{pmatrix} \nu_\alpha \\ \nu_{\mathbb{C}}^{\dot\alpha} \end{pmatrix}, \quad N_M = \begin{pmatrix} N_{\mathbb{C}\alpha} \\ N^{\dot\alpha} \end{pmatrix}, \tag{2.28}$$

where $\nu_{\mathbb{C}}^{\dot\alpha} = \nu^{\dagger\dot\alpha}$ and $N^{\dot\alpha} = N_{\mathbb{C}}^{\dagger\dot\alpha}$. We show the complete list of the $\mathrm{U}(1)_L$ violating operators in the paper, which should contain the answer. For generality, we stick to the chiral fermion notation eq. (2.22)–(2.24) throughout the paper.

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[1]Consider the $\mathrm{U}(1)^7$ phase symmetry of the field content $H, Q, L, u_{\mathbb{C}}, d_{\mathbb{C}}, e_{\mathbb{C}}, N_{\mathbb{C}}$ in the νSMEFT, broken by the 3 Standard Model Yukawa's and an additional Yukawa for neutrinos $HLN_{\mathbb{C}}$ down to $\mathrm{U}(1)^3$, one of which gauged to be $\mathrm{U}(1)_{\mathrm{EM}}$. The remaining two $\mathrm{U}(1)'s$ are conventionally divided into Baryon number $\mathrm{U}(1)_B$ and Lepton number $\mathrm{U}(1)_L$, and by definition, the neutrinos carry no Baryon numbers. Hence the $\mathrm{U}(1)$ symmetry for neutrinos has to be the Lepton number $\mathrm{U}(1)_L$.

3 Operator basis

In this section, we will briefly introduce the Young Tensor method to obtain the complete operator bases of νSMEFT and νLEFT, then give a specific example of the method. More details can be found in refs. [5, 7, 12].

3.1 Operator construction using Young tensor

The independent Lorentz structures of a certain class corresponding to amplitudes of N particles containing $2n$ λs and $2\tilde{n}$ $\tilde{\lambda}$s can be presented as SU(N) semi-standard Young tableaux (SSYTs) of a so-called primary Young diagram. The primary Young diagram is as follows,

$$Y_{N,n,\tilde{n}} \quad = \quad N-2 \left\{ \begin{array}{c} \overbrace{}^{n} \\ \end{array} \right. \underbrace{}_{\tilde{n}} . \tag{3.1}$$

The number of certain indices i to be filled in the primary Young diagram to form SSYTs is determined by $\#i = \tilde{n} - 2h_i$, where h_i denotes the helicity of the ith particle in the class and the set $\{h_i\}$ are sorted in the order $h_i \leq h_{i+1}$, $i = 1, \cdots, N$. The Fock's condition of Young tableaux corresponds to the IBP relation and the Schouten identities of operators, and the SSYTs obtained in this way form a complete and independent amplitude basis that spans a subspace of the representation $Y_{N,n,\tilde{n}}$ of the auxiliary SU(N) group. The correspondence between SSYTs and amplitudes translates columns of SSYTs into brackets using the following rules

$$\boxed{\begin{array}{c} i \\ j \end{array}} \sim \langle ij \rangle, \qquad \boxed{\begin{array}{c} k_1 \\ k_2 \\ \vdots \\ k_{N-3} \\ k_{N-2} \end{array}} \sim \mathcal{E}^{k_1 \ldots k_{N-2} ij}[ij]. \tag{3.2}$$

An concrete example of this correspondence is demonstrated in eq. (3.8) and eq. (3.9). So far, we manage the massless particles except for the massive Majorana neutrino. As discussed in ref. [12], we show that our algorithm for finding the massive amplitude basis can be directly applied to the theory with massive particle of spin $S = 0, 1/2$, because the following one to one correspondence between massless and massive amplitudes exists:

$$\begin{aligned}
h = 0 & \qquad \lambda^r \tilde{\lambda}^r \longrightarrow \left(\lambda^J \tilde{\lambda}_J \right)^r & S = 0, & \quad n = 0 \\
h = -\frac{1}{2} & \quad \lambda^{1+r} \tilde{\lambda}^r \longrightarrow \lambda^I \left(\lambda^J \tilde{\lambda}_J \right)^r & S = \frac{1}{2}, & \quad n = 0 \\
h = \frac{1}{2} & \quad \lambda^r \tilde{\lambda}^{1+r} \longrightarrow \tilde{\lambda}^I \left(\lambda^J \tilde{\lambda}_J \right)^r & S = \frac{1}{2}, & \quad n = 1.
\end{aligned} \tag{3.3}$$

Therefore we treat the massive Majorana neutrino as a massless particle in our method, finding the operator basis for a given dimension. Taking into account the amplitude-operator correspondence introduced in eq. (2.18) to eq. (2.21), one can further translate the amplitudes to operators as an example showed in eq. (3.10).

The independent gauge structures of a certain type contain the Levi-Civita tensors contracted with fundamental gauge group indices of building blocks. Other representations, such as anti-fundamental and adjoint representations, can be converted to the one with fundamental indices only, which corresponds to a particular Young tableau as shown in the following examples,

$$
\begin{aligned}
\epsilon_{acd}\lambda^{A\,d}_{\ b}G^A = G_{abc} &\sim \begin{array}{|c|c|}\hline a & b \\\hline c \\\cline{1-1}\end{array}, \\
\epsilon_{abc}Q^{\dagger,c} = Q^\dagger_{ab} &\sim \begin{array}{|c|}\hline a \\\hline b \\\hline\end{array}, \\
\epsilon_{jk}\tau^{I\,k}_{\ i}W^I = W_{ij} &\sim \begin{array}{|c|c|}\hline i & j \\\hline\end{array}, \\
\epsilon_{ij}H^{\dagger,j} = H_i &\sim \begin{array}{|c|}\hline i \\\hline\end{array}.
\end{aligned}
\tag{3.4}
$$

Then the independent gauge structures are obtained using the modified Littlewood-Richardson rule which applies to the Young tableaux [5].

If there are repeated fields in an operator, more redundancies emerge since certain permutation symmetries of flavor indices are supposed to vanish due to permutation symmetries of the Lorentz and gauge structures and spin-statistics of identical particles. To remove these redundancies, we introduce the projectors [5] to pick out the permutation symmetries of Lorentz and gauge structures and obtain the operators with allowed permutation symmetries of flavor indices through inner product decomposition, since the effect of permuting flavor indices is equivalent to that of permuting gauge and Lorentz structures:

$$
\underbrace{\pi \circ \mathcal{O}^{\{f_k,\dots\}}}_{\text{permute flavor}} = \underbrace{\left(\pi \circ T_{\text{SU3}}^{\{g_k,\dots\}}\right)\left(\pi \circ T_{\text{SU2}}^{\{h_k,\dots\}}\right)}_{\text{permute gauge}}\underbrace{\left(\pi \circ \mathcal{M}^{\{f_k,\dots\}}_{\{g_k,\dots\},\{h_k,\dots\}}\right)}_{\text{permute Lorentz}}.
\tag{3.5}
$$

After an extra step to simplify the result while keeping track of the permutation symmetries, which we called de-symmetrization, the final result is expressed as $\mathcal{Y}^{[\lambda]}_x \circ \mathcal{O}^{(\mathrm{m})}_i$, where $\mathcal{Y}^{[\lambda]}_x$ is the xth Young symmetrizer of the S_n group representation λ, and $\mathcal{O}^{(\mathrm{m})}_i$ is a monomial. For example,

$$
\begin{aligned}
\mathcal{Y}^{[3]}_1 O^{prs} &= \mathcal{Y}\left[\begin{array}{|c|c|c|}\hline p & r & s \\\hline\end{array}\right] O^{prs} = O^{prs} + O^{rps} + O^{psr} + O^{rsp} + O^{srp} + O^{spr}, \\
\mathcal{Y}^{[2,1]}_1 O^{prs} &= \mathcal{Y}\left[\begin{array}{|c|c|}\hline p & r \\\hline s \\\cline{1-1}\end{array}\right] O^{prs} = O^{prs} + O^{rps} - O^{srp} - O^{spr}, \\
\mathcal{Y}^{[1^3]}_1 O^{prs} &= \mathcal{Y}\left[\begin{array}{|c|}\hline p \\\hline r \\\hline s \\\hline\end{array}\right] O^{prs} = O^{prs} - O^{rps} - O^{psr} + O^{rsp} - O^{srp} + O^{spr}.
\end{aligned}
\tag{3.6}
$$

The action of a Young symmetrizer can also be interpreted as acting on the Wilson coefficient tensor instead of the operator since

$$
\sum_{p_i} C_{p_1 p_2 \dots p_n}\left(\mathcal{Y}[\lambda]\mathcal{O}^{p_1 p_2 \dots p_n}\right) = \sum_{p_i}\left(\mathcal{Y}^{-1}[\lambda]C_{p_1 p_2 \dots p_n}\right)\mathcal{O}^{p_1 p_2 \dots p_n},
\tag{3.7}
$$

where $\mathcal{Y}^{-1}[\lambda]$ means taking inverse of each constituting permutation in $\mathcal{Y}[\lambda]$. $\mathcal{Y}^{-1}[\lambda]C_{p_1p_2...p_n}$ will project out the λ irreducible representation of S_n group in terms of the Wilson coefficient $C_{p_1p_2...p_n}$, and the operator is still a monomial in this case. An explicit example will be given in section 3.2.

3.2 Procedure and example

Before getting started, we should clarify some terminology that will be used in the following content.

- Class: A (Lorentz) class is formed by abstract fields that are Lorentz irreducible representations and covariant derivatives.

- Type: Substituting the specific fields of νSMEFT/νLEFT into each class, the combination of fields (and covariant derivatives) that can form gauge invariant is called a type.

- Term: In each type, we organize Lorentz and gauge invariant flavor tensors into different irreducible representations of the symmetric group of flavor indices, and each of the irreducible representations is called a term.

- Operator (flavor-specified): Each flavor-specified component of a term viewed as an irreducible flavor tensor is an operator.

Let us take the operator type $LN_{\mathbb{C}}^3HD^2$ as an example. The independent Lorentz structures are presented by the following SSYTs.

$$
\begin{array}{llllll}
\begin{array}{|c|c|c|c|}\hline 1&1&3&3\\\hline 2&2&4&4\\\hline 5\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&3&3\\\hline 2&2&4&5\\\hline 4\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&3&4\\\hline 2&2&4&5\\\hline 3\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&2\\\hline 3&3&4&4\\\hline 5\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&2\\\hline 3&3&4&5\\\hline 4\\\cline{1-1}\end{array} \\[2.5em]
\begin{array}{|c|c|c|c|}\hline 1&1&2&4\\\hline 2&3&3&5\\\hline 4\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&4\\\hline 2&3&4&5\\\hline 3\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&3\\\hline 2&4&4&5\\\hline 3\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&3\\\hline 2&3&4&4\\\hline 5\\\cline{1-1}\end{array} &
\begin{array}{|c|c|c|c|}\hline 1&1&2&3\\\hline 2&3&4&5\\\hline 4\\\cline{1-1}\end{array}
\end{array} \tag{3.8}
$$

These SSYTs are independent and complete, and any non-SSYT can be converted to SSTYs with the Fock's conditions [39], thus form the so-called y-basis (Young tableau basis) of this type and can be interpreted as amplitudes using eq. (3.2)

$$
\begin{array}{lllll}
\langle 12\rangle\langle 34\rangle^2[34] & -\langle 12\rangle\langle 34\rangle\langle 35\rangle[35] & \langle 12\rangle\langle 34\rangle\langle 45\rangle[45] & -\langle 13\rangle\langle 24\rangle^2[24] & \langle 13\rangle\langle 24\rangle\langle 25\rangle[25] \\
-\langle 13\rangle\langle 23\rangle\langle 45\rangle[35] & \langle 13\rangle\langle 24\rangle\langle 45\rangle[45] & \langle 14\rangle\langle 24\rangle\langle 35\rangle[45] & \langle 13\rangle\langle 24\rangle\langle 34\rangle[34] & -\langle 13\rangle\langle 24\rangle\langle 35\rangle[35].
\end{array} \tag{3.9}
$$

Furthermore, the y-basis can be expressed as Lorentz structures of operators using the

amplitude-operator correspondence eq. (2.18)-(2.21), and the basis vectors are

$$
\begin{aligned}
\mathcal{M}_1^{\text{y}} &= L_1^\alpha N_{\mathbb{C}2\alpha} \, (DN_{\mathbb{C}3})_{\dot\alpha}^{\beta\gamma} \, (DN_{\mathbb{C}4})_{\beta\gamma}^{\dot\alpha} \, H_5, \\
\mathcal{M}_2^{\text{y}} &= -L_1^\alpha N_{\mathbb{C}2\alpha} \, (DN_{\mathbb{C}3})_{\dot\alpha}^{\beta\gamma} \, N_{\mathbb{C}4\beta} \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_3^{\text{y}} &= L_1^\alpha N_{\mathbb{C}2\alpha} N_{\mathbb{C}3}{}^\beta \, (DN_{\mathbb{C}4})_{\beta\dot\alpha}^\gamma \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_4^{\text{y}} &= -L_1^\alpha \, (DN_{\mathbb{C}2})_{\dot\alpha}^{\beta\gamma} \, N_{\mathbb{C}3\alpha} \, (DN_{\mathbb{C}4})_{\beta\gamma}^{\dot\alpha} \, H_5, \\
\mathcal{M}_5^{\text{y}} &= L_1^\alpha \, (DN_{\mathbb{C}2})_{\dot\alpha}^{\beta\gamma} \, N_{\mathbb{C}3\alpha} N_{\mathbb{C}4\beta} \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_6^{\text{y}} &= -L_1^\alpha N_{\mathbb{C}2}{}^\beta \, (DN_{\mathbb{C}3})_{\alpha\beta\dot\alpha} \, N_{\mathbb{C}4}{}^\gamma \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_7^{\text{y}} &= L_1^\alpha N_{\mathbb{C}2}{}^\beta N_{\mathbb{C}3\alpha} \, (DN_{\mathbb{C}4})_{\beta\dot\alpha}^\gamma \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_8^{\text{y}} &= L_1^\alpha N_{\mathbb{C}2}{}^\beta N_{\mathbb{C}3}{}^\gamma \, (DN_{\mathbb{C}4})_{\alpha\beta\dot\alpha} \, (DH_5)_\gamma^{\dot\alpha}, \\
\mathcal{M}_9^{\text{y}} &= L_1^\alpha N_{\mathbb{C}2}{}^\beta \, (DN_{\mathbb{C}3})_{\alpha\dot\alpha}^\gamma \, (DN_{\mathbb{C}4})_{\beta\gamma}^{\dot\alpha} \, H_5, \\
\mathcal{M}_{10}^{\text{y}} &= -L_1^\alpha N_{\mathbb{C}2}{}^\beta \, (DN_{\mathbb{C}3})_{\alpha\dot\alpha}^\gamma \, N_{\mathbb{C}4\beta} \, (DH_5)_\gamma^{\dot\alpha}.
\end{aligned}
\tag{3.10}
$$

The m-basis of this type, which independent monomial operators span, can be obtained by converting $D_{\alpha\beta}$ to D_μ and finding the independent monomials, which in this case are

$$
\begin{aligned}
\mathcal{M}_1^{\text{m}} &= (L_{pi}N_{\mathbb{C}r}) \, (D_\mu N_{\mathbb{C}s} D^\mu N_{\mathbb{C}t}) \, H_j, \\
\mathcal{M}_2^{\text{m}} &= (L_{pi}N_{\mathbb{C}r}) \, (D_\mu N_{\mathbb{C}s} N_{\mathbb{C}t}) \, D^\mu H_j, \\
\mathcal{M}_3^{\text{m}} &= (L_{pi}N_{\mathbb{C}r}) \, (N_{\mathbb{C}s} D_\mu N_{\mathbb{C}t}) \, D^\mu H_j, \\
\mathcal{M}_4^{\text{m}} &= (L_{pi}N_{\mathbb{C}s}) \, (D_\mu N_{\mathbb{C}r} D^\mu N_{\mathbb{C}t}) \, H_j, \\
\mathcal{M}_5^{\text{m}} &= (L_{pi}N_{\mathbb{C}s}) \, (D_\mu N_{\mathbb{C}r} N_{\mathbb{C}t}) \, D^\mu H_j, \\
\mathcal{M}_6^{\text{m}} &= (L_{pi}N_{\mathbb{C}t}) \, (N_{\mathbb{C}r} D_\mu N_{\mathbb{C}s}) \, D^\mu H_j, \\
\mathcal{M}_7^{\text{m}} &= i \, (L_{pi}\sigma_{\mu\nu}N_{\mathbb{C}t}) \, (N_{\mathbb{C}r} D^\mu N_{\mathbb{C}s}) \, D^\nu H_j, \\
\mathcal{M}_8^{\text{m}} &= (L_{pi}N_{\mathbb{C}s}) \, (N_{\mathbb{C}r} D_\mu N_{\mathbb{C}t}) \, D^\mu H_j, \\
\mathcal{M}_9^{\text{m}} &= i \, (L_{pi}\sigma_{\mu\nu}N_{\mathbb{C}s}) \, (N_{\mathbb{C}r} D^\mu N_{\mathbb{C}t}) \, D^\nu H_j, \\
\mathcal{M}_{10}^{\text{m}} &= i \, (L_{pi}\sigma_{\mu\nu}N_{\mathbb{C}r}) \, (D^\mu N_{\mathbb{C}s} D^\nu N_{\mathbb{C}t}) \, H_j.
\end{aligned}
\tag{3.11}
$$

After obtaining the m-basis, we can symmetrize the Lorentz structures into irreducible representations with regards to permutation of flavor indices of the repeated fields $N_{\mathbb{C}}$, which form the so-called p-basis Lorentz structures (symmetric permutation basis) $\mathcal{M}_x^{\lambda,\xi}$

$$
\begin{pmatrix}
\mathcal{M}_1^{[3],1} \\
\mathcal{M}_1^{[3],2} \\
\mathcal{M}_1^{[2,1],1} \\
\mathcal{M}_2^{[2,1],1} \\
\mathcal{M}_1^{[2,1],2} \\
\mathcal{M}_2^{[2,1],2} \\
\mathcal{M}_1^{[2,1],3} \\
\mathcal{M}_2^{[2,1],3} \\
\mathcal{M}_1^{[1^3],1} \\
\mathcal{M}_1^{[1^3],2}
\end{pmatrix}
=
\begin{pmatrix}
0 & -\frac{2}{3} & 0 & 0 & \frac{2}{3} & \frac{1}{6} & -\frac{1}{6} & -\frac{1}{2} & \frac{1}{6} & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 0 \\
\frac{2}{3} & 0 & 0 & -\frac{2}{3} & 0 & 0 & 0 & 0 & 0 & 0 \\
-\frac{2}{3} & -\frac{2}{3} & 0 & \frac{2}{3} & \frac{2}{3} & -1 & -\frac{1}{3} & \frac{2}{3} & 0 & \frac{2}{3} \\
0 & 0 & \frac{2}{3} & 0 & 0 & -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} & -\frac{1}{3} & 0 \\
0 & -\frac{2}{3} & 0 & 0 & 0 & -\frac{1}{3} & -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} & 0 \\
0 & \frac{2}{3} & \frac{4}{3} & 0 & -\frac{2}{3} & -\frac{1}{3} & \frac{1}{3} & -\frac{1}{3} & -\frac{1}{3} & 0 \\
0 & -\frac{2}{3} & 0 & 0 & -\frac{2}{3} & \frac{2}{3} & 0 & \frac{2}{3} & 0 & 0 \\
\frac{2}{3} & -\frac{2}{3} & 0 & \frac{4}{3} & \frac{2}{3} & -1 & -\frac{1}{3} & \frac{2}{3} & 0 & \frac{2}{3} \\
0 & -\frac{2}{3} & -\frac{2}{3} & 0 & 0 & -\frac{1}{2} & -\frac{1}{6} & -\frac{1}{2} & \frac{1}{6} & 0
\end{pmatrix}
\begin{pmatrix}
\mathcal{M}_1^{\text{m}} \\
\mathcal{M}_2^{\text{m}} \\
\mathcal{M}_3^{\text{m}} \\
\mathcal{M}_4^{\text{m}} \\
\mathcal{M}_5^{\text{m}} \\
\mathcal{M}_6^{\text{m}} \\
\mathcal{M}_7^{\text{m}} \\
\mathcal{M}_8^{\text{m}} \\
\mathcal{M}_9^{\text{m}} \\
\mathcal{M}_{10}^{\text{m}}
\end{pmatrix},
\tag{3.12}
$$

where λ denotes the representation of the symmetric group, and $x = 1, \cdots, d_\lambda$. ξ is the multiplicity of the representation. As we can see, the symmetrization procedure here is a full-rank conversion matrix that converts m-basis vectors to p-basis vectors, which guarantees the independence and completeness of the p-basis. Here one subtlety emerges, as we elaborated in ref. [5], the Grassmann nature of fermions needs to be taken into account, so the final permutation symmetry of Lorentz structure should be λ^{T} instead of λ.

The gauge group structure of this type is simple. After presenting the SU(2) representations of L and H as Young tableaux,

$$L_i \sim \boxed{i}, \ H_j \sim \boxed{j}, \tag{3.13}$$

we find that the only non-trivial $\mathrm{SU}(2)_W$ gauge group factor is

$$\boxed{\begin{array}{c} i \\ j \end{array}} \sim \epsilon^{ij} = T_{SU2}^m. \tag{3.14}$$

At last, the flavor structures of operators are determined by the inner-product decomposition of the Lorentz structures and the gauge structures. We denote the operators with certain flavor symmetries λ by $\mathcal{O}^{(\mathrm{p})}_{(\lambda,x),\xi}$ and find that

$$
\begin{pmatrix}
\mathcal{O}^{(\mathrm{p})}_{([1^3],1),1} \\
\mathcal{O}^{(\mathrm{p})}_{([1^3],1),2} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],1),1} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],2),1} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],1),2} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],2),2} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],1),3} \\
\mathcal{O}^{(\mathrm{p})}_{([2,1],2),3} \\
\mathcal{O}^{(\mathrm{p})}_{([3],1),1} \\
\mathcal{O}^{(\mathrm{p})}_{([3],1),2}
\end{pmatrix}
=
\begin{pmatrix}
0 & -\frac{2}{3} & 0 & 0 & \frac{2}{3} & \frac{1}{6} & -\frac{1}{6} & -\frac{1}{2} & \frac{1}{6} & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 0 \\
\frac{2}{3} & 0 & 0 & -\frac{2}{3} & 0 & 0 & 0 & 0 & 0 & 0 \\
-\frac{2}{3} & -\frac{2}{3} & 0 & \frac{2}{3} & \frac{2}{3} & -1 & -\frac{1}{3} & \frac{2}{3} & 0 & \frac{2}{3} \\
0 & 0 & \frac{2}{3} & 0 & 0 & -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} & -\frac{1}{3} & 0 \\
0 & -\frac{2}{3} & 0 & 0 & 0 & -\frac{1}{3} & -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} & 0 \\
0 & \frac{2}{3} & \frac{4}{3} & 0 & -\frac{2}{3} & -\frac{1}{3} & \frac{1}{3} & -\frac{1}{3} & -\frac{1}{3} & 0 \\
0 & -\frac{2}{3} & 0 & 0 & -\frac{2}{3} & \frac{2}{3} & 0 & \frac{2}{3} & 0 & 0 \\
\frac{2}{3} & -\frac{2}{3} & 0 & \frac{4}{3} & \frac{2}{3} & -1 & -\frac{1}{3} & \frac{2}{3} & 0 & \frac{2}{3} \\
0 & -\frac{2}{3} & -\frac{2}{3} & 0 & 0 & -\frac{1}{2} & -\frac{1}{6} & -\frac{1}{2} & \frac{1}{6} & 0
\end{pmatrix}
\begin{pmatrix}
\mathcal{M}_1^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_2^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_3^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_4^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_5^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_6^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_7^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_8^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_9^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}} \\
\mathcal{M}_{10}^{\mathrm{m}} T_{\mathrm{SU2}}^{\mathrm{m}}
\end{pmatrix}. \tag{3.15}
$$

It should be noted that the basis $\{\mathcal{O}^{(\mathrm{p})}_{(\lambda,x),\xi}\}$ is over complete, as discussed in ref. [5] and [40], so we only keep the $x = 1$ basis vector for each representations. Therefore the complete operator basis of type $LN_{\mathbb{C}}^3 HD^2$ is

$$\left\{ \mathcal{O}^{(\mathrm{p})}_{([1^3],1),1}, \ \mathcal{O}^{(\mathrm{p})}_{([1^3],1),2}, \ \mathcal{O}^{(\mathrm{p})}_{([2,1],1),1}, \ \mathcal{O}^{(\mathrm{p})}_{([2,1],1),2}, \ \mathcal{O}^{(\mathrm{p})}_{([2,1],1),3}, \ \mathcal{O}^{(\mathrm{p})}_{([3],1),1}, \ \mathcal{O}^{(\mathrm{p})}_{([3],1),2} \right\}. \tag{3.16}$$

The p-basis obtained above is very long. To simplify the form of the result, we apply the desymmetrization procedure [7] and express the operator basis as monomial flavor tensors with certain flavor symmetry λ, that is, $\mathcal{Y}_x^{[\lambda]} \circ \mathcal{O}_i^{(\mathrm{m})}$, called the p'-basis. In this

example, the p'-basis is

$$\mathcal{O}^{(\mathrm{p}')}_{([1^3],1),1} = \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] \epsilon^{ij} D^\mu H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(D_\mu N_{\mathbb{C}} s N_{\mathbb{C}} t\right),$$

$$\mathcal{O}^{(\mathrm{p}')}_{([1^3],1),2} = \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] i\epsilon^{ij} D^\nu H_j \left(L_{pi} \sigma_{\mu\nu} N_{\mathbb{C}} t\right) \left(N_{\mathbb{C}} r D^\mu N_{\mathbb{C}} s\right),$$

$$\mathcal{O}^{(\mathrm{p}')}_{([2,1],1),1} = \mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right] \epsilon^{ij} H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(D_\mu N_{\mathbb{C}} s D^\mu N_{\mathbb{C}} t\right),$$

$$\mathcal{O}^{(\mathrm{p}')}_{([2,1],1),2} = \mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right] \epsilon^{ij} D^\mu H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(D_\mu N_{\mathbb{C}} s N_{\mathbb{C}} t\right), \tag{3.17}$$

$$\mathcal{O}^{(\mathrm{p}')}_{([2,1],1),3} = \mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right] \epsilon^{ij} D^\mu H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(N_{\mathbb{C}} s D_\mu N_{\mathbb{C}} t\right),$$

$$\mathcal{O}^{(\mathrm{p}')}_{([3],1),1} = \mathcal{Y}\left[\begin{smallmatrix}r&s&t\end{smallmatrix}\right] \epsilon^{ij} H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(D_\mu N_{\mathbb{C}} s D^\mu N_{\mathbb{C}} t\right),$$

$$\mathcal{O}^{(\mathrm{p}')}_{([3],1),2} = \mathcal{Y}\left[\begin{smallmatrix}r&s&t\end{smallmatrix}\right] \epsilon^{ij} D^\mu H_j \left(L_{pi} N_{\mathbb{C}} r\right) \left(D_\mu N_{\mathbb{C}} s N_{\mathbb{C}} t\right).$$

This is the final form of operators in our result, eq. (4.318), after converting two-component spinors to four-component spinors. The Young symmetrizer in front of each monomial operator is interpreted as acting on the Wilson coefficient tensor C_{prst}, so that the independent component of the Wilson coefficient tensor that corresponds to each flavor specified operator is constrained. For example, for three generations of fermions, the flavor tensor C_{prst} contains the following independent components for each possible value of $p = 1, 2, 3$:

$$\tag{3.18}$$

Thus the flavor tensor can be further written as

$$C_{prst} = C_{p\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right]} + C_{p\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right]} + C_{p\left[\begin{smallmatrix}r&s&t\end{smallmatrix}\right]}. \tag{3.19}$$

4   Lists of operators in νSMEFT

In this section, we list the complete and independent operator basis in νSMEFT from dimension 5 to dimension 9, and the statistic results of the operator basis are listed in table 3, 4 and 5. It should be noted that the two-component Weyl fermions are used in our building block and converted to four-component (chiral) Dirac fermions in the final result. We give the relations for conversion here for readers' convenience.

$$q_\mathrm{L} = \begin{pmatrix} Q \\ 0 \end{pmatrix}, \qquad u_\mathrm{R} = \begin{pmatrix} 0 \\ u_\mathbb{C}^\dagger \end{pmatrix}, \quad d_\mathrm{R} = \begin{pmatrix} 0 \\ d_\mathbb{C}^\dagger \end{pmatrix}, \quad l_\mathrm{L} = \begin{pmatrix} L \\ 0 \end{pmatrix}, \qquad e_\mathrm{R} = \begin{pmatrix} 0 \\ e_\mathbb{C}^\dagger \end{pmatrix}, \quad N_\mathrm{R} = \begin{pmatrix} 0 \\ N_\mathbb{C}^\dagger \end{pmatrix}. \tag{4.1}$$

$$\bar{q}_\mathrm{L} = \left(0, Q^\dagger\right), \quad \bar{u}_\mathrm{R} = (u_\mathbb{C}, 0), \quad \bar{d}_\mathrm{R} = (d_\mathbb{C}, 0), \quad \bar{l}_\mathrm{L} = \left(0, L^\dagger\right), \quad \bar{e}_\mathrm{R} = (e_\mathbb{C}, 0), \quad \bar{N}_\mathrm{R} = (N_\mathbb{C}, 0). \tag{4.2}$$

Since each four-component fermion is given a unique name here, for simplicity and consistency with other references, the subscripts L and R are omitted without causing any confusion.

Dim-5 operators						
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
3	$(2,0)$	$F_{\text{L}}\psi^2 + h.c.$	$0+0+2+0$	2	$n_f(n_f-1)$	(4.11)
4	$(1,0)$	$\psi^2\phi^2 + h.c.$	$0+0+2+0$	2	$n_f(n_f+1)$	(4.12)
Total		4	$0+0+4+0$	4	$2n_f^2$	
Dim-6 operators						
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(2,0)$	$\psi^4 + h.c.$	$4+2+0+2$	14	$\frac{1}{6}n_f^2(49n_f^2-1)$	(4.24)–(4.27)
		$F_{\text{L}}\psi^2\phi + h.c.$	$4+0+0+0$	4	$4n_f^2$	(4.28)–(4.29)
	$(1,1)$	$\psi^2\psi^{\dagger 2}$	$10+2+0+0$	12	$\frac{1}{4}n_f^2(41n_f^2+6n_f+1)$	(4.30)–(4.38)
		$\psi\psi^\dagger\phi^2 D$	$3+0+0+0$	3	$3n_f^2$	(4.39)–(4.40)
5	$(1,0)$	$\psi^2\phi^3 + h.c.$	$2+0+0+0$	2	$2n_f^2$	(4.41)
Total		8	$23+4+0+2$	35	$\frac{1}{12}n_f^2(221n_f^2+18n_f+109)$	
Dim-7 operators						
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(3,0)$	$F_{\text{L}}^2\psi^2 + h.c.$	$0+0+6+0$	6	$3n_f(n_f+1)$	(4.42)–(4.44)
	$(2,1)$	$F_{\text{L}}^2\psi^{\dagger 2} + h.c.$	$0+0+6+0$	6	$3n_f(n_f+1)$	(4.45)–(4.47)
		$\psi^3\psi^\dagger D + h.c.$	$0+4+20+0$	24	$\frac{1}{3}n_f^2(43n_f^2-15n_f+2)$	(4.48)–(4.59)
		$F_{\text{L}}\psi\psi^\dagger\phi D + h.c.$	$0+0+8+0$	8	$8n_f^2$	(4.60)–(4.63)
		$\psi^2\phi^2 D^2 + h.c.$	$0+0+4+0$	6	$4n_f^2$	(4.64)–(4.65)
5	$(2,0)$	$\psi^4\phi + h.c.$	$0+2+10+0$	24	$12n_f^4$	(4.66)–(4.71)
		$F_{\text{L}}\psi^2\phi^2 + h.c.$	$0+0+6+0$	6	$2n_f(2n_f-1)$	(4.72)–(4.74)
	$(1,1)$	$\psi^2\psi^{\dagger 2}\phi$	$0+4+22+0$	30	$n_f^3(23n_f+3)$	(4.75)–(4.87)
		$\psi\psi^\dagger\phi^3 D$	$0+0+2+0$	4	$4n_f^2$	(4.88)
6	$(1,0)$	$\psi^2\phi^4 + h.c.$	$0+0+2+0$	2	$n_f(n_f+1)$	(4.89)
Total		18	$0+10+86+0$	116	$\frac{1}{3}n_f(148n_f^3-6n_f^2+83n_f+15)$	

Table 3. The complete statistics of dimension 5, 6, 7 νSMEFT operators. N in the leftmost column shows the number of particles. $(n,\tilde{n})$ are the numbers of ϵ and $\tilde{\epsilon}$ in the Lorentz structure. $\mathcal{N}_{\text{type}}$, $\mathcal{N}_{\text{term}}$, and $\mathcal{N}_{\text{operator}}$ show the number of types, terms and Hermitian operators respectively (independent conjugates are counted), while the numbers under $\mathcal{N}_{\text{type}}$ describe the sum of each possible $|\Delta L|$ types/operators with $\mathcal{N} = \mathcal{N}(|\Delta L|=0)+\mathcal{N}(|\Delta L|=1)+\mathcal{N}(|\Delta L|=2)+\mathcal{N}(|\Delta L|=4)$. The links in the rightmost column refer to the list(s) of the terms in given classes.

Here, we give some conversions between four-component spinors and two-component spinors for readers' convenience. For four-component bilinears formed by

$$\Psi = \begin{pmatrix} \xi_\alpha \\ \chi^{\dagger\dot{\alpha}} \end{pmatrix}, \quad \bar{\Psi} = \Psi^\dagger\gamma^0 = \left(\chi^\alpha,\ \xi_{\dot{\alpha}}^\dagger\right), \tag{4.3}$$

N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	(3,1)	$\psi^4 D^2 + h.c.$	$4+0+2+2$	22	$\frac{1}{4}n_f(49n_f^3 - 6n_f^2 + 3n_f + 2)$	(4.90)–(4.93)
		$F_{\mathrm{L}}\psi^2\phi D^2 + h.c.$	$4+0+0+0$	8	$8n_f^2$	(4.94)–(4.95)
	(2,2)	$F_{\mathrm{L}}F_{\mathrm{R}}\psi\psi^\dagger D$	$3+0+0+0$	3	$3n_f^2$	(4.96)–(4.98)
		$\psi^2\psi^{\dagger 2}D^2$	$10+2+0+0$	24	$\frac{1}{2}n_f^2(41n_f^2 + 1)$	(4.99)–(4.107)
		$F_{\mathrm{R}}\psi^2\phi D^2 + h.c.$	$4+0+0+0$	4	$4n_f^2$	(4.108)–(4.109)
		$\psi\psi^\dagger\phi^2 D^3$	$3+0+0+0$	4	$4n_f^2$	(4.110)–(4.111)
5	(3,0)	$F_{\mathrm{L}}\psi^4 + h.c.$	$10+4+0+2$	50	$\frac{1}{4}n_f(133n_f^3 + 2n_f^2 - n_f + 2)$	(4.112)–(4.119)
		$F_{\mathrm{L}}{}^2\psi^2\phi + h.c.$	$8+0+0+0$	12	$12n_f^2$	(4.120)–(4.123)
	(2,1)	$F_{\mathrm{L}}\psi^2\psi^{\dagger 2} + h.c.$	$42+12+0+0$	58	$\frac{1}{2}n_f^2(97n_f^2 - 1)$	(4.124)–(4.150)
		$F_{\mathrm{L}}{}^2\psi^{\dagger 2}\phi + h.c.$	$8+0+0+0$	8	$8n_f^2$	(4.151)–(4.154)
		$\psi^3\psi^\dagger\phi D + h.c.$	$24+6+0+2$	108	$n_f^3(87n_f - 1)$	(4.155)–(4.170)
		$F_{\mathrm{L}}\psi\psi^\dagger\phi^2 D + h.c.$	$12+0+0+0$	16	$16n_f^2$	(4.171)–(4.176)
		$\psi^2\phi^3 D^2 + h.c.$	$2+0+0+0$	12	$12n_f^2$	(4.177)
6	(2,0)	$\psi^4\phi^2 + h.c.$	$8+2+0+2$	30	$\frac{5}{6}n_f^2(23n_f^4 + 1)$	(4.178)–(4.183)
		$F_{\mathrm{L}}\psi^2\phi^3 + h.c.$	$4+0+0+0$	6	$6n_f^2$	(4.184)–(4.185)
	(1,1)	$\psi^2\psi^{\dagger 2}\phi^2$	$16+4+0+2$	28	$\frac{1}{4}n_f^2(91n_f^2 + 2n_f + 3)$	(4.186)–(4.199)
		$\psi\psi^\dagger\phi^4 D$	$3+0+0+0$	3	$3n_f^2$	(4.200)–(4.201)
7	(1,0)	$\psi^2\phi^5 + h.c.$	$2+0+0+0$	2	$2n_f^2$	(4.202)
	Total	31	$167+30+2+10$	398	$\frac{1}{12}n_f(2921n_f^3 - 18n_f^2 + 961n_f + 12)$	

Table 4. The complete statistics of dimension 8 νSMEFT operators. The numbers under $\mathcal{N}_{\text{type}}$ describe the sum of each possible $|\Delta L|$ types/operators with $\mathcal{N} = \mathcal{N}(|\Delta L| = 0) + \mathcal{N}(|\Delta L| = 1) + \mathcal{N}(|\Delta L| = 2) + \mathcal{N}(|\Delta L| = 4)$.

the following relations are useful to convert the four-component bilinears to the two-component spinors.

$$
\begin{aligned}
\bar{\Psi}_1\Psi_2 &= \chi_1^\alpha \xi_{2\alpha} + \xi_{1\dot\alpha}^\dagger \chi_2^{\dagger\dot\alpha}\,, \\
\bar{\Psi}_1\gamma^\mu\Psi_2 &= \chi_1^\alpha \sigma_{\alpha\dot\alpha}^\mu \chi_2^{\dagger\dot\alpha} + \xi_{1\dot\alpha}^\dagger \bar\sigma^{\mu\dot\alpha\alpha}\xi_{2\alpha}\,, \\
\bar{\Psi}_1\sigma^{\mu\nu}\Psi_2 &= \chi_1^\alpha (\sigma^{\mu\nu})_\alpha{}^\beta \xi_{2\beta} + \xi_{1\dot\alpha}^\dagger (\bar\sigma^{\mu\nu})^{\dot\alpha}{}_{\dot\beta}\chi_2^{\dagger\dot\beta}\,, \\
\Psi_1^{\mathrm{T}}C\Psi_2 &= \xi_1^\alpha \xi_{2\alpha} + \chi_{1\dot\alpha}^\dagger \chi_2^{\dagger\dot\alpha}\,, \\
\Psi_1^{\mathrm{T}}C\gamma^\mu\Psi_2 &= \xi_1^\alpha \sigma_{\alpha\dot\alpha}^\mu \chi_2^{\dagger\dot\alpha} + \chi_{1\dot\alpha}^\dagger \bar\sigma^{\mu\dot\alpha\alpha}\xi_{2\alpha}\,, \\
\Psi_1^{\mathrm{T}}C\sigma^{\mu\nu}\Psi_2 &= \xi_1^\alpha (\sigma^{\mu\nu})_\alpha{}^\beta \xi_{2\beta} + \chi_{1\dot\alpha}^\dagger (\bar\sigma^{\mu\nu})^{\dot\alpha}{}_{\dot\beta}\chi_2^{\dagger\dot\beta}\,, \\
\bar{\Psi}_1 C\bar{\Psi}_2^{\mathrm{T}} &= \xi_{1\dot\alpha}^\dagger \xi_2^{\dagger\dot\alpha} + \chi_1^\alpha \chi_{2\alpha}\,, \\
\bar{\Psi}_1\gamma^\mu C\bar{\Psi}_2^{\mathrm{T}} &= \chi_1^\alpha \sigma_{\alpha\dot\alpha}^\mu \xi_2^{\dagger\dot\alpha} + \xi_{1\dot\alpha}^\dagger \bar\sigma^{\mu\dot\alpha\alpha}\chi_{2\alpha}\,, \\
\bar{\Psi}_1\sigma^{\mu\nu}C\bar{\Psi}_2^{\mathrm{T}} &= \xi_{1\dot\alpha}^\dagger (\bar\sigma^{\mu\nu})^{\dot\alpha}{}_{\dot\beta}\xi_2^{\dagger\dot\beta} + \chi_1^\alpha (\sigma^{\mu\nu})_\alpha{}^\beta \chi_{2\beta}\,,
\end{aligned}
\tag{4.4}
$$

N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(4,1)$	$F_{\text{L}}{}^2\psi^2 D^2 + h.c.$	$0+6+0+0$	12	$6n_f(n_f+1)$	(4.203)–(4.205)
	$(3,2)$	$F_{\text{L}}F_{\text{R}}\psi^2 D^2 + h.c.$	$0+6+0+0$	6	$3n_f(n_f+1)$	(4.206)–(4.208)
		$F_{\text{L}}{}^2\psi^{\dagger 2} D^2 + h.c.$	$0+6+0+0$	6	$3n_f(n_f+1)$	(4.209)–(4.211)
		$\psi^3\psi^\dagger D^3 + h.c.$	$4+20+0+0$	46	$\frac{2}{3}n_f^2(43n_f^2-1)$	(4.275)–(4.286)
		$F_{\text{L}}\psi\psi^\dagger\phi D^3 + h.c.$	$0+8+0+0$	16	$16n_f^2$	(4.212)–(4.215)
		$\psi^2\phi^2 D^4 + h.c.$	$0+4+0+0$	8	$n_f(5n_f+1)$	(4.216)–(4.217)
5	$(4,0)$	$F_{\text{L}}{}^3\psi^2 + h.c.$	$0+10+0+0$	16	$4n_f(2n_f-1)$	(4.218)–(4.222)
	$(3,1)$	$F_{\text{L}}{}^3\psi^{\dagger 2} + h.c.$	$0+4+0+0$	4	$2n_f(n_f+1)$	(4.223)–(4.224)
		$F_{\text{L}}\psi^3\psi^\dagger D + h.c.$	$10+42+0+0$	222	$\frac{2}{3}n_f^2(212n_f^2+1)$	(4.287)–(4.312)
		$F_{\text{L}}{}^2\psi\psi^\dagger\phi D + h.c.$	$0+16+0+0$	32	$32n_f^2$	(4.225)–(4.232)
		$\psi^4\phi D^2 + h.c.$	$2+10+0+0$	120	$60n_f^4$	(4.313)–(4.318)
		$F_{\text{L}}\psi^2\phi^2 D^2 + h.c.$	$0+8+0+0$	42	$2n_f(14n_f-1)$	(4.233)–(4.236)
	$(2,2)$	$F_{\text{L}}F_{\text{R}}{}^2\psi^2 + h.c.$	$0+12+0+0$	12	$6n_f(n_f-1)$	(4.237)–(4.242)
		$F_{\text{R}}\psi^3\psi^\dagger D + h.c.$	$10+42+0+0$	166	$2n_f^3(53n_f-5)$	(4.319)–(4.344)
		$F_{\text{L}}F_{\text{R}}\psi\psi^\dagger\phi D$	$0+10+0+0$	24	$24n_f^2$	(4.248)–(4.252)
		$\psi^2\psi^{\dagger 2}\phi D^2$	$4+22+0+0$	210	$n_f^3(161n_f-3)$	(4.345)–(4.357)
		$F_{\text{R}}\psi^2\phi^2 D^2 + h.c.$	$0+8+0+0$	24	$4n_f(4n_f-1)$	(4.243)–(4.246)
		$\psi\psi^\dagger\phi^3 D^3$	$0+2+0+0$	20	$20n_f^2$	(4.247)
6	$(3,0)$	$\psi^6 + h.c.$	$6+10+6+2$	130	$\frac{1}{72}n_f^2(1921n_f^4-219n_f^3-335n_f^2+75n_f-2)$	(4.571)–(4.582)
		$F_{\text{L}}\psi^4\phi + h.c.$	$6+26+0+0$	110	$n_f^3(53n_f-9)$	(4.358)–(4.373)
		$F_{\text{L}}{}^2\psi^2\phi^2 + h.c.$	$0+12+0+0$	18	$2n_f(6n_f+1)$	(4.253)–(4.258)
	$(2,1)$	$\psi^4\psi^{\dagger 2} + h.c.$	$40+106+14+0$	474	$\frac{1}{12}n_f^3(2455n_f^3+91n_f^2-91n_f+65)$	(4.491)–(4.570)
		$F_{\text{L}}\psi^2\psi^{\dagger 2}\phi + h.c.$	$24+116+0+0$	176	$138n_f^4$	(4.374)–(4.443)
		$F_{\text{L}}{}^2\psi^{\dagger 2}\phi^2 + h.c.$	$0+10+0+0$	10	$2n_f(3n_f+2)$	(4.259)–(4.263)
		$\psi^3\psi^\dagger\phi^2 D + h.c.$	$10+44+0+0$	268	$n_f^2(181n_f^2-7n_f-2)$	(4.444)–(4.470)
		$F_{\text{L}}\psi\psi^\dagger\phi^3 D + h.c.$	$0+8+0+0$	32	$32n_f^2$	(4.264)–(4.267)
		$\psi^2\phi^4 D^2 + h.c.$	$0+4+0+0$	20	$2n_f(7n_f+1)$	(4.268)–(4.269)
7	$(2,0)$	$\psi^4\phi^3 + h.c.$	$2+12+0+0$	28	$\frac{4}{3}n_f^2(10n_f^2-1)$	(4.471)–(4.477)
		$F_{\text{L}}\psi^2\phi^4 + h.c.$	$0+6+0+0$	6	$2n_f(2n_f-1)$	(4.270)–(4.272)
	$(1,1)$	$\psi^2\psi^{\dagger 2}\phi^3$	$4+22+0+0$	34	$2n_f^3(13n_f+2)$	(4.478)–(4.490)
		$\psi\psi^\dagger\phi^5 D$	$0+2+0+0$	4	$4n_f^2$	(4.273)
8	$(1,0)$	$\psi^2\phi^6 + h.c.$	$0+2+0+0$	2	$n_f(n_f+1)$	(4.274)
Total		59	$122+616+20+2$	2298	$\frac{1}{72}n_f(16651n_f^5+327n_f^4+64519n_f^3$ $-1335n_f^2+17182n_f+432)$	

Table 5. The complete statistics of dimension 9 νSMEFT operators. The numbers under $\mathcal{N}_{\text{type}}$ describe the sum of each possible $|\Delta L|$ types/operators with $\mathcal{N} = \mathcal{N}(|\Delta L| = 1) + \mathcal{N}(|\Delta L| = 2) + \mathcal{N}(|\Delta L| = 3) + \mathcal{N}(|\Delta L| = 6)$.

where $\gamma^\mu = \begin{pmatrix} 0 & \sigma^\mu_{\alpha\dot\beta} \\ \bar\sigma^{\mu\dot\alpha\beta} & 0 \end{pmatrix}$ and $\sigma^{\mu\nu} = \frac{i}{2}[\gamma^\mu, \gamma^\nu] = \begin{pmatrix} (\sigma^{\mu\nu})_\alpha{}^\beta & 0 \\ 0 & (\bar\sigma^{\mu\nu})^{\dot\alpha}{}_{\dot\beta} \end{pmatrix}$. In our notation, the

Dirac charge conjugation matrix $C = i\gamma^0\gamma^2 = \begin{pmatrix} \epsilon_{\alpha\beta} & 0 \\ 0 & \epsilon^{\dot\alpha\dot\beta} \end{pmatrix} = \begin{pmatrix} -\epsilon^{\alpha\beta} & 0 \\ 0 & -\epsilon_{\dot\alpha\dot\beta} \end{pmatrix} = -C^{-1}$ and

the following relations are needed to compare with the literature,

$$\Psi^c = C\overline\Psi^{\mathrm{T}}, \quad \overline{\Psi^c} = -\Psi^{\mathrm{T}}C^{-1} = \Psi^{\mathrm{T}}C. \tag{4.5}$$

It should be noted that the transpose symbol T is omitted in our result. Here we give some examples of the conversion

$$\epsilon_{abc}\left(\bar d_p{}^a C\overline N_s\right)\left(\bar d_r{}^b C\bar u_t{}^c\right) = \epsilon_{abc}\left(d_{\mathbb{C}p}{}^a N_{\mathbb{C}s}\right)\left(d_{\mathbb{C}r}{}^b u_{\mathbb{C}t}{}^c\right), \tag{4.6}$$

$$iH_i D^\mu H^{\dagger i}\left(\overline N_p \gamma_\mu N_r\right) = iH_i D^\mu H^{\dagger i}\left(N_{\mathbb{C}p}\sigma_\mu N^\dagger_{\mathbb{C}r}\right), \tag{4.7}$$

$$iB_{\mathrm{L}}{}^{\mu\nu}\left(\overline N_p \sigma_{\mu\nu} C\overline N_r\right) = iB_{\mathrm{L}}{}^{\mu\nu}\left(N_{\mathbb{C}p}\sigma_{\mu\nu} N_{\mathbb{C}r}\right). \tag{4.8}$$

The Hermitian conjugates of the fermion chains are

$$\left[\bar\Psi_1\Psi_2\right]^\dagger = \bar\Psi_2\Psi_1, \qquad \left[\bar\Psi_1\gamma^\mu\Psi_2\right]^\dagger = \bar\Psi_2\gamma^\mu\Psi_1, \qquad \left[\bar\Psi_1\sigma^{\mu\nu}\Psi_2\right]^\dagger = \bar\Psi_2\sigma^{\mu\nu}\Psi_1, \tag{4.9}$$

$$[\Psi_1 C\Psi_2]^\dagger = \bar\Psi_2 C\bar\Psi_1, \quad [\Psi_1 C\gamma^\mu\Psi_2]^\dagger = \bar\Psi_2\gamma^\mu C\bar\Psi_1, \quad [\Psi_1 C\sigma^{\mu\nu}\Psi_2]^\dagger = \bar\Psi_2\sigma^{\mu\nu}C\bar\Psi_1. \tag{4.10}$$

In the following we will list the operator basis up to dimension nine. Our result of operator basis has been checked with these in ref. [18] up to dimension-seven for νSMEFT and refs. [19, 20] up to dimension-six for νLEFT. The number of independent operators are the same as those in the literature and we also checked that the concrete form of operator bases are consistent with the literature up to the freedom to choose independent operators due to redundancies. We should clarify that each ψ ($\psi^\dagger$) in an operator class means a two-component left-handed (right handed) spinor in this class. The baryon number and lepton number violation pattern of each operator type are presented next to the type as $(\Delta B, \Delta L)$. The subscripts and superscripts $\{p, r, s, t, u, v\}$, $\{i, j, k, l, m, n\}$, $\{I, J, K, L\}$, $\{a, b, c, d, e, f\}$ and $\{A, B, C, D\}$ denote flavor indices, $\mathrm{SU}(2)_W$ group (anti)fundamental representation indices, $\mathrm{SU}(2)_W$ group adjoint representation indices, $\mathrm{SU}(3)_C$ group (anti)fundamental representation indices and $\mathrm{SU}(3)_C$ group adjoint representation indices respectively.

4.1 Lists of the dim-5 operators

Class $F_{\mathrm{L}}\psi^2$: 1 type

$$\mathcal{O}_{B_{\mathrm{L}}\bar N^2}(0, -2)\Big| \mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right] iB_{\mathrm{L}}{}^{\mu\nu}\left(\overline N_p \sigma_{\mu\nu} C\overline N_r\right) \tag{4.11}$$

Class $\psi^2\phi^2$: 1 type

$$\mathcal{O}_{\bar N^2 HH^\dagger}(0, -2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right] H_i H^{\dagger i}\left(\overline N_p C\overline N_r\right) \tag{4.12}$$

These operators contribute to the sterile neutrino masses and right-handed neutrino magnetic moments, listed and discussed in refs. [15, 16]. Here $(0, -2)$ denotes the baryon and lepton

numbers and each of the ψs or $\psi^\dagger$s in the class name means a left-handed two-component spinor or a right-handed two-component spinor in the class respectively.

We take these two operators as an example to discuss the connection between our results and those in other literature. In ref. [15], the above two operators are written as $\left(\overline{N}\sigma^{\mu\nu}N^c\right)B_{\mu\nu}$ and $\left(\overline{N}N^c\right)\left(\phi^\dagger\phi\right)$. These operators are exactly the same as our result after some conversions between notations. For gauge bosons contracting with σ matrices, the following relations are useful,

$$F_{\mathrm{L}}{}^{\mu\nu}\left(\sigma_{\mu\nu}\right)_\alpha{}^\beta = F^{\mu\nu}\left(\sigma_{\mu\nu}\right)_\alpha{}^\beta = -i\tilde{F}^{\mu\nu}\left(\sigma_{\mu\nu}\right)_\alpha{}^\beta, \qquad F_{\mathrm{R}}{}^{\mu\nu}\left(\sigma_{\mu\nu}\right)_\alpha{}^\beta = 0, \qquad (4.13)$$

$$F_{\mathrm{R}}{}^{\mu\nu}\left(\bar{\sigma}_{\mu\nu}\right)^{\dot{\alpha}}{}_{\dot{\beta}} = F^{\mu\nu}\left(\bar{\sigma}_{\mu\nu}\right)^{\dot{\alpha}}{}_{\dot{\beta}} = i\tilde{F}^{\mu\nu}\left(\bar{\sigma}_{\mu\nu}\right)^{\dot{\alpha}}{}_{\dot{\beta}}, \qquad F_{\mathrm{L}}{}^{\mu\nu}\left(\bar{\sigma}_{\mu\nu}\right)^{\dot{\alpha}}{}_{\dot{\beta}} = 0, \qquad (4.14)$$

where F can be the field strength of any gauge boson in the νSMEFT or νLEFT and $F_{\mathrm{L/R}} = \frac{1}{2}\left(F \mp i\tilde{F}\right)$. Taking account of eq. (4.5) and eq. (4.13), eq. (4.11) and eq. (4.12) become

$$\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]iB^{\mu\nu}\left(\overline{N}_p\sigma_{\mu\nu}N_r^c\right), \qquad (4.15)$$

$$\mathcal{Y}\left[\boxed{p\,r}\right]H_iH^{\dagger i}\left(\overline{N}_pN_r^c\right). \qquad (4.16)$$

Now we can see that these two operators are the same operators as these in ref. [15]. Besides, we also explicitly show the flavor symmetries of the operators. For example, the flavor structure of the two right-handed neutrinos in eq. (4.15) must be antisymmetric, while the flavor structure of the two right-handed neutrinos in eq. (4.16) must be symmetric.

4.2 Lists of the dim-6 operators

These operators were listed and discussed in refs. [17, 18]. We will take type $\bar{d}^2\bar{N}\bar{u}$ as an example and compare our result with that of ref. [18]. To do that, first we find the Hermitian conjugate of operators eq. (4.25), which are

$$\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right) = \left[\epsilon_{abc}\left(\overline{d}_p{}^aC\overline{N}_s\right)\left(\overline{d}_r{}^bC\overline{u}_t{}^c\right)\right]^\dagger, \qquad (4.17)$$

$$\epsilon^{abc}\left(d_{rb}Cd_{pa}\right)\left(u_{tc}CN_s\right) = \left[\epsilon_{abc}\left(\overline{d}_p{}^aC\overline{d}_r{}^b\right)\left(\overline{N}_sC\overline{u}_t{}^c\right)\right]^\dagger, \qquad (4.18)$$

derived from eq. (4.10). Afterwards, taking account of the flavor structure of eq. (4.18), we find

$$\epsilon^{abc}\left(d_{rb}Cd_{pa}\right)\left(u_{tc}CN_s\right) = -\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right) + \epsilon^{abc}\left(N_sCd_{ra}\right)\left(u_{tc}Cd_{pb}\right) \qquad (4.19)$$

$$= -\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right) \qquad (4.20)$$

$$\propto \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\epsilon^{abc}\left(d_{rb}Cd_{pa}\right)\left(u_{tc}CN_s\right), \qquad (4.21)$$

where we used Schouten identity in the first equality. After these conversions, we can write our result as

$$\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right), \qquad (4.22)$$

$$\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right), \qquad (4.23)$$

which can be reorganized into one term $\epsilon^{abc}\left(N_sCd_{pa}\right)\left(u_{tc}Cd_{rb}\right)$ and is the same as operator $\mathcal{O}_{uddN}$ in ref. [18].

Class ψ^4: 4 types

$$\mathcal{O}^{(1,2)}_{\bar{d}l\bar{N}q}(0,0) \left| \begin{matrix} \epsilon^{ij} \left(\overline{N}_s q_{taj} \right) \left(\overline{d}_p{}^a l_{ri} \right) \\ \epsilon^{ij} \left(\overline{d}_p{}^a C \overline{N}_s \right) \left(l_{ri} C q_{taj} \right) \end{matrix} \right. \tag{4.24}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2\bar{N}\bar{u}}(-1,-1) \left| \begin{matrix} \mathcal{Y} \, \fbox{$p|r$} \, \epsilon_{abc} \left(\overline{d}_p{}^a C \overline{N}_s \right) \left(\overline{d}_r{}^b C \overline{u}_t{}^c \right) \\ \mathcal{Y} \, \fbox{$\begin{smallmatrix}p\\r\end{smallmatrix}$} \, \epsilon_{abc} \left(\overline{d}_p{}^a C \overline{d}_r{}^b \right) \left(\overline{N}_s C \overline{u}_t{}^c \right) \end{matrix} \right. \tag{4.25}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l^2\bar{N}}(0,0) \left| \begin{matrix} \mathcal{Y} \, \fbox{$r|s$} \, \epsilon^{ij} \left(\overline{e}_p l_{ri} \right) \left(\overline{N}_t l_{sj} \right) \\ \mathcal{Y} \, \fbox{$\begin{smallmatrix}r\\s\end{smallmatrix}$} \, \epsilon^{ij} \left(\overline{e}_p l_{ri} \right) \left(\overline{N}_t l_{sj} \right) \end{matrix} \right. \tag{4.26}$$

$$\mathcal{O}_{\bar{N}^4}(0,-4) \left| \mathcal{Y} \, \fbox{$\begin{smallmatrix}p|r\\s|t\end{smallmatrix}$} \, \left(\overline{N}_p C \overline{N}_r \right) \left(\overline{N}_s C \overline{N}_t \right) \right. \tag{4.27}$$

Class $F_L\psi^2\phi$: 2 types

$$\mathcal{O}_{W_L l\bar{N}H}(0,0) \left| i \left(\tau^I \right)^i_k \epsilon^{jk} H_j W_L^{I\mu\nu} \left(\overline{N}_r \sigma_{\mu\nu} l_{pi} \right) \right. \tag{4.28}$$

$$\mathcal{O}_{B_L l\bar{N}H}(0,0) \left| i\epsilon^{ij} H_j B_L{}^{\mu\nu} \left(\overline{N}_r \sigma_{\mu\nu} l_{pi} \right) \right. \tag{4.29}$$

Class $\psi^2\psi^{\dagger 2}$: 9 types

$$\mathcal{O}_{dNq^2}(1,1) \left| \mathcal{Y} \, \fbox{$p|r$} \, \epsilon^{abc}\epsilon^{ij} \left(d_{sc} C N_t \right) \left(q_{pai} C q_{rbj} \right) \right. \tag{4.30}$$

$$\mathcal{O}_{\bar{l}Nq\bar{u}}(0,0) \left| \left(\bar{l}_s{}^i N_t \right) \left(\overline{u}_r{}^a q_{pai} \right) \right. \tag{4.31}$$

$$\mathcal{O}_{\bar{N}Nq\bar{q}}(0,0) \left| \left(\overline{N}_p q_{rai} \right) \left(\overline{q}_t{}^{ai} N_s \right) \right. \tag{4.32}$$

$$\mathcal{O}_{d\bar{e}N\bar{u}}(0,0) \left| \left(d_{sa} C N_t \right) \left(\overline{e}_p C \overline{u}_r{}^a \right) \right. \tag{4.33}$$

$$\mathcal{O}_{\bar{N}N\bar{u}u}(0,0) \left| \left(N_s C u_{ta} \right) \left(\overline{N}_p C \overline{u}_r{}^a \right) \right. \tag{4.34}$$

$$\mathcal{O}_{\bar{d}d\bar{N}N}(0,0) \left| \left(d_{sa} C N_t \right) \left(\overline{d}_p{}^a C \overline{N}_r \right) \right. \tag{4.35}$$

$$\mathcal{O}_{l\bar{l}\bar{N}N}(0,0) \left| \left(\overline{N}_r l_{pi} \right) \left(\bar{l}_s{}^i N_t \right) \right. \tag{4.36}$$

$$\mathcal{O}_{\bar{e}e\bar{N}N}(0,0) \left| \left(e_s C N_t \right) \left(\overline{e}_p C \overline{N}_r \right) \right. \tag{4.37}$$

$$\mathcal{O}_{\bar{N}^2N^2}(0,0) \left| \mathcal{Y} \, \fbox{$p|r$}, \fbox{$s|t$} \, \left(N_s C N_t \right) \left(\overline{N}_p C \overline{N}_r \right) \right. \tag{4.38}$$

Class $\psi\psi^\dagger\phi^2 D$: 2 types

$$\mathcal{O}_{\bar{e}NH^{\dagger 2}D}(0,0) \left| i\epsilon_{ij} H^{\dagger i} D^\mu H^{\dagger j} \left(\overline{e}_p \gamma_\mu N_r \right) \right. \tag{4.39}$$

$$\mathcal{O}_{\bar{N}NHH^\dagger D}(0,0) \left| iH_i D^\mu H^{\dagger i} \left(\overline{N}_p \gamma_\mu N_r \right) \right. \tag{4.40}$$

Class $\psi^2\phi^3$: 1 type

$$\mathcal{O}_{l\bar{N}H^2H^\dagger}(0,0) \left| \epsilon^{ik} H_j H_k H^{\dagger j} \left(\overline{N}_r l_{pi} \right) \right. \tag{4.41}$$

4.3 Lists of the dim-7 operators

Class $F_L{}^2\psi^2$: 3 types

$$\mathcal{O}_{G_L{}^2\bar{N}^2}(0,-2)\Big|\mathcal{Y}\,[\overline{p|r}]\left(\overline{N}_p C\overline{N}_r\right)G_{L\,\mu\nu}^A G_L^{A\mu\nu} \tag{4.42}$$

$$\mathcal{O}_{W_L{}^2\bar{N}^2}(0,-2)\Big|\mathcal{Y}\,[\overline{p|r}]\left(\overline{N}_p C\overline{N}_r\right)W_{L\,\mu\nu}^I W_L^{I\mu\nu} \tag{4.43}$$

$$\mathcal{O}_{B_L{}^2\bar{N}^2}(0,-2)\Big|\mathcal{Y}\,[\overline{p|r}]\,B_{L\mu\nu}B_L^{\mu\nu}\left(\overline{N}_p C\overline{N}_r\right) \tag{4.44}$$

Class $F_L{}^2\psi^{\dagger 2}$: 3 types

$$\mathcal{O}_{G_L{}^2 N^2}(0,2)\Big|\mathcal{Y}\,[\overline{p|r}]\left(N_p C N_r\right)G_{L\,\mu\nu}^A G_L^{A\mu\nu} \tag{4.45}$$

$$\mathcal{O}_{W_L{}^2 N^2}(0,2)\Big|\mathcal{Y}\,[\overline{p|r}]\left(N_p C N_r\right)W_{L\,\mu\nu}^I W_L^{I\mu\nu} \tag{4.46}$$

$$\mathcal{O}_{B_L{}^2 N^2}(0,2)\Big|\mathcal{Y}\,[\overline{p|r}]\,B_{L\mu\nu}B_L^{\mu\nu}\left(N_p C N_r\right) \tag{4.47}$$

Class $\psi^3\psi^\dagger D$: 12 types

$$\mathcal{O}_{d\bar{N}q^2 D}(1,-1)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\epsilon^{abc}\epsilon^{ij}\left(\overline{N}_p\gamma_\mu d_{tc}\right)(q_{rai}CD^\mu q_{sbj}) \tag{4.48}$$

$$\mathcal{O}_{l\bar{N}q\bar{u}D}(0,-2)\Big|i\left(D^\mu\overline{u}_s{}^a q_{rai}\right)\left(\overline{N}_p\gamma_\mu C\overline{l}_t{}^i\right) \tag{4.49}$$

$$\mathcal{O}_{\bar{d}lNqD}(0,2)\Big|i\epsilon^{ij}\left(\overline{d}_p{}^a\gamma_\mu N_t\right)(l_{ri}CD^\mu q_{saj}) \tag{4.50}$$

$$\mathcal{O}_{\bar{N}^2 q\bar{q}D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\overline{N}_r D^\mu q_{sai}\right)\left(\overline{N}_p\gamma_\mu C\overline{q}_t^{ai}\right) \tag{4.51}$$

$$\mathcal{O}_{\bar{d}^2 N\bar{u}D}(-1,1)\Big|\mathcal{Y}\,[\overline{p|r}]\,i\epsilon_{abc}\left(\overline{d}_p{}^a\gamma_\mu N_t\right)\left(\overline{d}_r{}^b CD^\mu\overline{u}_s{}^c\right) \tag{4.52}$$

$$\mathcal{O}_{d\bar{e}\bar{N}\bar{u}D}(0,-2)\Big|i\left(\overline{e}_p\gamma_\mu d_{ta}\right)\left(\overline{N}_r CD^\mu\overline{u}_s{}^a\right) \tag{4.53}$$

$$\mathcal{O}_{\bar{N}^2\bar{u}uD}(0,-2)\Big|\mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\overline{N}_p\gamma_\mu u_{ta}\right)\left(\overline{N}_r CD^\mu\overline{u}_s{}^a\right) \tag{4.54}$$

$$\mathcal{O}_{\bar{d}d\bar{N}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\overline{d}_p{}^a\gamma_\mu d_{ta}\right)\left(\overline{N}_r CD^\mu\overline{N}_s\right) \tag{4.55}$$

$$\mathcal{O}_{\bar{e}l^2 ND}(0,2)\Big|\mathcal{Y}\,[\overline{r|s}]\,i\epsilon^{ij}\left(\overline{e}_p\gamma_\mu N_t\right)(l_{ri}CD^\mu l_{sj}) \tag{4.56}$$

$$\mathcal{O}_{l\bar{l}\bar{N}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\overline{N}_r CD^\mu\overline{N}_s\right)\left(\overline{l}_t{}^i\gamma_\mu l_{pi}\right) \tag{4.57}$$

$$\mathcal{O}_{\bar{e}e\bar{N}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\overline{e}_p\gamma_\mu e_t\right)\left(\overline{N}_r CD^\mu\overline{N}_s\right) \tag{4.58}$$

$$\mathcal{O}_{\bar{N}^3 ND}(0,-2)\Big|\mathcal{Y}\left[\tfrac{p}{r}\atop s\right]i\left(\overline{N}_p\gamma_\mu N_t\right)\left(\overline{N}_r CD^\mu\overline{N}_s\right) \tag{4.59}$$

Class $F_L\psi\psi^\dagger\phi D$: 4 types

$$\mathcal{O}_{W_L lNHD}(0,2)\Big|i\left(\tau^I\right)^i{}_k\epsilon^{jk}D_\mu H_j W_L^{I\mu}{}_\nu\left(l_{pi}C\gamma^\nu N_r\right) \tag{4.60}$$

$$\mathcal{O}_{W_L\bar{l}\bar{N}H^\dagger D}(0,-2)\Big|i\epsilon_{jk}\left(\tau^I\right)^k{}_i D_\mu H^{\dagger i}W_L^{I\mu}{}_\nu\left(\overline{N}_p\gamma^\nu C\overline{l}_r{}^j\right) \tag{4.61}$$

$$\mathcal{O}_{B_L lNHD}(0,2)\Big|i\epsilon^{ij}B_L^\mu{}_\nu D_\mu H_j\left(l_{pi}C\gamma^\nu N_r\right) \tag{4.62}$$

$$\mathcal{O}_{B_L\bar{l}\bar{N}H^\dagger D}(0,-2)\Big|i\epsilon_{ij}B_L^\mu{}_\nu D_\mu H^{\dagger i}\left(\overline{N}_p\gamma^\nu C\overline{l}_r{}^j\right) \tag{4.63}$$

Class $\psi^2\phi^2 D^2$: 2 types

$$\mathcal{O}_{\bar{e}\bar{N}H^{\dagger 2}D^2}(0,-2)\Big|i\epsilon_{ij}D_\mu H^{\dagger i}D_\nu H^{\dagger j}\left(\overline{e}_p\sigma^{\mu\nu}C\overline{N}_r\right) \tag{4.64}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2HH^{\dagger}D^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]iD_\mu H_iD_\nu H^{\dagger i}\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,r}\right]D_\mu H_i\left(\overline{N}_pC\overline{N}_r\right)D^\mu H^{\dagger i}\end{array}\right. \tag{4.65}$$

Class $\psi^4\phi$: 6 types

$$\mathcal{O}^{(1\sim 3)}_{\bar{N}q^3H^{\dagger}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{r\,s\,t}\right]\epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right]\epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\end{array}\right. \tag{4.66}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}\bar{N}q\bar{u}H^{\dagger}}(0,-2)\left|\begin{array}{l}H^{\dagger i}\left(\overline{e}_pC\overline{N}_r\right)(\overline{u}_t{}^aq_{sai})\\[4pt]H^{\dagger i}\left(\overline{e}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_t{}^a\right)\end{array}\right. \tag{4.67}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2q\bar{u}H}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}H_j\left(\overline{N}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_t{}^a\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}H_j\left(\overline{N}_pC\overline{N}_r\right)(\overline{u}_t{}^aq_{sai})\end{array}\right. \tag{4.68}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}\bar{N}^2qH^{\dagger}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]H^{\dagger i}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\[4pt]\mathcal{Y}\left[\boxed{r\,s}\right]H^{\dagger i}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\end{array}\right. \tag{4.69}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l\bar{N}^2H^{\dagger}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]H^{\dagger i}\left(\overline{e}_pC\overline{N}_s\right)\left(\overline{N}_tl_{ri}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]H^{\dagger i}\left(\overline{N}_sC\overline{N}_t\right)(\overline{e}_pl_{ri})\end{array}\right. \tag{4.70}$$

$$\mathcal{O}_{l\bar{N}^3H}(0,-2)\Big|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\epsilon^{ij}H_j\left(\overline{N}_sC\overline{N}_t\right)\left(\overline{N}_rl_{pi}\right) \tag{4.71}$$

Class $F_{\mathrm{L}}\psi^2\phi^2$: 3 types

$$\mathcal{O}_{W_{\mathrm{L}}\bar{e}\bar{N}H^{\dagger 2}}(0,-2)\Big|i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i}H^{\dagger j}W_{\mathrm{L}}^{I\mu\nu}\left(\overline{e}_p\sigma_{\mu\nu}C\overline{N}_r\right) \tag{4.72}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{N}^2HH^{\dagger}}(0,-2)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\tau^I\right)_j^i H_iH^{\dagger j}W_{\mathrm{L}}^{I\mu\nu}\left(\overline{N}_p\sigma_{\mu\nu}C\overline{N}_r\right) \tag{4.73}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{N}^2HH^{\dagger}}(0,-2)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]iH_iH^{\dagger i}B_{\mathrm{L}}^{\mu\nu}\left(\overline{N}_p\sigma_{\mu\nu}C\overline{N}_r\right) \tag{4.74}$$

Class $\psi^2\psi^{\dagger 2}\phi$: 13 types

$$\mathcal{O}_{N^2q\bar{u}H}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{ij}H_j(N_sCN_t)(\overline{u}_r{}^aq_{pai}) \tag{4.75}$$

$$\mathcal{O}_{\bar{d}eNqH}(0,2)\Big|\epsilon^{ij}H_j(e_sCN_t)\left(\overline{d}_p{}^aq_{rai}\right) \tag{4.76}$$

$$\mathcal{O}_{\bar{d}N^2qH^{\dagger}}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right]H^{\dagger i}(N_sCN_t)\left(\overline{d}_p{}^aq_{rai}\right) \tag{4.77}$$

$$\mathcal{O}^{(1,2)}_{lNq\bar{q}H}(0,2)\left|\begin{array}{l}\epsilon^{ik}H_k\left(\overline{q}_t^{aj}N_s\right)(l_{pi}Cq_{raj})\\[4pt]\epsilon^{ij}H_k\left(\overline{q}_t^{ak}N_s\right)(l_{pi}Cq_{raj})\end{array}\right. \tag{4.78}$$

$$\mathcal{O}_{d^2\bar{N}qH}(1,-1)\Big|\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\epsilon^{ij}H_j(d_{sb}Cd_{tc})\left(\overline{N}_pq_{rai}\right) \tag{4.79}$$

$$\mathcal{O}_{d\bar{N}quH^{\dagger}}(1,-1)\Big|\epsilon^{abc}H^{\dagger i}\left(\overline{N}_pq_{rai}\right)(d_{sb}Cu_{tc}) \tag{4.80}$$

$$\mathcal{O}_{lN\bar{u}uH}(0,2)\Big|\epsilon^{ij}H_j\left(N_sCu_{ta}\right)\left(\overline{u}_r{}^al_{pi}\right) \tag{4.81}$$

$$\mathcal{O}_{d\bar{l}\bar{N}\bar{u}H}(0,-2)\Big|H_i\left(\overline{N}_pC\overline{u}_r{}^a\right)\left(\bar{l}_t{}^id_{sa}\right) \tag{4.82}$$

$$\mathcal{O}_{\bar{d}dlNH}(0,2)\Big|\epsilon^{ij}H_j\left(d_{sa}CN_t\right)\left(\bar{d}_p{}^al_{ri}\right) \tag{4.83}$$

$$\mathcal{O}_{l^2\bar{l}NH}^{(1,2)}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,\epsilon^{ik}H_k\left(l_{pi}Cl_{rj}\right)\left(\bar{l}_s{}^jN_t\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon^{ik}H_k\left(l_{pi}Cl_{rj}\right)\left(\bar{l}_s{}^jN_t\right)\end{array}\right. \tag{4.84}$$

$$\mathcal{O}_{\bar{e}elNH}(0,2)\Big|\epsilon^{ij}H_j\left(e_sCN_t\right)\left(\bar{e}_pl_{ri}\right) \tag{4.85}$$

$$\mathcal{O}_{\bar{e}lN^2H^\dagger}(0,2)\Big|\mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\,H^{\dagger i}\left(N_sCN_t\right)\left(\bar{e}_pl_{ri}\right) \tag{4.86}$$

$$\mathcal{O}_{l\bar{N}N^2H}(0,2)\Big|\mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\,\epsilon^{ij}H_j\left(N_sCN_t\right)\left(\overline{N}_rl_{pi}\right) \tag{4.87}$$

Class $\psi\psi^\dagger\phi^3D$: 1 type

$$\mathcal{O}_{lNH^2H^\dagger D}^{(1,2)}(0,2)\left|\begin{array}{l}i\epsilon^{ik}H_jH_kD^\mu H^{\dagger j}\left(l_{pi}C\gamma_\mu N_r\right)\\[4pt]i\epsilon^{ik}H_jH^{\dagger j}D^\mu H_k\left(l_{pi}C\gamma_\mu N_r\right)\end{array}\right. \tag{4.88}$$

Class $\psi^2\phi^4$: 1 type

$$\mathcal{O}_{\bar{N}^2H^2H^{\dagger2}}(0,-2)\Big|\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,H_iH_jH^{\dagger i}H^{\dagger j}\left(\overline{N}_pC\overline{N}_r\right) \tag{4.89}$$

4.4 Lists of the dim-8 operators

Class ψ^4D^2: 4 types

$$\mathcal{O}_{\bar{d}l\bar{N}qD^2}^{(1\sim3)}(0,0)\left|\begin{array}{l}\epsilon^{ij}\left(\bar{d}_p{}^al_{ri}\right)\left(D_\mu\overline{N}_sD^\mu q_{taj}\right)\\[4pt]\epsilon^{ij}\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(D_\mu l_{ri}CD^\mu q_{taj}\right)\\[4pt]i\epsilon^{ij}\left(D_\mu\overline{N}_sD_\nu q_{taj}\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.90}$$

$$\mathcal{O}_{\bar{d}^2\bar{N}\bar{u}D^2}^{(1\sim3)}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(D_\mu\bar{d}_r{}^bCD^\mu\overline{u}_t{}^c\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_p{}^aC\bar{d}_r{}^b\right)\left(D_\mu\overline{N}_sCD^\mu\overline{u}_t{}^c\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(D_\mu\bar{d}_r{}^bCD^\mu\overline{u}_t{}^c\right)\end{array}\right. \tag{4.91}$$

$$\mathcal{O}_{\bar{e}l^2\bar{N}D^2}^{(1\sim3)}(0,0)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r&s\end{smallmatrix}}\,\epsilon^{ij}\left(\bar{e}_pl_{ri}\right)\left(D^\mu\overline{N}_tD_\mu l_{sj}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\epsilon^{ij}\left(\bar{e}_pl_{ri}\right)\left(D^\mu\overline{N}_tD_\mu l_{sj}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\epsilon^{ij}\left(D_\nu\overline{N}_tD_\mu l_{sj}\right)\left(\bar{e}_p\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.92}$$

$$\mathcal{O}_{\bar{N}^4D^2}^{(1,2)}(0,-4)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\\s&t\end{smallmatrix}}\,\left(\overline{N}_pC\overline{N}_r\right)\left(D_\mu\overline{N}_sCD^\mu\overline{N}_t\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r&s&t\end{smallmatrix}}\,\left(\overline{N}_pC\overline{N}_r\right)\left(D_\mu\overline{N}_sCD^\mu\overline{N}_t\right)\end{array}\right. \tag{4.93}$$

Class $F_{\rm L}\psi^2\phi D^2$: 2 types

$$\mathcal{O}_{W_{\rm L}l\bar{N}HD^2}^{(1,2)}(0,0)\left|\begin{array}{l}i\left(\tau^I\right)^i_k\epsilon^{jk}D_\nu H_jW_{{\rm L}\lambda}^{I\,\mu}\left(D_\mu\overline{N}_r\sigma^{\lambda\nu}l_{pi}\right)\\[4pt]\left(\tau^I\right)^i_k\epsilon^{jk}D_\nu H_jW_{\rm L}^{I\mu\nu}\left(D_\mu\overline{N}_rl_{pi}\right)\end{array}\right. \tag{4.94}$$

$$\mathcal{O}_{B_{\rm L}l\bar{N}HD^2}^{(1,2)}(0,0)\left|\begin{array}{l}i\epsilon^{ij}B_{{\rm L}\lambda}{}^\mu D_\nu H_j\left(D_\mu\overline{N}_r\sigma^{\lambda\nu}l_{pi}\right)\\[4pt]\epsilon^{ij}B_{\rm L}^{\mu\nu}D_\nu H_j\left(D_\mu\overline{N}_rl_{pi}\right)\end{array}\right. \tag{4.95}$$

Class $F_\mathrm{L}F_\mathrm{R}\psi\psi^\dagger D$: 3 types

$$\mathcal{O}_{G_\mathrm{L}G_\mathrm{R}\bar{N}ND}(0,0)\Big| iG_\mathrm{L}^{A\mu}{}_\nu G_\mathrm{R}^{A\nu}{}_\lambda \left(\overline{N}_p\gamma^\lambda D_\mu N_r\right) \tag{4.96}$$

$$\mathcal{O}_{W_\mathrm{L}W_\mathrm{R}\bar{N}ND}(0,0)\Big| iW_\mathrm{L}^{I\mu}{}_\nu W_\mathrm{R}^{I\nu}{}_\lambda \left(\overline{N}_p\gamma^\lambda D_\mu N_r\right) \tag{4.97}$$

$$\mathcal{O}_{B_\mathrm{L}B_\mathrm{R}\bar{N}ND}(0,0)\Big| iB_\mathrm{L}{}^\mu{}_\nu B_\mathrm{R}{}^\nu{}_\lambda \left(\overline{N}_p\gamma^\lambda D_\mu N_r\right) \tag{4.98}$$

Class $\psi^2\psi^{\dagger 2}D^2$: 9 types

$$\mathcal{O}^{(1,2)}_{dNq^2D^2}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\tiny\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right] i\epsilon^{abc}\epsilon^{ij}\left(D_\mu d_{sc}CD_\nu N_t\right)\left(q_{pai}C\sigma^{\mu\nu}q_{rbj}\right)\\ \mathcal{Y}\left[\tiny\begin{array}{|c|c|}\hline p&r\\\hline\end{array}\right] \epsilon^{abc}\epsilon^{ij}\left(q_{pai}Cq_{rbj}\right)\left(D_\mu d_{sc}CD^\mu N_t\right)\end{array}\right. \tag{4.99}$$

$$\mathcal{O}^{(1,2)}_{\bar{l}Nq\bar{u}D^2}(0,0)\left|\begin{array}{l}\left(\overline{u}_r{}^a q_{pai}\right)\left(D_\mu\bar{l}_s{}^i D^\mu N_t\right)\\ i\left(D_\mu\bar{l}_s{}^i D_\nu N_t\right)\left(\overline{u}_r{}^a\sigma^{\mu\nu}q_{pai}\right)\end{array}\right. \tag{4.100}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}Nq\bar{q}D^2}(0,0)\left|\begin{array}{l}\left(\overline{N}_p q_{rai}\right)\left(D^\mu\overline{q}_t^{ai}D_\mu N_s\right)\\ i\left(D_\nu\overline{q}_t^{ai}D_\mu N_s\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\end{array}\right. \tag{4.101}$$

$$\mathcal{O}^{(1,2)}_{d\bar{e}N\bar{u}D^2}(0,0)\left|\begin{array}{l}\left(\overline{e}_p C\overline{u}_r{}^a\right)\left(D_\mu d_{sa}CD^\mu N_t\right)\\ i\left(D_\mu d_{sa}CD_\nu N_t\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{u}_r{}^a\right)\end{array}\right. \tag{4.102}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}N\bar{u}uD^2}(0,0)\left|\begin{array}{l}\left(\overline{N}_p C\overline{u}_r{}^a\right)\left(D_\mu N_s CD^\mu u_{ta}\right)\\ i\left(D_\mu N_s CD_\nu u_{ta}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r{}^a\right)\end{array}\right. \tag{4.103}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}d\bar{N}ND^2}(0,0)\left|\begin{array}{l}\left(\overline{d}_p{}^a C\overline{N}_r\right)\left(D_\mu d_{sa}CD^\mu N_t\right)\\ i\left(D_\mu d_{sa}CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right)\end{array}\right. \tag{4.104}$$

$$\mathcal{O}^{(1,2)}_{l\bar{l}\bar{N}ND^2}(0,0)\left|\begin{array}{l}\left(\overline{N}_r l_{pi}\right)\left(D_\mu\bar{l}_s{}^i D^\mu N_t\right)\\ i\left(D_\mu\bar{l}_s{}^i D_\nu N_t\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\end{array}\right. \tag{4.105}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}e\bar{N}ND^2}(0,0)\left|\begin{array}{l}\left(\overline{e}_p C\overline{N}_r\right)\left(D_\mu e_s CD^\mu N_t\right)\\ i\left(D_\mu e_s CD_\nu N_t\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\end{array}\right. \tag{4.106}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2N^2D^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\tiny\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array},\begin{array}{|c|}\hline s\\\hline t\\\hline\end{array}\right] i\left(D_\mu N_s CD_\nu N_t\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\ \mathcal{Y}\left[\tiny\begin{array}{|c|c|}\hline p&r\\\hline\end{array},\begin{array}{|c|c|}\hline s&t\\\hline\end{array}\right]\left(\overline{N}_p C\overline{N}_r\right)\left(D_\mu N_s CD^\mu N_t\right)\end{array}\right. \tag{4.107}$$

Class $F_\mathrm{R}\psi^2\phi D^2$: 2 types

$$\mathcal{O}_{W_\mathrm{R}l\bar{N}HD^2}(0,0)\Big| i\left(\tau^I\right)^j_k\epsilon^{ik}D_\mu D_\nu H_j W_\mathrm{R}^{I\mu}{}_\lambda\left(\overline{N}_r\sigma^{\nu\lambda}l_{pi}\right) \tag{4.108}$$

$$\mathcal{O}_{B_\mathrm{R}l\bar{N}HD^2}(0,0)\Big| i\epsilon^{ij}B_\mathrm{R}{}^\mu{}_\lambda D_\mu D_\nu H_j\left(\overline{N}_r\sigma^{\nu\lambda}l_{pi}\right) \tag{4.109}$$

Class $\psi\psi^\dagger\phi^2 D^3$: 2 types

$$\mathcal{O}_{\bar{e}NH^{\dagger 2}D^3}(0,0)\Big| i\epsilon_{ij}H^{\dagger i}D_\mu D_\nu H^{\dagger j}\left(\overline{e}_p\gamma^\nu D^\mu N_r\right) \tag{4.110}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}NHH^\dagger D^3}(0,0)\left|\begin{array}{l}iH_i D_\mu D_\nu H^{\dagger i}\left(\overline{N}_p\gamma^\nu D^\mu N_r\right)\\ iD_\nu H_i D^\mu H^{\dagger i}\left(\overline{N}_p\gamma_\mu D^\nu N_r\right)\end{array}\right. \tag{4.111}$$

Class $F_{\mathrm{L}}\psi^4$: 8 types

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{L}}\bar{d}l\bar{N}q}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^{\ b}_a \epsilon^{ij}G^A_{\mathrm{L}\mu\nu}\left(\overline{N}_s q_{tbj}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\\ i\left(\lambda^A\right)^{\ b}_a \epsilon^{ij}G^{A\mu\nu}_{\mathrm{L}}\left(l_{ri}Cq_{tbj}\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ i\left(\lambda^A\right)^{\ b}_a \epsilon^{ij}G^A_{\mathrm{L}\mu\nu}\left(\overline{d}_p{}^a q_{tbj}\right)\left(\overline{N}_s\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.112}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\mathrm{L}}\bar{d}^2\bar{N}\bar{u}}(-1,-1)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ace}\left(\lambda^A\right)^{\ e}_b G^A_{\mathrm{L}\mu\nu}\left(\overline{N}_s C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{d}_r{}^b\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ace}\left(\lambda^A\right)^{\ e}_b G^{A\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abe}\left(\lambda^A\right)^{\ e}_c G^{A\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{ace}\left(\lambda^A\right)^{\ e}_b G^A_{\mathrm{L}\mu\nu}\left(\overline{N}_s C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{d}_r{}^b\right)\\ \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{ace}\left(\lambda^A\right)^{\ e}_b G^{A\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abe}\left(\lambda^A\right)^{\ e}_c G^{A\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\end{array}\right. \tag{4.113}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{d}l\bar{N}q}(0,0)\left|\begin{array}{l} i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_s q_{taj}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\\ i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^{I\mu\nu}_{\mathrm{L}}\left(l_{ri}Cq_{taj}\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^I_{\mathrm{L}\mu\nu}\left(\overline{d}_p{}^a q_{taj}\right)\left(\overline{N}_s\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.114}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{e}l^2\bar{N}}(0,0)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_t l_{sj}\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^I_{\mathrm{L}\mu\nu}\left(\overline{e}_p C\overline{N}_t\right)\left(l_{ri}C\sigma^{\mu\nu}l_{sj}\right)\\ \mathcal{Y}\left[\overline{r\,s}\right] i\left(\tau^I\right)^{\ i}_k \epsilon^{jk}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_t l_{sj}\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.115}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{L}}\bar{d}l\bar{N}q}(0,0)\left|\begin{array}{l} i\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(\overline{N}_s q_{taj}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\\ i\epsilon^{ij}B^{\mu\nu}_{\mathrm{L}}\left(l_{ri}Cq_{taj}\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ i\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(\overline{d}_p{}^a q_{taj}\right)\left(\overline{N}_s\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.116}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{L}}\bar{d}^2\bar{N}\bar{u}}(-1,-1)\left|\begin{array}{l} \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abc}B_{\mathrm{L}\mu\nu}\left(\overline{N}_s C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{d}_r{}^b\right)\\ \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abc}B^{\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}B^{\mu\nu}_{\mathrm{L}}\left(\overline{d}_r{}^b C\overline{u}_t{}^c\right)\left(\overline{d}_p{}^a\sigma_{\mu\nu}C\overline{N}_s\right)\end{array}\right. \tag{4.117}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{L}}\bar{e}l^2\bar{N}}(0,0)\left|\begin{array}{l} \mathcal{Y}\left[\overline{r\,s}\right] i\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(\overline{N}_t l_{sj}\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)\\ \mathcal{Y}\left[\overline{r\,s}\right] i\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(\overline{e}_p C\overline{N}_t\right)\left(l_{ri}C\sigma^{\mu\nu}l_{sj}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(\overline{N}_t l_{sj}\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)\end{array}\right. \tag{4.118}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{N}^4}(0,-4)\left|\mathcal{Y}\left[\begin{smallmatrix}p\\s\\t\end{smallmatrix}\right] iB^{\mu\nu}_{\mathrm{L}}\left(\overline{N}_r C\overline{N}_t\right)\left(\overline{N}_p\sigma_{\mu\nu}C\overline{N}_s\right)\right. \tag{4.119}$$

Class $F_{\mathrm{L}}{}^2\psi^2\phi$: 4 types

$$\mathcal{O}_{G_{\mathrm{L}}{}^2 l\bar{N}H}(0,0)\left|\epsilon^{ij}H_j G^A_{\mathrm{L}\mu\nu}G^{A\mu\nu}_{\mathrm{L}}\left(\overline{N}_r l_{pi}\right)\right. \tag{4.120}$$

$$\mathcal{O}^{(1,2)}_{W_{\mathrm{L}}{}^2 l\bar{N}H}(0,0)\left|\begin{array}{l} \epsilon^{ij}H_j W^I_{\mathrm{L}\mu\nu}W^{I\mu\nu}_{\mathrm{L}}\left(\overline{N}_r l_{pi}\right)\\ i\left(\tau^K\right)^{\ i}_k \epsilon^{IJK}\epsilon^{jk}H_j W^I_{\mathrm{L}\mu\nu}W^{J\mu}_{\mathrm{L}\ \lambda}\left(\overline{N}_r\sigma^{\nu\lambda}l_{pi}\right)\end{array}\right. \tag{4.121}$$

$$\mathcal{O}_{B_{\mathrm{L}}W_{\mathrm{L}}l\bar{N}H}^{(1,2)}(0,0)\left|\begin{array}{l}\left(\tau^I\right)_k^i\epsilon^{jk}H_jB_{\mathrm{L}\mu\nu}W_{\mathrm{L}}^{I\mu\nu}\left(\overline{N}_rl_{pi}\right)\\ i\left(\tau^I\right)_k^i\epsilon^{jk}H_jB_{\mathrm{L}\mu\nu}W_{\mathrm{L}}^{I\mu}{}_\lambda\left(\overline{N}_r\sigma^{\nu\lambda}l_{pi}\right)\end{array}\right.\tag{4.122}$$

$$\mathcal{O}_{B_{\mathrm{L}}^2l\bar{N}H}(0,0)\left|\epsilon^{ij}H_jB_{\mathrm{L}\mu\nu}B_{\mathrm{L}}{}^{\mu\nu}\left(\overline{N}_rl_{pi}\right)\right.\tag{4.123}$$

Class $F_{\mathrm{L}}\psi^2\psi^{\dagger 2}$: 27 types

$$\mathcal{O}_{G_{\mathrm{L}}dNq^2}^{(1,2)}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\,i\left(\lambda^A\right)_e^b\epsilon^{ace}\epsilon^{ij}G_{\mathrm{L}\mu\nu}^A\left(d_{sc}CN_t\right)\left(q_{pai}C\sigma^{\mu\nu}q_{rbj}\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\lambda^A\right)_e^b\epsilon^{ace}\epsilon^{ij}G_{\mathrm{L}\mu\nu}^A\left(d_{sc}CN_t\right)\left(q_{pai}C\sigma^{\mu\nu}q_{rbj}\right)\end{array}\right.\tag{4.124}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{l}Nq\bar{u}}(0,0)\left|i\left(\lambda^A\right)_b^a G_{\mathrm{L}\mu\nu}^A\left(\bar{l}_s^{\,i}N_t\right)\left(\overline{u}_r^{\,b}\sigma^{\mu\nu}q_{pai}\right)\right.\tag{4.125}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{N}Nq\bar{q}}(0,0)\left|i\left(\lambda^A\right)_b^a G_{\mathrm{L}\mu\nu}^A\left(\bar{q}_t^{bi}N_s\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\right.\tag{4.126}$$

$$\mathcal{O}_{G_{\mathrm{L}}d\bar{e}N\bar{u}}(0,0)\left|i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(d_{sb}CN_t\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{u}_r^{\,a}\right)\right.\tag{4.127}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{N}N\bar{u}u}(0,0)\left|i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(N_sCu_{tb}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r^{\,a}\right)\right.\tag{4.128}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}\bar{N}\bar{q}^2}^{(1,2)}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,i\epsilon_{ace}\epsilon_{ij}\left(\lambda^A\right)_b^e G_{\mathrm{L}\mu\nu}^A\left(\bar{q}_s^{bi}C\bar{q}_t^{cj}\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,i\epsilon_{ace}\epsilon_{ij}\left(\lambda^A\right)_b^e G_{\mathrm{L}\mu\nu}^A\left(\bar{q}_s^{bi}C\bar{q}_t^{cj}\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\end{array}\right.\tag{4.129}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}e\bar{N}u}(0,0)\left|i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(e_sCu_{tb}\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.130}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}d\bar{N}N}(0,0)\left|i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(d_{sb}CN_t\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.131}$$

$$\mathcal{O}_{G_{\mathrm{L}}l\bar{N}\bar{q}u}(0,0)\left|i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(\bar{q}_s^{ai}u_{tb}\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.132}$$

$$\mathcal{O}_{W_{\mathrm{L}}dNq^2}(1,1)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\,i\left(\tau^I\right)_k^i\epsilon^{abc}\epsilon^{jk}W_{\mathrm{L}\mu\nu}^I\left(d_{sc}CN_t\right)\left(q_{pai}C\sigma^{\mu\nu}q_{rbj}\right)\right.\tag{4.133}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{l}Nq\bar{u}}(0,0)\left|i\left(\tau^I\right)_j^i W_{\mathrm{L}\mu\nu}^I\left(\bar{l}_s^{\,j}N_t\right)\left(\overline{u}_r^{\,a}\sigma^{\mu\nu}q_{pai}\right)\right.\tag{4.134}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{N}Nq\bar{q}}(0,0)\left|i\left(\tau^I\right)_j^i W_{\mathrm{L}\mu\nu}^I\left(\bar{q}_t^{aj}N_s\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\right.\tag{4.135}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}\bar{N}\bar{q}^2}(-1,-1)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,i\epsilon_{abc}\epsilon_{jk}\left(\tau^I\right)_i^k W_{\mathrm{L}\mu\nu}^I\left(\bar{q}_s^{bi}C\bar{q}_t^{cj}\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.136}$$

$$\mathcal{O}_{W_{\mathrm{L}}l\bar{N}\bar{q}u}(0,0)\left|i\left(\tau^I\right)_j^i W_{\mathrm{L}\mu\nu}^I\left(\bar{q}_s^{aj}u_{ta}\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.137}$$

$$\mathcal{O}_{W_{\mathrm{L}}l\bar{l}\bar{N}N}(0,0)\left|i\left(\tau^I\right)_j^i W_{\mathrm{L}\mu\nu}^I\left(\bar{l}_s^{\,j}N_t\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.138}$$

$$\mathcal{O}_{B_{\mathrm{L}}dNq^2}(1,1)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\epsilon^{abc}\epsilon^{ij}B_{\mathrm{L}\mu\nu}\left(d_{sc}CN_t\right)\left(q_{pai}C\sigma^{\mu\nu}q_{rbj}\right)\right.\tag{4.139}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{l}Nq\bar{u}}(0,0)\left|iB_{\mathrm{L}\mu\nu}\left(\bar{l}_s^{\,i}N_t\right)\left(\overline{u}_r^{\,a}\sigma^{\mu\nu}q_{pai}\right)\right.\tag{4.140}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{N}Nq\bar{q}}(0,0)\left|iB_{\mathrm{L}\mu\nu}\left(\bar{q}_t^{ai}N_s\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\right.\tag{4.141}$$

$$\mathcal{O}_{B_{\mathrm{L}}d\bar{e}N\bar{u}}(0,0)\left|iB_{\mathrm{L}\mu\nu}\left(d_{sa}CN_t\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{u}_r^{\,a}\right)\right.\tag{4.142}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{N}N\bar{u}u}(0,0)\left|iB_{\mathrm{L}\mu\nu}\left(N_sCu_{ta}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r^{\,a}\right)\right.\tag{4.143}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{d}\bar{N}\bar{q}^2}(-1,-1)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,i\epsilon_{abc}\epsilon_{ij}B_{\mathrm{L}\mu\nu}\left(\bar{q}_s^{bi}C\bar{q}_t^{cj}\right)\left(\bar{d}_p^{\,a}\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.144}$$

$$\mathcal{O}_{B_{\rm L}\bar{d}e\bar{N}u}(0,0)\Big| iB_{{\rm L}\mu\nu}\left(e_sCu_{ta}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right) \tag{4.145}$$

$$\mathcal{O}_{B_{\rm L}\bar{d}d\bar{N}N}(0,0)\Big| iB_{{\rm L}\mu\nu}\left(d_{sa}CN_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right) \tag{4.146}$$

$$\mathcal{O}_{B_{\rm L}l\bar{N}\bar{q}u}(0,0)\Big| iB_{{\rm L}\mu\nu}\left(\overline{q}_s^{ai}u_{ta}\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right) \tag{4.147}$$

$$\mathcal{O}_{B_{\rm L}l\bar{l}\bar{N}N}(0,0)\Big| iB_{{\rm L}\mu\nu}\left(\overline{l}_s{}^iN_t\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right) \tag{4.148}$$

$$\mathcal{O}_{B_{\rm L}\bar{e}e\bar{N}N}(0,0)\Big| iB_{{\rm L}\mu\nu}\left(e_sCN_t\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{N}_r\right) \tag{4.149}$$

$$\mathcal{O}_{B_{\rm L}\bar{N}^2N^2}(0,0)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right] iB_{{\rm L}\mu\nu}\left(N_sCN_t\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right) \tag{4.150}$$

Class $F_{\rm L}{}^2\psi^{\dagger2}\phi$: 4 types

$$\mathcal{O}_{G_{\rm L}^2\bar{l}NH^\dagger}(0,0)\Big| \epsilon_{ij}H^{\dagger i}G_{{\rm L}\mu\nu}^AG_{\rm L}^{A\mu\nu}\left(\overline{l}_p{}^jN_r\right) \tag{4.151}$$

$$\mathcal{O}_{W_{\rm L}^2\bar{l}NH^\dagger}(0,0)\Big| \epsilon_{km}\left(\tau^I\right)_j^m\left(\tau^J\right)_i^k H^{\dagger i}W_{{\rm L}\mu\nu}^IW_{\rm L}^{J\mu\nu}\left(\overline{l}_p{}^jN_r\right) \tag{4.152}$$

$$\mathcal{O}_{B_{\rm L}W_{\rm L}\bar{l}NH^\dagger}(0,0)\Big| \epsilon_{jk}\left(\tau^I\right)_i^k B_{{\rm L}\mu\nu}H^{\dagger i}W_{\rm L}^{I\mu\nu}\left(\overline{l}_p{}^jN_r\right) \tag{4.153}$$

$$\mathcal{O}_{B_{\rm L}^2\bar{l}NH^\dagger}(0,0)\Big| \epsilon_{ij}B_{{\rm L}\mu\nu}H^{\dagger i}B_{\rm L}^{\mu\nu}\left(\overline{l}_p{}^jN_r\right) \tag{4.154}$$

Class $\psi^3\psi^\dagger\phi D$: 16 types

$$\mathcal{O}_{Nq^3H^\dagger D}^{(1\sim4)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}(q_{pai}Cq_{rbj})(q_{sck}C\gamma_\mu N_t)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ik}H^{\dagger j}(q_{pai}C\gamma_\mu N_t)(q_{rbj}CD^\mu q_{sck})\\[4pt] \mathcal{Y}\left[\boxed{p\,r\,s}\right] i\epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}(q_{pai}Cq_{rbj})(q_{sck}C\gamma_\mu N_t)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}(q_{pai}Cq_{rbj})(q_{sck}C\gamma_\mu N_t)\end{array}\right. \tag{4.155}$$

$$\mathcal{O}_{\bar{e}Nq\bar{u}H^\dagger D}^{(1\sim3)}(0,0)\left|\begin{array}{l}iD^\mu H^{\dagger i}\left(\overline{e}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu N_t\right)\\[4pt] iH^{\dagger i}\left(\overline{e}_p\gamma_\mu N_t\right)\left(D^\mu\overline{u}_s{}^aq_{rai}\right)\\[4pt] iD^\mu H^{\dagger i}\left(\overline{e}_pC\overline{u}_s{}^a\right)\left(q_{rai}C\gamma_\mu N_t\right)\end{array}\right. \tag{4.156}$$

$$\mathcal{O}_{\bar{N}Nq\bar{u}HD}^{(1\sim3)}(0,0)\left|\begin{array}{l}i\epsilon^{ij}D^\mu H_j\left(\overline{N}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu N_t\right)\\[4pt] i\epsilon^{ij}H_j\left(\overline{N}_p\gamma_\mu N_t\right)\left(D^\mu\overline{u}_s{}^aq_{rai}\right)\\[4pt] i\epsilon^{ij}D^\mu H_j\left(\overline{N}_pC\overline{u}_s{}^a\right)\left(q_{rai}C\gamma_\mu N_t\right)\end{array}\right. \tag{4.157}$$

$$\mathcal{O}_{\bar{d}e\bar{N}qHD}^{(1\sim3)}(0,0)\left|\begin{array}{l}i\epsilon^{ij}D^\mu H_j\left(\overline{d}_p{}^aC\overline{N}_r\right)\left(q_{sai}C\gamma_\mu e_t\right)\\[4pt] i\epsilon^{ij}H_j\left(\overline{d}_p{}^a\gamma_\mu e_t\right)\left(\overline{N}_rD^\mu q_{sai}\right)\\[4pt] i\epsilon^{ij}D^\mu H_j\left(\overline{N}_r\gamma_\mu e_t\right)\left(\overline{d}_p{}^aq_{sai}\right)\end{array}\right. \tag{4.158}$$

$$\mathcal{O}_{\bar{d}\bar{N}NqH^\dagger D}^{(1\sim3)}(0,0)\left|\begin{array}{l}iD^\mu H^{\dagger i}\left(\overline{d}_p{}^aC\overline{N}_r\right)\left(q_{sai}C\gamma_\mu N_t\right)\\[4pt] iH^{\dagger i}\left(\overline{d}_p{}^a\gamma_\mu N_t\right)\left(\overline{N}_rD^\mu q_{sai}\right)\\[4pt] iD^\mu H^{\dagger i}\left(\overline{N}_r\gamma_\mu N_t\right)\left(\overline{d}_p{}^aq_{sai}\right)\end{array}\right. \tag{4.159}$$

$$\mathcal{O}_{l\bar{N}q\bar{q}HD}^{(1\sim6)}(0,0)\begin{vmatrix} i\epsilon^{ik}D^\mu H_k\left(\overline{N}_r l_{pi}\right)\left(\overline{q}_t^{aj}\gamma_\mu q_{saj}\right)\\ i\epsilon^{ij}D^\mu H_k\left(\overline{N}_r l_{pi}\right)\left(\overline{q}_t^{ak}\gamma_\mu q_{saj}\right)\\ i\epsilon^{ik}H_k\left(\overline{N}_r D^\mu q_{saj}\right)\left(\overline{q}_t^{aj}\gamma_\mu l_{pi}\right)\\ i\epsilon^{ij}H_k\left(\overline{N}_r D^\mu q_{saj}\right)\left(\overline{q}_t^{ak}\gamma_\mu l_{pi}\right)\\ i\epsilon^{ik}D^\mu H_k\left(l_{pi}Cq_{saj}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{aj}\right)\\ i\epsilon^{ij}D^\mu H_k\left(l_{pi}Cq_{saj}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{ak}\right) \end{vmatrix} \tag{4.160}$$

$$\mathcal{O}_{\bar{d}N\bar{q}\bar{u}HD}^{(1\sim3)}(-1,-1)\begin{vmatrix} i\epsilon_{abc}D^\mu H_i\left(\overline{d}_p{}^a C\overline{N}_r\right)\left(\overline{u}_s{}^b\gamma_\mu C\overline{q}_t^{ci}\right)\\ i\epsilon_{abc}H_i\left(\overline{N}_r CD^\mu\overline{u}_s{}^b\right)\left(\overline{d}_p{}^a\gamma_\mu C\overline{q}_t^{ci}\right)\\ i\epsilon_{abc}D^\mu H_i\left(\overline{d}_p{}^a C\overline{u}_s{}^b\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{ci}\right) \end{vmatrix} \tag{4.161}$$

$$\mathcal{O}_{l\bar{N}\bar{u}uHD}^{(1\sim3)}(0,0)\begin{vmatrix} i\epsilon^{ij}D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{u}_s{}^a\gamma_\mu u_{ta}\right)\\ i\epsilon^{ij}H_j\left(l_{pi}C\gamma_\mu u_{ta}\right)\left(\overline{N}_r CD^\mu\overline{u}_s{}^a\right)\\ i\epsilon^{ij}D^\mu H_j\left(\overline{u}_s{}^a l_{pi}\right)\left(\overline{N}_r\gamma_\mu u_{ta}\right) \end{vmatrix} \tag{4.162}$$

$$\mathcal{O}_{\bar{d}^2\bar{N}\bar{q}H^\dagger D}^{(1\sim3)}(-1,-1)\begin{vmatrix} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon_{abc}\epsilon_{ij}H^{\dagger i}\left(\overline{d}_r{}^b CD^\mu\overline{N}_s\right)\left(\overline{d}_p{}^a\gamma_\mu C\overline{q}_t^{cj}\right)\\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon_{abc}\epsilon_{ij}D^\mu H^{\dagger i}\left(\overline{d}_p{}^a C\overline{N}_s\right)\left(\overline{d}_r{}^b\gamma_\mu C\overline{q}_t^{cj}\right)\\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon_{abc}\epsilon_{ij}D^\mu H^{\dagger i}\left(\overline{d}_p{}^a C\overline{d}_r{}^b\right)\left(\overline{N}_s\gamma_\mu C\overline{q}_t^{cj}\right) \end{vmatrix} \tag{4.163}$$

$$\mathcal{O}_{\bar{d}dl\bar{N}HD}^{(1\sim3)}(0,0)\begin{vmatrix} i\epsilon^{ij}D^\mu H_j\left(\overline{d}_p{}^a l_{ri}\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\\ i\epsilon^{ij}H_j\left(\overline{d}_p{}^a\gamma_\mu d_{ta}\right)\left(D^\mu\overline{N}_s l_{ri}\right)\\ i\epsilon^{ij}D^\mu H_j\left(\overline{d}_p{}^a C\overline{N}_s\right)\left(l_{ri}C\gamma_\mu d_{ta}\right) \end{vmatrix} \tag{4.164}$$

$$\mathcal{O}_{\bar{d}l\bar{N}uH^\dagger D}^{(1\sim3)}(0,0)\begin{vmatrix} iD^\mu H^{\dagger i}\left(\overline{d}_p{}^a l_{ri}\right)\left(\overline{N}_s\gamma_\mu u_{ta}\right)\\ iH^{\dagger i}\left(\overline{d}_p{}^a\gamma_\mu u_{ta}\right)\left(D^\mu\overline{N}_s l_{ri}\right)\\ iD^\mu H^{\dagger i}\left(\overline{d}_p{}^a C\overline{N}_s\right)\left(l_{ri}C\gamma_\mu u_{ta}\right) \end{vmatrix} \tag{4.165}$$

$$\mathcal{O}_{l^2\bar{l}\bar{N}HD}^{(1\sim6)}(0,0)\begin{vmatrix} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon^{ik}D^\mu H_k\left(l_{pi}Cl_{rj}\right)\left(\overline{N}_s\gamma_\mu C\overline{l}_t{}^j\right)\\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon^{ik}H_k\left(D^\mu\overline{N}_s l_{rj}\right)\left(\overline{l}_t{}^j\gamma_\mu l_{pi}\right)\\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\epsilon^{ik}D^\mu H_k\left(\overline{N}_s l_{pi}\right)\left(\overline{l}_t{}^j\gamma_\mu l_{rj}\right)\\ \mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon^{ik}D^\mu H_k\left(l_{pi}Cl_{rj}\right)\left(\overline{N}_s\gamma_\mu C\overline{l}_t{}^j\right)\\ \mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon^{ik}H_k\left(D^\mu\overline{N}_s l_{rj}\right)\left(\overline{l}_t{}^j\gamma_\mu l_{pi}\right)\\ \mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon^{ik}D^\mu H_k\left(\overline{N}_s l_{pi}\right)\left(\overline{l}_t{}^j\gamma_\mu l_{rj}\right) \end{vmatrix} \tag{4.166}$$

$$\mathcal{O}_{\bar{e}el\bar{N}HD}^{(1\sim3)}(0,0)\begin{vmatrix} i\epsilon^{ij}D^\mu H_j\left(\overline{e}_p l_{ri}\right)\left(\overline{N}_s\gamma_\mu e_t\right)\\ i\epsilon^{ij}H_j\left(\overline{e}_p\gamma_\mu e_t\right)\left(D^\mu\overline{N}_s l_{ri}\right)\\ i\epsilon^{ij}D^\mu H_j\left(\overline{e}_p C\overline{N}_s\right)\left(l_{ri}C\gamma_\mu e_t\right) \end{vmatrix} \tag{4.167}$$

$$\mathcal{O}_{\bar{e}l\bar{N}NH^\dagger D}^{(1\sim3)}(0,0)\begin{vmatrix} iD^\mu H^{\dagger i}\left(\overline{e}_p l_{ri}\right)\left(\overline{N}_s\gamma_\mu N_t\right)\\ iH^{\dagger i}\left(\overline{e}_p\gamma_\mu N_t\right)\left(D^\mu\overline{N}_s l_{ri}\right)\\ iD^\mu H^{\dagger i}\left(\overline{e}_p C\overline{N}_s\right)\left(l_{ri}C\gamma_\mu N_t\right) \end{vmatrix} \tag{4.168}$$

$$\mathcal{O}^{(1\sim3)}_{l\bar{N}^2NHD}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} \boxed{r} \\ \boxed{s} \end{smallmatrix}\right] i\epsilon^{ij} D^\mu H_j \left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix} \boxed{r} \\ \boxed{s} \end{smallmatrix}\right] i\epsilon^{ij} H_j \left(\overline{N}_r C D^\mu \overline{N}_s\right)\left(l_{pi} C \gamma_\mu N_t\right) \\ \mathcal{Y}\left[\boxed{r\,|\,s}\right] i\epsilon^{ij} D^\mu H_j \left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu N_t\right) \end{array}\right. \tag{4.169}$$

$$\mathcal{O}^{(1,2)}_{l\bar{N}^3H^\dagger D}(0,-4) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} \boxed{p} \\ \boxed{r} \\ \boxed{s} \end{smallmatrix}\right] i\epsilon_{ij} H^{\dagger i}\left(\overline{N}_r C D^\mu \overline{N}_s\right)\left(\overline{N}_p \gamma_\mu C \bar{l}_t^{\,j}\right) \\ \mathcal{Y}\left[\boxed{p\,|\,r}\,\big|\,\boxed{s}\right] i\epsilon_{ij}\left(\overline{N}_p C \overline{N}_r\right) D^\mu H^{\dagger i}\left(\overline{N}_s \gamma_\mu C \bar{l}_t^{\,j}\right) \end{array}\right. \tag{4.170}$$

Class $F_{\rm L}\psi\psi^\dagger\phi^2 D$: 6 types

$$\mathcal{O}_{W_{\rm L}\bar{e}NH^{\dagger2}D}(0,0) \left| i\epsilon_{jk}\left(\tau^I\right)^k_{\ i} H^{\dagger i} D_\mu H^{\dagger j} W^{I\mu}_{{\rm L}\ \nu}\left(\bar{e}_p \gamma^\nu N_r\right) \right. \tag{4.171}$$

$$\mathcal{O}_{W_{\rm L}e\bar{N}H^2D}(0,0) \left| i\left(\tau^I\right)^i_{\ k}\epsilon^{jk} H_i D_\mu H_j W^{I\mu}_{{\rm L}\ \nu}\left(\overline{N}_p \gamma^\nu e_r\right) \right. \tag{4.172}$$

$$\mathcal{O}^{(1,2)}_{W_{\rm L}\bar{N}NHH^\dagger D}(0,0) \left|\begin{array}{l} i\left(\tau^I\right)^i_{\ j} H_i D_\mu H^{\dagger j} W^{I\mu}_{{\rm L}\ \nu}\left(\overline{N}_p \gamma^\nu N_r\right) \\ i\left(\tau^I\right)^i_{\ j} H^{\dagger j} D_\mu H_i W^{I\mu}_{{\rm L}\ \nu}\left(\overline{N}_p \gamma^\nu N_r\right) \end{array}\right. \tag{4.173}$$

$$\mathcal{O}_{B_{\rm L}\bar{e}NH^{\dagger2}D}(0,0) \left| i\epsilon_{ij} H^{\dagger i} B_{\rm L}^{\ \mu}_{\ \ \nu} D_\mu H^{\dagger j}\left(\bar{e}_p \gamma^\nu N_r\right) \right. \tag{4.174}$$

$$\mathcal{O}_{B_{\rm L}e\bar{N}H^2D}(0,0) \left| i\epsilon^{ij} H_i B_{\rm L}^{\ \mu}_{\ \ \nu} D_\mu H_j\left(\overline{N}_p \gamma^\nu e_r\right) \right. \tag{4.175}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm L}\bar{N}NHH^\dagger D}(0,0) \left|\begin{array}{l} i H_i B_{\rm L}^{\ \mu}_{\ \ \nu} D_\mu H^{\dagger i}\left(\overline{N}_p \gamma^\nu N_r\right) \\ i H^{\dagger i} B_{\rm L}^{\ \mu}_{\ \ \nu} D_\mu H_i\left(\overline{N}_p \gamma^\nu N_r\right) \end{array}\right. \tag{4.176}$$

Class $\psi^2\phi^3 D^2$: 1 type

$$\mathcal{O}^{(1\sim6)}_{l\bar{N}H^2H^\dagger D^2}(0,0) \left|\begin{array}{l} \epsilon^{ik} H_j D_\mu H_k D^\mu H^{\dagger j}\left(\overline{N}_r l_{pi}\right) \\ \epsilon^{ij} H_j D_\mu H_k D^\mu H^{\dagger k}\left(\overline{N}_r l_{pi}\right) \\ \epsilon^{ik} H^{\dagger j} D_\mu H_j D^\mu H_k\left(\overline{N}_r l_{pi}\right) \\ i\epsilon^{ik} H_j D_\mu H_k D_\nu H^{\dagger j}\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ i\epsilon^{ij} H_j D_\mu H_k D_\nu H^{\dagger k}\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ i\epsilon^{ik} H^{\dagger j} D_\mu H_j D_\nu H_k\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \end{array}\right. \tag{4.177}$$

Class $\psi^4\phi^2$: 6 types

$$\mathcal{O}^{(1,2)}_{l\bar{N}q\bar{u}H^2}(0,0) \left|\begin{array}{l} \epsilon^{ik}\epsilon^{jm} H_k H_m\left(\overline{N}_r l_{pi}\right)\left(\overline{u}_t^{\,a} q_{saj}\right) \\ \epsilon^{ik}\epsilon^{jm} H_k H_m\left(\overline{N}_r C \overline{u}_t^{\,a}\right)\left(l_{pi} C q_{saj}\right) \end{array}\right. \tag{4.178}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}l\bar{N}qHH^\dagger}(0,0) \left|\begin{array}{l} \epsilon^{ik} H_k H^{\dagger j}\left(\overline{N}_s q_{taj}\right)\left(\bar{d}_p^{\,a} l_{ri}\right) \\ \epsilon^{ij} H_k H^{\dagger k}\left(\overline{N}_s q_{taj}\right)\left(\bar{d}_p^{\,a} l_{ri}\right) \\ \epsilon^{ik} H_k H^{\dagger j}\left(\bar{d}_p^{\,a} C \overline{N}_s\right)\left(l_{ri} C q_{taj}\right) \\ \epsilon^{ij} H_k H^{\dagger k}\left(\bar{d}_p^{\,a} C \overline{N}_s\right)\left(l_{ri} C q_{taj}\right) \end{array}\right. \tag{4.179}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2\bar{N}\bar{u}HH^\dagger}(-1,-1) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{p\,|\,r}\right]\epsilon_{abc} H_i H^{\dagger i}\left(\bar{d}_p^{\,a} C \overline{N}_s\right)\left(\bar{d}_r^{\,b} C \overline{u}_t^{\,c}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} \boxed{p} \\ \boxed{r} \end{smallmatrix}\right]\epsilon_{abc} H_i H^{\dagger i}\left(\bar{d}_p^{\,a} C \bar{d}_r^{\,b}\right)\left(\overline{N}_s C \overline{u}_t^{\,c}\right) \end{array}\right. \tag{4.180}$$

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$$\mathcal{O}^{(1\sim4)}_{\bar{e}l^2\bar{N}HH^\dagger}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\epsilon^{ik}H_kH^{\dagger j}\left(\overline{e}_pl_{ri}\right)\left(\overline{N}_tl_{sj}\right)\\[4pt]\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\epsilon^{ij}H_kH^{\dagger k}\left(\overline{e}_pl_{ri}\right)\left(\overline{N}_tl_{sj}\right)\\[4pt]\mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\epsilon^{ik}H_kH^{\dagger j}\left(\overline{e}_pl_{ri}\right)\left(\overline{N}_tl_{sj}\right)\\[4pt]\mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\epsilon^{ij}H_kH^{\dagger k}\left(\overline{e}_pl_{ri}\right)\left(\overline{N}_tl_{sj}\right)\end{array}\right.\tag{4.181}$$

$$\mathcal{O}^{(1,2)}_{l^2\bar{N}^2H^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}p\\r\end{array},\begin{array}{c}s\\t\end{array}\right]\epsilon^{ik}\epsilon^{jm}H_kH_m\left(\overline{N}_sl_{pi}\right)\left(\overline{N}_tl_{rj}\right)\\[4pt]\mathcal{Y}\left[\begin{array}{c|c}p&r\end{array},\begin{array}{c|c}s&t\end{array}\right]\epsilon^{ik}\epsilon^{jm}H_kH_m\left(\overline{N}_sC\overline{N}_t\right)\left(l_{pi}Cl_{rj}\right)\end{array}\right.\tag{4.182}$$

$$\mathcal{O}_{\bar{N}^4HH^\dagger}(0,-4)\left|\mathcal{Y}\left[\begin{array}{c|c}p&r\\\hline s&t\end{array}\right]H_iH^{\dagger i}\left(\overline{N}_pC\overline{N}_r\right)\left(\overline{N}_sC\overline{N}_t\right)\right.\tag{4.183}$$

Class $F_{\rm L}\psi^2\phi^3$: 2 types

$$\mathcal{O}^{(1,2)}_{W_{\rm L}l\bar{N}H^2H^\dagger}(0,0)\left|\begin{array}{l}i\left(\tau^I\right)^j_n\epsilon^{kn}H_jH_kH^{\dagger i}W^I_{{\rm L}\mu\nu}\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\\[4pt]i\left(\tau^I\right)^i_n\epsilon^{kn}H_jH_kH^{\dagger j}W^I_{{\rm L}\mu\nu}\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\end{array}\right.\tag{4.184}$$

$$\mathcal{O}_{B_{\rm L}l\bar{N}H^2H^\dagger}(0,0)\left|i\epsilon^{ik}H_jH_kB_{{\rm L}\mu\nu}H^{\dagger j}\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.185}$$

Class $\psi^2\psi^{\dagger2}\phi^2$: 14 types

$$\mathcal{O}^{(1,2)}_{dNq^2HH^\dagger}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}p\\r\end{array}\right]\epsilon^{abc}\epsilon^{ik}H_kH^{\dagger j}\left(d_{sc}CN_t\right)\left(q_{pai}Cq_{rbj}\right)\\[4pt]\mathcal{Y}\left[\begin{array}{c|c}p&r\end{array}\right]\epsilon^{abc}\epsilon^{ik}H_kH^{\dagger j}\left(d_{sc}CN_t\right)\left(q_{pai}Cq_{rbj}\right)\end{array}\right.\tag{4.186}$$

$$\mathcal{O}_{Nq^2uH^{\dagger2}}(1,1)\left|\mathcal{Y}\left[\begin{array}{c}p\\r\end{array}\right]\epsilon^{abc}H^{\dagger i}H^{\dagger j}\left(N_sCu_{tc}\right)\left(q_{pai}Cq_{rbj}\right)\right.\tag{4.187}$$

$$\mathcal{O}^{(1,2)}_{\bar{l}Nq\bar{u}HH^\dagger}(0,0)\left|\begin{array}{l}H_jH^{\dagger i}\left(\overline{l}_s{}^jN_t\right)\left(\overline{u}_r{}^aq_{pai}\right)\\[4pt]H_jH^{\dagger j}\left(\overline{l}_s{}^iN_t\right)\left(\overline{u}_r{}^aq_{pai}\right)\end{array}\right.\tag{4.188}$$

$$\mathcal{O}_{\bar{d}\bar{l}NqH^{\dagger2}}(0,0)\left|\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(\overline{l}_s{}^mN_t\right)\left(\overline{d}_p{}^aq_{rai}\right)\right.\tag{4.189}$$

$$\mathcal{O}_{\bar{e}Nq\bar{q}H^{\dagger2}}(0,0)\left|\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(\overline{e}_pq_{rai}\right)\left(\overline{q}_t^{am}N_s\right)\right.\tag{4.190}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}Nq\bar{q}HH^\dagger}(0,0)\left|\begin{array}{l}H_jH^{\dagger i}\left(\overline{N}_pq_{rai}\right)\left(\overline{q}_t^{aj}N_s\right)\\[4pt]H_jH^{\dagger j}\left(\overline{N}_pq_{rai}\right)\left(\overline{q}_t^{ai}N_s\right)\end{array}\right.\tag{4.191}$$

$$\mathcal{O}_{d\bar{e}N\bar{u}HH^\dagger}(0,0)\left|H_iH^{\dagger i}\left(d_{sa}CN_t\right)\left(\overline{e}_pC\overline{u}_r{}^a\right)\right.\tag{4.192}$$

$$\mathcal{O}_{\bar{N}N\bar{u}uHH^\dagger}(0,0)\left|H_iH^{\dagger i}\left(N_sCu_{ta}\right)\left(\overline{N}_pC\overline{u}_r{}^a\right)\right.\tag{4.193}$$

$$\mathcal{O}_{\bar{d}d\bar{N}NHH^\dagger}(0,0)\left|H_iH^{\dagger i}\left(d_{sa}CN_t\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\right.\tag{4.194}$$

$$\mathcal{O}_{l^2N^2H^2}(0,4)\left|\mathcal{Y}\left[\begin{array}{c|c}p&r\end{array},\begin{array}{c|c}s&t\end{array}\right]\epsilon^{ik}\epsilon^{jm}H_kH_m\left(N_sCN_t\right)\left(l_{pi}Cl_{rj}\right)\right.\tag{4.195}$$

$$\mathcal{O}_{\bar{e}l\bar{l}NH^{\dagger2}}(0,0)\left|\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(\overline{e}_pl_{ri}\right)\left(\overline{l}_s{}^mN_t\right)\right.\tag{4.196}$$

$$\mathcal{O}^{(1,2)}_{l\bar{l}\bar{N}NHH^\dagger}(0,0)\left|\begin{array}{l}H_jH^{\dagger i}\left(\overline{N}_rl_{pi}\right)\left(\overline{l}_s{}^jN_t\right)\\[4pt]H_jH^{\dagger j}\left(\overline{N}_rl_{pi}\right)\left(\overline{l}_s{}^iN_t\right)\end{array}\right.\tag{4.197}$$

$$\mathcal{O}_{\bar{e}e\bar{N}NHH^\dagger}(0,0)\left|H_iH^{\dagger i}\left(e_sCN_t\right)\left(\overline{e}_pC\overline{N}_r\right)\right.\tag{4.198}$$

$$\mathcal{O}_{\bar{N}^2N^2HH^\dagger}(0,0)\left|\mathcal{Y}\left[\begin{array}{c|c}p&r\end{array},\begin{array}{c|c}s&t\end{array}\right]H_iH^{\dagger i}\left(N_sCN_t\right)\left(\overline{N}_pC\overline{N}_r\right)\right.\tag{4.199}$$

Class $\psi\psi^\dagger\phi^4 D$: 2 types

$$\mathcal{O}_{\bar{e}NHH^{\dagger 3}D}(0,0)\Big| i\epsilon_{jm}H_i H^{\dagger i}H^{\dagger j}D^\mu H^{\dagger m}\left(\bar{e}_p\gamma_\mu N_r\right) \tag{4.200}$$

$$\mathcal{O}_{\bar{N}NH^2H^{\dagger 2}D}(0,0)\Big| iH_i H_j H^{\dagger i}D^\mu H^{\dagger j}\left(\overline{N}_p\gamma_\mu N_r\right) \tag{4.201}$$

Class $\psi^2\phi^5$: 1 type

$$\mathcal{O}_{l\bar{N}H^3H^{\dagger 2}}(0,0)\Big| \epsilon^{im}H_j H_k H_m H^{\dagger j}H^{\dagger k}\left(\overline{N}_r l_{pi}\right) \tag{4.202}$$

4.5 Lists of the dim-9 operators

4.5.1 Classes involving two-fermions

Class $F_L{}^2\psi^2 D^2$: 3 types

$$\mathcal{O}^{(1,2)}_{G_L{}^2\bar{N}^2 D^2}(0,-2)\left| \begin{array}{l}\mathcal{Y}\left[\boxed{p\,r}\right]G^A_{L\,\nu\lambda}G^{A\nu\lambda}_L\left(D_\mu\overline{N}_p CD^\mu\overline{N}_r\right)\\[6pt]\mathcal{Y}\left[\boxed{p\,r}\right]iG^{A\lambda\rho}_L G^A_{L\,\mu\nu}\left(D_\lambda\overline{N}_p\sigma^{\mu\nu}CD_\rho\overline{N}_r\right)\end{array}\right. \tag{4.203}$$

$$\mathcal{O}^{(1,2)}_{W_L{}^2\bar{N}^2 D^2}(0,-2)\left| \begin{array}{l}\mathcal{Y}\left[\boxed{p\,r}\right]W^I_{L\,\nu\lambda}W^{I\nu\lambda}_L\left(D_\mu\overline{N}_p CD^\mu\overline{N}_r\right)\\[6pt]\mathcal{Y}\left[\boxed{p\,r}\right]iW^{I\lambda\rho}_L W^I_{L\,\mu\nu}\left(D_\lambda\overline{N}_p\sigma^{\mu\nu}CD_\rho\overline{N}_r\right)\end{array}\right. \tag{4.204}$$

$$\mathcal{O}^{(1,2)}_{B_L{}^2\bar{N}^2 D^2}(0,-2)\left| \begin{array}{l}\mathcal{Y}\left[\boxed{p\,r}\right]B_{L\,\nu\lambda}B_L{}^{\nu\lambda}\left(D_\mu\overline{N}_p CD^\mu\overline{N}_r\right)\\[6pt]\mathcal{Y}\left[\boxed{p\,r}\right]iB_{L\,\mu\nu}B_L{}^{\lambda\rho}\left(D_\lambda\overline{N}_p\sigma^{\mu\nu}CD_\rho\overline{N}_r\right)\end{array}\right. \tag{4.205}$$

Class $F_L F_R\psi^2 D^2$: 3 types

$$\mathcal{O}_{G_L G_R\bar{N}^2 D^2}(0,-2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]G^{A\mu}_L{}_\lambda G^{A\nu\lambda}_R\left(\overline{N}_p CD_\mu D_\nu\overline{N}_r\right) \tag{4.206}$$

$$\mathcal{O}_{W_L W_R\bar{N}^2 D^2}(0,-2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]W^{I\mu}_L{}_\lambda W^{I\nu\lambda}_R\left(\overline{N}_p CD_\mu D_\nu\overline{N}_r\right) \tag{4.207}$$

$$\mathcal{O}_{B_L B_R\bar{N}^2 D^2}(0,-2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]B_L{}^\mu{}_\lambda B_R{}^{\nu\lambda}\left(\overline{N}_p CD_\mu D_\nu\overline{N}_r\right) \tag{4.208}$$

Class $F_L{}^2\psi^{\dagger 2} D^2$: 3 types

$$\mathcal{O}_{G_L{}^2 N^2 D^2}(0,2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]G^A_{L\,\nu\lambda}G^{A\nu\lambda}_L\left(D_\mu N_p CD^\mu N_r\right) \tag{4.209}$$

$$\mathcal{O}_{W_L{}^2 N^2 D^2}(0,2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]W^I_{L\,\nu\lambda}W^{I\nu\lambda}_L\left(D_\mu N_p CD^\mu N_r\right) \tag{4.210}$$

$$\mathcal{O}_{B_L{}^2 N^2 D^2}(0,2)\Big| \mathcal{Y}\left[\boxed{p\,r}\right]B_{L\,\nu\lambda}B_L{}^{\nu\lambda}\left(D_\mu N_p CD^\mu N_r\right) \tag{4.211}$$

Class $F_L\psi\psi^\dagger\phi D^3$: 4 types

$$\mathcal{O}^{(1,2)}_{W_L l NHD^3}(0,2)\left| \begin{array}{l}i\left(\tau^I\right)^i_k\epsilon^{jk}D_\mu D_\nu H_j W^{I\nu}_L{}_\lambda\left(l_{pi}C\gamma^\lambda D^\mu N_r\right)\\[6pt]i\left(\tau^I\right)^i_k\epsilon^{jk}D_\mu D_\nu H_j W^{I\nu}_L{}_\lambda\left(l_{pi}C\gamma^\mu D_\lambda N_r\right)\end{array}\right. \tag{4.212}$$

$$\mathcal{O}^{(1,2)}_{W_L\bar{l}\bar{N}H^\dagger D^3}(0,-2)\left| \begin{array}{l}i\epsilon_{jk}\left(\tau^I\right)^k_i W^{I\nu}_L{}_\lambda D_\mu D_\nu H^{\dagger i}\left(\overline{N}_p\gamma^\lambda CD^\mu\bar{l}_r{}^j\right)\\[6pt]i\epsilon_{jk}\left(\tau^I\right)^k_i W^{I\nu\lambda}_L D_\mu D_\nu H^{\dagger i}\left(\overline{N}_p\gamma^\mu CD_\lambda\bar{l}_r{}^j\right)\end{array}\right. \tag{4.213}$$

$$\mathcal{O}_{B_{\mathrm{L}} l N H D^3}^{(1,2)}(0,2) \left| \begin{matrix} i\epsilon^{ij} B_{\mathrm{L}}{}^{\nu}{}_{\lambda} D_{\mu} D_{\nu} H_j \left(l_{pi} C \gamma^{\lambda} D^{\mu} N_r \right) \\ i\epsilon^{ij} B_{\mathrm{L}}{}^{\nu\lambda} D_{\mu} D_{\nu} H_j \left(l_{pi} C \gamma^{\mu} D_{\lambda} N_r \right) \end{matrix} \right. \tag{4.214}$$

$$\mathcal{O}_{B_{\mathrm{L}} \bar{l} N H^{\dagger} D^3}^{(1,2)}(0,-2) \left| \begin{matrix} i\epsilon_{ij} B_{\mathrm{L}}{}^{\nu}{}_{\lambda} D_{\mu} D_{\nu} H^{\dagger i} \left(\overline{N}_p \gamma^{\lambda} C D^{\mu} \bar{l}_r{}^j \right) \\ i\epsilon_{ij} B_{\mathrm{L}}{}^{\nu\lambda} D_{\mu} D_{\nu} H^{\dagger i} \left(\overline{N}_p \gamma^{\mu} C D_{\lambda} \bar{l}_r{}^j \right) \end{matrix} \right. \tag{4.215}$$

Class $\psi^2 \phi^2 D^4$: 2 types

$$\mathcal{O}_{\bar{e} \bar{N} H^{\dagger 2} D^4}(0,-2) \left| i\epsilon_{ij} D_{\mu} D_{\nu} H^{\dagger i} D_{\lambda} D^{\mu} H^{\dagger j} \left(\bar{e}_p \sigma^{\nu\lambda} C \overline{N}_r \right) \right. \tag{4.216}$$

$$\mathcal{O}_{\bar{N}^2 H H^{\dagger} D^4}^{(1\sim 3)}(0,-2) \left| \begin{matrix} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i D_{\mu} D_{\nu} H_i D_{\lambda} D^{\mu} H^{\dagger i} \left(\overline{N}_p \sigma^{\nu\lambda} C \overline{N}_r \right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] \left(\overline{N}_p C \overline{N}_r \right) D_{\mu} D_{\nu} H_i D^{\mu} D^{\nu} H^{\dagger i} \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] i D_{\nu} H_i D_{\lambda} D^{\mu} H^{\dagger i} \left(\overline{N}_p \sigma^{\nu\lambda} C D_{\mu} \overline{N}_r \right) \end{matrix} \right. \tag{4.217}$$

Class $F_{\mathrm{L}}{}^3 \psi^2$: 5 types

$$\mathcal{O}_{G_{\mathrm{L}}{}^3 \bar{N}^2}^{(1,2)}(0,-2) \left| \begin{matrix} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i d^{ABC} G_{\mathrm{L}}^{A}{}_{\mu\nu} G_{\mathrm{L}}^{B \mu\nu} G_{\mathrm{L}}^{C}{}_{\lambda\rho} \left(\overline{N}_p \sigma^{\lambda\rho} C \overline{N}_r \right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] f^{ABC} \left(\overline{N}_p C \overline{N}_r \right) G_{\mathrm{L}}^{A}{}_{\mu\nu} G_{\mathrm{L}}^{B \mu}{}_{\lambda} G_{\mathrm{L}}^{C \nu\lambda} \end{matrix} \right. \tag{4.218}$$

$$\mathcal{O}_{B_{\mathrm{L}} G_{\mathrm{L}}{}^2 \bar{N}^2}^{(1,2)}(0,-2) \left| \begin{matrix} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i B_{\mathrm{L} \mu\nu} G_{\mathrm{L}}^{A}{}_{\lambda\rho} G_{\mathrm{L}}^{A \mu\nu} \left(\overline{N}_p \sigma^{\lambda\rho} C \overline{N}_r \right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i B_{\mathrm{L} \mu\nu} G_{\mathrm{L}}^{A \mu}{}_{\lambda} G_{\mathrm{L}}^{A \lambda}{}_{\rho} \left(\overline{N}_p \sigma^{\nu\rho} C \overline{N}_r \right) \end{matrix} \right. \tag{4.219}$$

$$\mathcal{O}_{W_{\mathrm{L}}{}^3 \bar{N}^2}(0,-2) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] \epsilon^{IJK} \left(\overline{N}_p C \overline{N}_r \right) W_{\mathrm{L} \mu\nu}^{I} W_{\mathrm{L}}^{J \mu}{}_{\lambda} W_{\mathrm{L}}^{K \nu\lambda} \right. \tag{4.220}$$

$$\mathcal{O}_{B_{\mathrm{L}} W_{\mathrm{L}}{}^2 \bar{N}^2}^{(1,2)}(0,-2) \left| \begin{matrix} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i B_{\mathrm{L} \mu\nu} W_{\mathrm{L} \lambda\rho}^{I} W_{\mathrm{L}}^{I \mu\nu} \left(\overline{N}_p \sigma^{\lambda\rho} C \overline{N}_r \right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i B_{\mathrm{L} \mu\nu} W_{\mathrm{L}}^{I \mu}{}_{\lambda} W_{\mathrm{L}}^{I \lambda}{}_{\rho} \left(\overline{N}_p \sigma^{\nu\rho} C \overline{N}_r \right) \end{matrix} \right. \tag{4.221}$$

$$\mathcal{O}_{B_{\mathrm{L}}{}^3 \bar{N}^2}(0,-2) \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] i B_{\mathrm{L} \lambda\rho} B_{\mathrm{L} \mu\nu} B_{\mathrm{L}}{}^{\mu\nu} \left(\overline{N}_p \sigma^{\lambda\rho} C \overline{N}_r \right) \right. \tag{4.222}$$

Class $F_{\mathrm{L}}{}^3 \psi^{\dagger 2}$: 2 types

$$\mathcal{O}_{G_{\mathrm{L}}{}^3 N^2}(0,2) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] f^{ABC} \left(N_p C N_r \right) G_{\mathrm{L} \mu\nu}^{A} G_{\mathrm{L}}^{B \mu}{}_{\lambda} G_{\mathrm{L}}^{C \nu\lambda} \right. \tag{4.223}$$

$$\mathcal{O}_{W_{\mathrm{L}}{}^3 N^2}(0,2) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] \epsilon^{IJK} \left(N_p C N_r \right) W_{\mathrm{L} \mu\nu}^{I} W_{\mathrm{L}}^{J \mu}{}_{\lambda} W_{\mathrm{L}}^{K \nu\lambda} \right. \tag{4.224}$$

Class $F_{\mathrm{L}}{}^2 \psi \psi^{\dagger} \phi D$: 8 types

$$\mathcal{O}_{G_{\mathrm{L}}{}^2 l N H D}(0,2) \left| i\epsilon^{ij} D_{\mu} H_j G_{\mathrm{L} \nu\lambda}^{A} G_{\mathrm{L}}^{A \nu\lambda} \left(l_{pi} C \gamma^{\mu} N_r \right) \right. \tag{4.225}$$

$$\mathcal{O}_{G_{\mathrm{L}}{}^2 \bar{l} \bar{N} H^{\dagger} D}(0,-2) \left| i\epsilon_{ij} G_{\mathrm{L} \nu\lambda}^{A} G_{\mathrm{L}}^{A \nu\lambda} D_{\mu} H^{\dagger i} \left(\overline{N}_p \gamma^{\mu} C \bar{l}_r{}^j \right) \right. \tag{4.226}$$

$$\mathcal{O}_{W_{\mathrm{L}}{}^2 l N H D}^{(1\sim 3)}(0,2) \left| \begin{matrix} i\epsilon^{ij} D_{\mu} H_j W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{I \nu\lambda} \left(l_{pi} C \gamma^{\mu} N_r \right) \\ i \left(\tau^K \right)_k^i \epsilon^{IJK} \epsilon^{jk} H_j W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{J \lambda\mu} \left(D_{\mu} l_{pi} C \gamma^{\nu} N_r \right) \\ i \left(\tau^K \right)_k^i \epsilon^{IJK} \epsilon^{jk} D_{\mu} H_j W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{J \lambda\mu} \left(l_{pi} C \gamma^{\nu} N_r \right) \end{matrix} \right. \tag{4.227}$$

$$\mathcal{O}_{W_{\mathrm{L}}{}^2 \bar{l} \bar{N} H^{\dagger} D}^{(1\sim 3)}(0,-2) \left| \begin{matrix} i\epsilon_{km} \left(\tau^I \right)_j^m \left(\tau^J \right)_i^k D_{\mu} H^{\dagger i} W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{J \nu\lambda} \left(\overline{N}_p \gamma^{\mu} C \bar{l}_r{}^j \right) \\ i\epsilon_{km} \left(\tau^I \right)_j^m \left(\tau^J \right)_i^k H^{\dagger i} W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{J \lambda\mu} \left(D_{\mu} \overline{N}_p \gamma^{\nu} C \bar{l}_r{}^j \right) \\ i\epsilon_{km} \left(\tau^I \right)_j^m \left(\tau^J \right)_i^k D_{\mu} H^{\dagger i} W_{\mathrm{L} \nu\lambda}^{I} W_{\mathrm{L}}^{J \lambda\mu} \left(\overline{N}_p \gamma^{\nu} C \bar{l}_r{}^j \right) \end{matrix} \right. \tag{4.228}$$

$$\mathcal{O}^{(1\sim3)}_{B_\mathrm{L}W_\mathrm{L}lNHD}(0,2)\left|\begin{array}{l} i\left(\tau^I\right)^i_{\;k}\epsilon^{jk}B_{\mathrm{L}\nu\lambda}D_\mu H_j W^{I\nu\lambda}_\mathrm{L}\left(l_{pi}C\gamma^\mu N_r\right)\\[4pt] i\left(\tau^I\right)^i_{\;k}\epsilon^{jk}H_j B_{\mathrm{L}\nu\lambda}W^{I\lambda\mu}_\mathrm{L}\left(D_\mu l_{pi}C\gamma^\nu N_r\right)\\[4pt] i\left(\tau^I\right)^i_{\;k}\epsilon^{jk}B_{\mathrm{L}\nu\lambda}D_\mu H_j W^{I\lambda\mu}_\mathrm{L}\left(l_{pi}C\gamma^\nu N_r\right)\end{array}\right. \tag{4.229}$$

$$\mathcal{O}^{(1\sim3)}_{B_\mathrm{L}W_\mathrm{L}\bar{l}\bar{N}H^\dagger D}(0,-2)\left|\begin{array}{l} i\epsilon_{jk}\left(\tau^I\right)^k_{\;i}B_{\mathrm{L}\nu\lambda}D_\mu H^{\dagger i}W^{I\nu\lambda}_\mathrm{L}\left(\overline{N}_p\gamma^\mu C\bar{l}_r^{\;j}\right)\\[4pt] i\epsilon_{jk}\left(\tau^I\right)^k_{\;i}B_{\mathrm{L}\nu\lambda}H^{\dagger i}W^{I\lambda\mu}_\mathrm{L}\left(D_\mu\overline{N}_p\gamma^\nu C\bar{l}_r^{\;j}\right)\\[4pt] i\epsilon_{jk}\left(\tau^I\right)^k_{\;i}B_{\mathrm{L}\nu\lambda}D_\mu H^{\dagger i}W^{I\lambda\mu}_\mathrm{L}\left(\overline{N}_p\gamma^\nu C\bar{l}_r^{\;j}\right)\end{array}\right. \tag{4.230}$$

$$\mathcal{O}_{B_\mathrm{L}^2 lNHD}(0,2)\left|i\epsilon^{ij}B_{\mathrm{L}\nu\lambda}B_\mathrm{L}^{\;\nu\lambda}D_\mu H_j\left(l_{pi}C\gamma^\mu N_r\right)\right. \tag{4.231}$$

$$\mathcal{O}_{B_\mathrm{L}^2\bar{l}\bar{N}H^\dagger D}(0,-2)\left|i\epsilon_{ij}B_{\mathrm{L}\nu\lambda}B_\mathrm{L}^{\;\nu\lambda}D_\mu H^{\dagger i}\left(\overline{N}_p\gamma^\mu C\bar{l}_r^{\;j}\right)\right. \tag{4.232}$$

Class $F_\mathrm{L}\psi^2\phi^2 D^2$: 4 types

$$\mathcal{O}^{(1\sim3)}_{W_\mathrm{L}\bar{e}\bar{N}H^{\dagger 2}D^2}(0,-2)\left|\begin{array}{l} i\epsilon_{jk}\left(\tau^I\right)^k_{\;i}D_\mu H^{\dagger i}D^\mu H^{\dagger j}W^I_{\mathrm{L}\nu\lambda}\left(\bar{e}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\\[4pt] i\epsilon_{jk}\left(\tau^I\right)^k_{\;i}H^{\dagger i}D_\nu H^{\dagger j}W^{I\lambda\mu}_\mathrm{L}\left(\bar{e}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\\[4pt] \epsilon_{jk}\left(\tau^I\right)^k_{\;i}H^{\dagger i}D_\nu H^{\dagger j}W^{I\mu\nu}_\mathrm{L}\left(\bar{e}_p CD_\mu\overline{N}_r\right)\end{array}\right. \tag{4.233}$$

$$\mathcal{O}^{(1\sim7)}_{W_\mathrm{L}\bar{N}^2 HH^\dagger D^2}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\substack{p\\r}\right]i\left(\tau^I\right)^i_{\;j}D_\mu H_i D^\mu H^{\dagger j}W^I_{\mathrm{L}\nu\lambda}\left(\overline{N}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]i\left(\tau^I\right)^i_{\;j}D_\mu H_i D_\nu H^{\dagger j}W^{I\lambda\mu}_\mathrm{L}\left(\overline{N}_p\sigma^{\lambda\nu}C\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]\left(\tau^I\right)^i_{\;j}H_i D_\nu H^{\dagger j}W^{I\mu\nu}_\mathrm{L}\left(\overline{N}_p CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]\left(\tau^I\right)^i_{\;j}H^{\dagger j}D_\nu H_i W^{I\mu\nu}_\mathrm{L}\left(\overline{N}_p CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]\left(\tau^I\right)^i_{\;j}D_\mu H_i\left(\overline{N}_p C\overline{N}_r\right)D_\nu H^{\dagger j}W^{I\mu\nu}_\mathrm{L}\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]i\left(\tau^I\right)^i_{\;j}H_i D_\nu H^{\dagger j}W^{I\lambda\mu}_\mathrm{L}\left(\overline{N}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]i\left(\tau^I\right)^i_{\;j}H^{\dagger j}D_\nu H_i W^{I\lambda\mu}_\mathrm{L}\left(\overline{N}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\end{array}\right. \tag{4.234}$$

$$\mathcal{O}^{(1\sim4)}_{B_\mathrm{L}\bar{e}\bar{N}H^{\dagger 2}D^2}(0,-2)\left|\begin{array}{l} i\epsilon_{ij}B_\mathrm{L}^{\;\lambda\mu}D_\mu H^{\dagger i}D_\nu H^{\dagger j}\left(\bar{e}_p\sigma^{\lambda\nu}C\overline{N}_r\right)\\[4pt] \epsilon_{ij}B_\mathrm{L}^{\;\mu\nu}D_\mu H^{\dagger i}D_\nu H^{\dagger j}\left(\bar{e}_p C\overline{N}_r\right)\\[4pt] i\epsilon_{ij}H^{\dagger i}B_\mathrm{L}^{\;\lambda\mu}D_\nu H^{\dagger j}\left(\bar{e}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\\[4pt] \epsilon_{ij}H^{\dagger i}B_\mathrm{L}^{\;\mu\nu}D_\nu H^{\dagger j}\left(\bar{e}_p CD_\mu\overline{N}_r\right)\end{array}\right. \tag{4.235}$$

$$\mathcal{O}^{(1\sim7)}_{B_\mathrm{L}\bar{N}^2 HH^\dagger D^2}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\substack{p\\r}\right]iB_{\mathrm{L}\nu\lambda}D_\mu H_i D^\mu H^{\dagger i}\left(\overline{N}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]iB_\mathrm{L}^{\;\lambda\mu}D_\mu H_i D_\nu H^{\dagger i}\left(\overline{N}_p\sigma^{\lambda\nu}C\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]H_i B_\mathrm{L}^{\;\mu\nu}D_\nu H^{\dagger i}\left(\overline{N}_p CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\substack{p\\r}\right]H^{\dagger i}B_\mathrm{L}^{\;\mu\nu}D_\nu H_i\left(\overline{N}_p CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]B_\mathrm{L}^{\;\mu\nu}D_\mu H_i\left(\overline{N}_p C\overline{N}_r\right)D_\nu H^{\dagger i}\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]iH_i B_\mathrm{L}^{\;\lambda\mu}D_\nu H^{\dagger i}\left(\overline{N}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]iH^{\dagger i}B_\mathrm{L}^{\;\lambda\mu}D_\nu H_i\left(\overline{N}_p\sigma^{\lambda\nu}CD_\mu\overline{N}_r\right)\end{array}\right. \tag{4.236}$$

Class $F_L F_R{}^2 \psi^2$: 6 types

$$\mathcal{O}_{G_L G_R{}^2 \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] id^{ABC} G_{L\,\mu\nu}^A G_{R\,\lambda\rho}^B G_R^{C\,\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.237}$$

$$\mathcal{O}_{B_R G_L G_R \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_{R\,\lambda\rho} G_{L\,\mu\nu}^A G_R^{A\,\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.238}$$

$$\mathcal{O}_{B_R W_L W_R \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_{R\,\lambda\rho} W_{L\,\mu\nu}^I W_R^{I\,\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.239}$$

$$\mathcal{O}_{B_L G_R{}^2 \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_{L\,\mu\nu} G_{R\,\lambda\rho}^A G_R^{A\,\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.240}$$

$$\mathcal{O}_{B_L W_R{}^2 \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_{L\,\mu\nu} W_{R\,\lambda\rho}^I W_R^{I\,\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.241}$$

$$\mathcal{O}_{B_L B_R{}^2 \bar{N}^2}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_{L\,\mu\nu} B_{R\,\lambda\rho} B_R^{\lambda\rho}\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \tag{4.242}$$

Class $F_R \psi^2 \phi^2 D^2$: 4 types

$$\mathcal{O}_{W_R \bar{e} \bar{N} H^{\dagger 2} D^2}^{(1,2)}(0,-2)\left|\begin{matrix} i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i} W_R^{I\,\mu}{}_\lambda D_\mu D_\nu H^{\dagger j}\left(\overline{e}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \\ i\epsilon_{jk}\left(\tau^I\right)_i^k D_\mu H^{\dagger i} D_\nu H^{\dagger j} W_R^{I}{}_\lambda{}^\mu\left(\overline{e}_p \sigma^{\lambda\nu} C \overline{N}_r\right) \end{matrix}\right. \tag{4.243}$$

$$\mathcal{O}_{B_R \bar{e} \bar{N} H^{\dagger 2} D^2}^{(1,2)}(0,-2)\left|\begin{matrix} \epsilon_{ij} B_R^{\mu\nu} D_\mu H^{\dagger i} D_\nu H^{\dagger j}\left(\overline{e}_p C \overline{N}_r\right) \\ i\epsilon_{ij} H^{\dagger i} B_R^{\mu}{}_\lambda D_\mu D_\nu H^{\dagger j}\left(\overline{e}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \end{matrix}\right. \tag{4.244}$$

$$\mathcal{O}_{W_R \bar{N}^2 H H^{\dagger} D^2}^{(1\sim4)}(0,-2)\left|\begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_j^i H_i W_R^{I\,\mu}{}_\lambda D_\mu D_\nu H^{\dagger j}\left(\overline{N}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_j^i H^{\dagger j} D_\mu D_\nu H_i W_R^{I\,\mu}{}_\lambda\left(\overline{N}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_j^i D_\mu H_i D_\nu H^{\dagger j} W_R^{I}{}_\lambda{}^\mu\left(\overline{N}_p \sigma^{\lambda\nu} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right]\left(\tau^I\right)_j^i D_\mu H_i\left(\overline{N}_p C \overline{N}_r\right) D_\nu H^{\dagger j} W_R^{I\,\mu\nu} \end{matrix}\right. \tag{4.245}$$

$$\mathcal{O}_{B_R \bar{N}^2 H H^{\dagger} D^2}^{(1\sim4)}(0,-2)\left|\begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iH_i B_R^{\mu}{}_\lambda D_\mu D_\nu H^{\dagger i}\left(\overline{N}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iH^{\dagger i} B_R^{\mu}{}_\lambda D_\mu D_\nu H_i\left(\overline{N}_p \sigma^{\nu\lambda} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iB_R{}_\lambda{}^\mu D_\mu H_i D_\nu H^{\dagger i}\left(\overline{N}_p \sigma^{\lambda\nu} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] B_R^{\mu\nu} D_\mu H_i\left(\overline{N}_p C \overline{N}_r\right) D_\nu H^{\dagger i} \end{matrix}\right. \tag{4.246}$$

Class $\psi\psi^{\dagger}\phi^3 D^3$: 1 type

$$\mathcal{O}_{lNH^2 H^{\dagger} D^3}^{(1\sim10)}(0,2)\left|\begin{matrix} i\epsilon^{ik} H_j H_k D_\mu D_\nu H^{\dagger j}\left(l_{pi} C \gamma^\nu D^\mu N_r\right) \\ \epsilon^{ik} H_j D_\mu H_k D_\nu H^{\dagger j} \epsilon^{\lambda\mu\nu\rho}\left(l_{pi} C \gamma_\rho D_\lambda N_r\right) \\ \epsilon^{ij} H_j D_\mu H_k D_\nu H^{\dagger k} \epsilon^{\lambda\mu\nu\rho}\left(l_{pi} C \gamma_\rho D_\lambda N_r\right) \\ i\epsilon^{ik} H_j D_\mu H_k D_\nu H^{\dagger j}\left(l_{pi} C \gamma^\nu D^\mu N_r\right) \\ i\epsilon^{ik} H_j D_\mu H_k D_\nu D^\mu H^{\dagger j}\left(l_{pi} C \gamma^\nu N_r\right) \\ i\epsilon^{ij} H_j D_\mu H_k D_\nu D^\mu H^{\dagger k}\left(l_{pi} C \gamma^\nu N_r\right) \\ i\epsilon^{ik} H_j H^{\dagger j} D_\mu D_\nu H_k\left(l_{pi} C \gamma^\nu D^\mu N_r\right) \\ i\epsilon^{ij} H_j H^{\dagger k} D_\mu D_\nu H_k\left(l_{pi} C \gamma^\nu D^\mu N_r\right) \\ i\epsilon^{ik} H_j D_\mu D_\nu H_k D^\mu H^{\dagger j}\left(l_{pi} C \gamma^\nu N_r\right) \\ i\epsilon^{ij} H_j D_\mu D_\nu H_k D^\mu H^{\dagger k}\left(l_{pi} C \gamma^\nu N_r\right) \end{matrix}\right. \tag{4.247}$$

Class $F_{\rm L}F_{\rm R}\psi\psi^\dagger\phi D$: 5 types

$$\mathcal{O}^{(1,2)}_{G_{\rm L}G_{\rm R}lNHD}(0,2)\left|\begin{array}{l} i\epsilon^{ij}H_j G^{A\mu}{}_\nu G^{A\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda D_\mu N_r\right)\\[4pt] i\epsilon^{ij}D_\mu H_j G^{A\mu}_{\rm L}{}_\nu G^{A\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda N_r\right)\end{array}\right. \tag{4.248}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\rm L}W_{\rm R}lNHD}(0,2)\left|\begin{array}{l} i\left(\tau^I\right)^j_m\left(\tau^J\right)^i_k\epsilon^{km}H_j W^{I\mu}_{\rm L}{}_\nu W^{J\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda D_\mu N_r\right)\\[4pt] i\left(\tau^I\right)^i_m\left(\tau^J\right)^j_k\epsilon^{km}H_j W^{I\mu}_{\rm L}{}_\nu W^{J\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda D_\mu N_r\right)\\[4pt] i\left(\tau^I\right)^j_m\left(\tau^J\right)^i_k\epsilon^{km}D_\mu H_j W^{I\mu}_{\rm L}{}_\nu W^{J\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda N_r\right)\\[4pt] i\left(\tau^I\right)^i_m\left(\tau^J\right)^j_k\epsilon^{km}D_\mu H_j W^{I\mu}_{\rm L}{}_\nu W^{J\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda N_r\right)\end{array}\right. \tag{4.249}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm R}W_{\rm L}lNHD}(0,2)\left|\begin{array}{l} i\left(\tau^I\right)^i_k\epsilon^{jk}H_j B^{\nu}_{\rm R}{}_\lambda W^{I\mu}_{\rm L}{}_\nu\left(l_{pi}C\gamma^\lambda D_\mu N_r\right)\\[4pt] i\left(\tau^I\right)^i_k\epsilon^{jk}B^{\nu}_{\rm R}{}_\lambda D_\mu H_j W^{I\mu}_{\rm L}{}_\nu\left(l_{pi}C\gamma^\lambda N_r\right)\end{array}\right. \tag{4.250}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm R}W_{\rm L}\bar{l}\bar{N}H^\dagger D}(0,-2)\left|\begin{array}{l} i\epsilon_{jk}\left(\tau^I\right)^k_i H^{\dagger i}B^{\nu}_{\rm R}{}_\lambda W^{I\mu}_{\rm L}{}_\nu\left(\overline{N}_p\gamma^\lambda C D_\mu\bar{l}_r{}^j\right)\\[4pt] i\epsilon_{jk}\left(\tau^I\right)^k_i B^{\nu}_{\rm R}{}_\lambda D_\mu H^{\dagger i}W^{I\mu}_{\rm L}{}_\nu\left(\overline{N}_p\gamma^\lambda C\bar{l}_r{}^j\right)\end{array}\right. \tag{4.251}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm L}B_{\rm R}lNHD}(0,2)\left|\begin{array}{l} i\epsilon^{ij}H_j B^{\mu}_{\rm L}{}_\nu B^{\nu}_{\rm R}{}_\lambda\left(l_{pi}C\gamma^\lambda D_\mu N_r\right)\\[4pt] i\epsilon^{ij}B^{\mu}_{\rm L}{}_\nu B^{\nu}_{\rm R}{}_\lambda D_\mu H_j\left(l_{pi}C\gamma^\lambda N_r\right)\end{array}\right. \tag{4.252}$$

Class $F_{\rm L}{}^2\psi^2\phi^2$: 6 types

$$\mathcal{O}_{G_{\rm L}{}^2\bar{N}^2 HH^\dagger}(0,-2)\left|\mathcal{Y}\left[\boxed{p|r}\right]H_i H^{\dagger i}\left(\overline{N}_p C\overline{N}_r\right)G^A_{{\rm L}\,\mu\nu}G^{A\mu\nu}_{\rm L}\right. \tag{4.253}$$

$$\mathcal{O}_{W_{\rm L}{}^2\bar{e}\bar{N}H^{\dagger2}}(0,-2)\left|i\epsilon_{km}\left(\tau^I\right)^m_j\left(\tau^J\right)^k_i H^{\dagger i}H^{\dagger j}W^I_{{\rm L}\,\mu\nu}W^{J\mu}_{\rm L}{}_\lambda\left(\overline{e}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\right. \tag{4.254}$$

$$\mathcal{O}^{(1,2)}_{W_{\rm L}{}^2\bar{N}^2 HH^\dagger}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{p|r}\right]H_i H^{\dagger i}\left(\overline{N}_p C\overline{N}_r\right)W^I_{{\rm L}\,\mu\nu}W^{I\mu\nu}_{\rm L}\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\left(\tau^K\right)^i_j\epsilon^{IJK}H_i H^{\dagger j}W^I_{{\rm L}\,\mu\nu}W^{J\mu}_{\rm L}{}_\lambda\left(\overline{N}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\end{array}\right. \tag{4.255}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm L}W_{\rm L}\bar{e}\bar{N}H^{\dagger2}}(0,-2)\left|\begin{array}{l}\epsilon_{jk}\left(\tau^I\right)^k_i B_{{\rm L}\,\mu\nu}H^{\dagger i}H^{\dagger j}W^{I\mu\nu}_{\rm L}\left(\overline{e}_p C\overline{N}_r\right)\\[4pt] i\epsilon_{jk}\left(\tau^I\right)^k_i B_{{\rm L}\,\mu\nu}H^{\dagger i}H^{\dagger j}W^{I\mu}_{\rm L}{}_\lambda\left(\overline{e}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\end{array}\right. \tag{4.256}$$

$$\mathcal{O}^{(1,2)}_{B_{\rm L}W_{\rm L}\bar{N}^2 HH^\dagger}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]i\left(\tau^I\right)^i_j H_i B_{{\rm L}\,\mu\nu}H^{\dagger j}W^{I\mu}_{\rm L}{}_\lambda\left(\overline{N}_p\sigma^{\nu\lambda}C\overline{N}_r\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\left(\tau^I\right)^i_j H_i B_{{\rm L}\,\mu\nu}H^{\dagger j}\left(\overline{N}_p C\overline{N}_r\right)W^{I\mu\nu}_{\rm L}\end{array}\right. \tag{4.257}$$

$$\mathcal{O}_{B_{\rm L}{}^2\bar{N}^2 HH^\dagger}(0,-2)\left|\mathcal{Y}\left[\boxed{p|r}\right]H_i B_{{\rm L}\,\mu\nu}H^{\dagger i}B^{\mu\nu}_{\rm L}\left(\overline{N}_p C\overline{N}_r\right)\right. \tag{4.258}$$

Class $F_{\rm L}{}^2\psi^{\dagger2}\phi^2$: 5 types

$$\mathcal{O}_{G_{\rm L}{}^2 N^2 HH^\dagger}(0,2)\left|\mathcal{Y}\left[\boxed{p|r}\right]H_i H^{\dagger i}\left(N_p C N_r\right)G^A_{{\rm L}\,\mu\nu}G^{A\mu\nu}_{\rm L}\right. \tag{4.259}$$

$$\mathcal{O}_{W_{\rm L}{}^2 N^2 HH^\dagger}(0,2)\left|\mathcal{Y}\left[\boxed{p|r}\right]H_i H^{\dagger i}\left(N_p C N_r\right)W^I_{{\rm L}\,\mu\nu}W^{I\mu\nu}_{\rm L}\right. \tag{4.260}$$

$$\mathcal{O}_{B_{\rm L}W_{\rm L}eNH^2}(0,2)\left|\left(\tau^I\right)^i_k\epsilon^{jk}H_i H_j B_{{\rm L}\,\mu\nu}\left(e_p C N_r\right)W^{I\mu\nu}_{\rm L}\right. \tag{4.261}$$

$$\mathcal{O}_{B_{\rm L}W_{\rm L}N^2 HH^\dagger}(0,2)\left|\mathcal{Y}\left[\boxed{p|r}\right]\left(\tau^I\right)^i_j H_i B_{{\rm L}\,\mu\nu}H^{\dagger j}\left(N_p C N_r\right)W^{I\mu\nu}_{\rm L}\right. \tag{4.262}$$

$$\mathcal{O}_{B_{\rm L}{}^2 N^2 HH^\dagger}(0,2)\left|\mathcal{Y}\left[\boxed{p|r}\right]H_i B_{{\rm L}\,\mu\nu}H^{\dagger i}B^{\mu\nu}_{\rm L}\left(N_p C N_r\right)\right. \tag{4.263}$$

Class $F_L \psi\psi^\dagger \phi^3 D$: 4 types

$$\mathcal{O}^{(1\sim5)}_{W_L l N H^2 H^\dagger D}(0,2) \left|
\begin{array}{l}
i\left(\tau^I\right)^j_n \epsilon^{kn} H_j H_k D_\mu H^{\dagger i} W_L^{I\mu}{}_\nu \left(l_{pi} C\gamma^\nu N_r\right) \\
i\left(\tau^I\right)^i_n \epsilon^{kn} H_j H_k D_\mu H^{\dagger j} W_L^{I\mu}{}_\nu \left(l_{pi} C\gamma^\nu N_r\right) \\
i\left(\tau^I\right)^j_n \epsilon^{kn} H_j H^{\dagger i} D_\mu H_k W_L^{I\mu}{}_\nu \left(l_{pi} C\gamma^\nu N_r\right) \\
i\left(\tau^I\right)^i_n \epsilon^{kn} H_j H^{\dagger j} D_\mu H_k W_L^{I\mu}{}_\nu \left(l_{pi} C\gamma^\nu N_r\right) \\
i\left(\tau^I\right)^i_n \epsilon^{jn} H_j H^{\dagger k} D_\mu H_k W_L^{I\mu}{}_\nu \left(l_{pi} C\gamma^\nu N_r\right)
\end{array}
\right. \tag{4.264}$$

$$\mathcal{O}^{(1\sim5)}_{W_L \bar{l} \bar{N} H H^{\dagger 2} D}(0,-2) \left|
\begin{array}{l}
i\epsilon_{kn}\left(\tau^I\right)^n_j H_i H^{\dagger j} D_\mu H^{\dagger k} W_L^{I\mu}{}_\nu \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^i\right) \\
i\epsilon_{kn}\left(\tau^I\right)^n_m H_i H^{\dagger i} D_\mu H^{\dagger k} W_L^{I\mu}{}_\nu \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^m\right) \\
i\epsilon_{mn}\left(\tau^I\right)^n_j H_i H^{\dagger j} D_\mu H^{\dagger i} W_L^{I\mu}{}_\nu \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^m\right) \\
i\epsilon_{kn}\left(\tau^I\right)^n_j H^{\dagger j} H^{\dagger k} D_\mu H_i W_L^{I\mu}{}_\nu \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^i\right) \\
i\epsilon_{kn}\left(\tau^I\right)^n_m H^{\dagger i} H^{\dagger k} D_\mu H_i W_L^{I\mu}{}_\nu \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^m\right)
\end{array}
\right. \tag{4.265}$$

$$\mathcal{O}^{(1\sim3)}_{B_L l N H^2 H^\dagger D}(0,2) \left|
\begin{array}{l}
i\epsilon^{ik} H_j H_k B_L^\mu{}_\nu D_\mu H^{\dagger j} \left(l_{pi} C\gamma^\nu N_r\right) \\
i\epsilon^{ik} H_j H^{\dagger j} B_L^\mu{}_\nu D_\mu H_k \left(l_{pi} C\gamma^\nu N_r\right) \\
i\epsilon^{ij} H_j H^{\dagger k} B_L^\mu{}_\nu D_\mu H_k \left(l_{pi} C\gamma^\nu N_r\right)
\end{array}
\right. \tag{4.266}$$

$$\mathcal{O}^{(1\sim3)}_{B_L \bar{l} \bar{N} H H^{\dagger 2} D}(0,-2) \left|
\begin{array}{l}
i\epsilon_{km} H_i H^{\dagger i} B_L^\mu{}_\nu D_\mu H^{\dagger k} \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^m\right) \\
i\epsilon_{jk} H_i H^{\dagger j} B_L^\mu{}_\nu D_\mu H^{\dagger k} \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^i\right) \\
i\epsilon_{km} H^{\dagger i} H^{\dagger k} B_L^\mu{}_\nu D_\mu H_i \left(\overline{N}_p \gamma^\nu C \bar{l}_r{}^m\right)
\end{array}
\right. \tag{4.267}$$

Class $\psi^2 \phi^4 D^2$: 2 types

$$\mathcal{O}^{(1\sim4)}_{\bar{e}\bar{N} H H^{\dagger 3} D^2}(0,-2) \left|
\begin{array}{l}
\epsilon_{jm} H_i H^{\dagger j} D_\mu H^{\dagger i} D^\mu H^{\dagger m} \left(\bar{e}_p C \overline{N}_r\right) \\
\epsilon_{jm} H^{\dagger i} H^{\dagger j} D_\mu H_i D^\mu H^{\dagger m} \left(\bar{e}_p C \overline{N}_r\right) \\
i\epsilon_{jm} H_i H^{\dagger j} D_\mu H^{\dagger i} D_\nu H^{\dagger m} \left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right) \\
i\epsilon_{jm} H^{\dagger i} H^{\dagger j} D_\mu H_i D_\nu H^{\dagger m} \left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right)
\end{array}
\right. \tag{4.268}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{N}^2 H^2 H^{\dagger 2} D^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i H_i H^{\dagger i} D_\mu H_j D_\nu H^{\dagger j} \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i H_i H^{\dagger j} D_\mu H_j D_\nu H^{\dagger i} \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \\
\mathcal{Y}\left[\boxed{p\,r}\right] H_i H_j \left(\overline{N}_p C \overline{N}_r\right) D_\mu H^{\dagger i} D^\mu H^{\dagger j} \\
\mathcal{Y}\left[\boxed{p\,r}\right] H_i H^{\dagger i} D_\mu H_j \left(\overline{N}_p C \overline{N}_r\right) D^\mu H^{\dagger j} \\
\mathcal{Y}\left[\boxed{p\,r}\right] H_i H^{\dagger j} D_\mu H_j \left(\overline{N}_p C \overline{N}_r\right) D^\mu H^{\dagger i} \\
\mathcal{Y}\left[\boxed{p\,r}\right] H^{\dagger i} H^{\dagger j} D_\mu H_i \left(\overline{N}_p C \overline{N}_r\right) D^\mu H_j
\end{array}
\right. \tag{4.269}$$

Class $F_L \psi^2 \phi^4$: 3 types

$$\mathcal{O}_{W_L \bar{e}\bar{N} H H^{\dagger 3}}(0,-2) \left| i\epsilon_{mn}\left(\tau^I\right)^n_k H_i H^{\dagger i} H^{\dagger k} H^{\dagger m} W_L^I{}_{\mu\nu} \left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right. \tag{4.270}$$

$$\mathcal{O}_{W_L \bar{N}^2 H^2 H^{\dagger 2}}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)^j_m H_i H_j H^{\dagger i} H^{\dagger m} W_L^I{}_{\mu\nu} \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right. \tag{4.271}$$

$$\mathcal{O}_{B_L \bar{N}^2 H^2 H^{\dagger 2}}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i H_i H_j B_L{}_{\mu\nu} H^{\dagger i} H^{\dagger j} \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right. \tag{4.272}$$

Class $\psi\psi^\dagger\phi^5 D$: 1 type

$$\mathcal{O}^{(1,2)}_{lNH^3H^{\dagger 2}D}(0,2)\left|\begin{array}{l} i\epsilon^{im} H_j H_k H_m H^{\dagger j} D^\mu H^{\dagger k} \left(l_{pi} C\gamma_\mu N_r\right) \\ i\epsilon^{im} H_j H_k H^{\dagger j} H^{\dagger k} D^\mu H_m \left(l_{pi} C\gamma_\mu N_r\right) \end{array}\right. \tag{4.273}$$

Class $\psi^2\phi^6$: 1 type

$$\mathcal{O}_{\bar{N}^2 H^3 H^{\dagger 3}}(0,-2)\left|\mathcal{Y}\,\boxed{\begin{array}{|c|}\hline p\,r\\\hline\end{array}}\, H_i H_j H_k H^{\dagger i} H^{\dagger j} H^{\dagger k} \left(\overline{N}_p C \overline{N}_r\right)\right. \tag{4.274}$$

4.5.2 Classes involving four-fermions

Class $\psi^3\psi^\dagger D^3$: 12 types

$$\mathcal{O}^{(1,2)}_{d\bar{N}q^2 D^3}(1,-1)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}\, i\epsilon^{abc}\epsilon^{ij}\left(\overline{N}_p D_\mu D_\nu q_{sbj}\right)\left(q_{rai} C\gamma^\nu D^\mu d_{tc}\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}\, i\epsilon^{abc}\epsilon^{ij}\left(\overline{N}_p D_\mu D_\nu q_{sbj}\right)\left(q_{rai} C\gamma^\nu D^\mu d_{tc}\right) \end{array}\right. \tag{4.275}$$

$$\mathcal{O}^{(1,2)}_{\bar{l}\bar{N}q\bar{u}D^3}(0,-2)\left|\begin{array}{l} i\left(\overline{N}_p C D_\mu D_\nu \bar{u}_s{}^a\right)\left(D^\mu \bar{l}_t{}^i \gamma^\nu q_{rai}\right) \\ i\left(D_\nu \bar{u}_s{}^a D_\mu q_{rai}\right)\left(\overline{N}_p \gamma^\nu C D^\mu \bar{l}_t{}^i\right) \end{array}\right. \tag{4.276}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}lNqD^3}(0,2)\left|\begin{array}{l} i\epsilon^{ij}\left(\bar{d}_p{}^a D_\mu D_\nu q_{saj}\right)\left(l_{ri} C\gamma^\nu D^\mu N_t\right) \\ i\epsilon^{ij}\left(\bar{d}_p{}^a \gamma^\nu D^\mu N_t\right)\left(D_\mu l_{ri} C D_\nu q_{saj}\right) \end{array}\right. \tag{4.277}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2 q\bar{q}D^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}\, i\left(\overline{N}_p D_\mu D_\nu q_{sai}\right)\left(\overline{N}_r \gamma^\nu C D^\mu \bar{q}_t{}^{ai}\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}\, i\left(D_\mu \overline{N}_r D_\nu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C D^\mu \bar{q}_t{}^{ai}\right) \end{array}\right. \tag{4.278}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2 N\bar{u}D^3}(-1,1)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}\, i\epsilon_{abc}\left(\bar{d}_r{}^b \gamma^\nu D^\mu N_t\right)\left(\bar{d}_p{}^a C D_\mu D_\nu \bar{u}_s{}^c\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}\, i\epsilon_{abc}\left(\bar{d}_p{}^a \gamma^\nu D^\mu N_t\right)\left(D_\mu \bar{d}_r{}^b C D_\nu \bar{u}_s{}^c\right) \end{array}\right. \tag{4.279}$$

$$\mathcal{O}^{(1,2)}_{d\bar{e}\bar{N}\bar{u}D^3}(0,-2)\left|\begin{array}{l} i\left(\bar{e}_p C D_\mu D_\nu \bar{u}_s{}^a\right)\left(\overline{N}_r \gamma^\nu D^\mu d_{ta}\right) \\ i\left(D_\mu \overline{N}_r C D_\nu \bar{u}_s{}^a\right)\left(\bar{e}_p \gamma^\nu D^\mu d_{ta}\right) \end{array}\right. \tag{4.280}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2\bar{u}uD^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}\, i\left(\overline{N}_p C D_\mu D_\nu \bar{u}_s{}^a\right)\left(\overline{N}_r \gamma^\nu D^\mu u_{ta}\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}\, i\left(D_\mu \overline{N}_r C D_\nu \bar{u}_s{}^a\right)\left(\overline{N}_p \gamma^\nu D^\mu u_{ta}\right) \end{array}\right. \tag{4.281}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}d\bar{N}^2 D^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}\, i\left(\bar{d}_p{}^a C D_\mu D_\nu \overline{N}_s\right)\left(\overline{N}_r \gamma^\nu D^\mu d_{ta}\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}\, i\left(\bar{d}_p{}^a C D_\mu D_\nu \overline{N}_s\right)\left(\overline{N}_r \gamma^\nu D^\mu d_{ta}\right) \end{array}\right. \tag{4.282}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l^2 ND^3}(0,2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}\, i\epsilon^{ij}\left(\bar{e}_p D_\mu D_\nu l_{sj}\right)\left(l_{ri} C\gamma^\nu D^\mu N_t\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}\, i\epsilon^{ij}\left(\bar{e}_p D_\mu D_\nu l_{sj}\right)\left(l_{ri} C\gamma^\nu D^\mu N_t\right) \end{array}\right. \tag{4.283}$$

$$\mathcal{O}^{(1,2)}_{l\bar{l}\bar{N}^2 D^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}\, i\left(D_\mu D_\nu \overline{N}_s l_{pi}\right)\left(\overline{N}_r \gamma^\nu C D^\mu \bar{l}_t{}^i\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}\, i\left(D_\mu D_\nu \overline{N}_s l_{pi}\right)\left(\overline{N}_r \gamma^\nu C D^\mu \bar{l}_t{}^i\right) \end{array}\right. \tag{4.284}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}e\bar{N}^2 D^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}\, i\left(\bar{e}_p C D_\mu D_\nu \overline{N}_s\right)\left(\overline{N}_r \gamma^\nu D^\mu e_t\right) \\ \mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}\, i\left(\bar{e}_p C D_\mu D_\nu \overline{N}_s\right)\left(\overline{N}_r \gamma^\nu D^\mu e_t\right) \end{array}\right. \tag{4.285}$$

$$\mathcal{O}_{\bar{N}^3 ND^3}(0,-2)\left|\mathcal{Y}\,\boxed{\begin{array}{|c|c|}\hline p & r\\\hline & s\\\hline\end{array}}\, i\left(\overline{N}_p C D_\mu D_\nu \overline{N}_s\right)\left(\overline{N}_r \gamma^\nu D^\mu N_t\right)\right. \tag{4.286}$$

$$\mathcal{O}^{(1\sim8)}_{G_Ld\bar{N}q^2D}(1,-1)\begin{vmatrix} \mathcal{Y}\,\boxed{\begin{smallmatrix}r&s\end{smallmatrix}}\,i\left(\lambda^A\right)^b_{\substack{e}}\epsilon^{ace}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r&s\end{smallmatrix}}\,i\left(\lambda^A\right)^a_{\substack{e}}\epsilon^{bce}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r&s\end{smallmatrix}}\,i\left(\lambda^A\right)^b_{\substack{e}}\epsilon^{ace}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r&s\end{smallmatrix}}\,i\left(\lambda^A\right)^a_{\substack{e}}\epsilon^{bce}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\lambda^A\right)^b_{\substack{e}}\epsilon^{ace}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\lambda^A\right)^a_{\substack{e}}\epsilon^{bce}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\lambda^A\right)^b_{\substack{e}}\epsilon^{ace}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc}) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\lambda^A\right)^a_{\substack{e}}\epsilon^{bce}\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc}) \end{vmatrix} \tag{4.287}$$

$$\mathcal{O}^{(1\sim4)}_{G_L\bar{l}\bar{N}q\bar{u}D}(0,-2)\begin{vmatrix} i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu C\bar{l}_t^{\ i}\right)\left(D_\mu\overline{u}_s^{\ b}q_{rai}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\overline{N}_p\gamma^\nu C\bar{l}_t^{\ i}\right)\left(\overline{u}_s^{\ b}D_\mu q_{rai}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\overline{N}_p C\overline{u}_s^{\ b}\right)\left(\bar{l}_t^{\ i}\gamma^\nu D_\mu q_{rai}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\bar{l}_t^{\ i}\gamma^\nu q_{rai}\right)\left(\overline{N}_p CD_\mu\overline{u}_s^{\ b}\right) \end{vmatrix} \tag{4.288}$$

$$\mathcal{O}^{(1\sim4)}_{G_L\bar{d}lNqD}(0,2)\begin{vmatrix} i\left(\lambda^A\right)^b_a\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)(l_{ri}CD_\mu q_{sbj}) \\ i\left(\lambda^A\right)^b_a\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)(D_\mu l_{ri}Cq_{sbj}) \\ i\left(\lambda^A\right)^b_a\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}q_{sbj}\right)(D_\mu l_{ri}C\gamma^\nu N_t) \\ i\left(\lambda^A\right)^b_a\epsilon^{ij}G^{A\mu}_{L\ \nu}\left(l_{ri}C\gamma^\nu N_t\right)\left(\bar{d}_p^{\ a}D_\mu q_{sbj}\right) \end{vmatrix} \tag{4.289}$$

$$\mathcal{O}^{(1\sim4)}_{G_L\bar{N}^2q\bar{q}D}(0,-2)\begin{vmatrix} \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\overline{q}_t^{\ bi}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(D_\mu\overline{N}_r q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\overline{q}_t^{\ bi}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\overline{q}_t^{\ bi}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\left(\lambda^A\right)^a_b G^{A\mu}_{L\ \nu}\left(D_\mu\overline{N}_r q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\overline{q}_t^{\ bi}\right) \end{vmatrix} \tag{4.290}$$

$$\mathcal{O}^{(1\sim8)}_{G_L\bar{d}^2N\bar{u}D}(-1,1)\begin{vmatrix} \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\epsilon_{ace}\left(\lambda^A\right)^e_b G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(\bar{d}_r^{\ b}CD_\mu\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\epsilon_{abe}\left(\lambda^A\right)^e_c G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(\bar{d}_r^{\ b}CD_\mu\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\epsilon_{ace}\left(\lambda^A\right)^e_b G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(D_\mu\bar{d}_r^{\ b}\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\epsilon_{abe}\left(\lambda^A\right)^e_c G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(D_\mu\bar{d}_r^{\ b}C\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\epsilon_{ace}\left(\lambda^A\right)^e_b G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(\bar{d}_r^{\ b}CD_\mu\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\epsilon_{abe}\left(\lambda^A\right)^e_c G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(\bar{d}_r^{\ b}CD_\mu\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\epsilon_{ace}\left(\lambda^A\right)^e_b G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(D_\mu\bar{d}_r^{\ b}C\overline{u}_s^{\ c}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\,i\epsilon_{abe}\left(\lambda^A\right)^e_c G^{A\mu}_{L\ \nu}\left(\bar{d}_p^{\ a}\gamma^\nu N_t\right)\left(D_\mu\bar{d}_r^{\ b}C\overline{u}_s^{\ c}\right) \end{vmatrix} \tag{4.291}$$

$$\mathcal{O}^{(1\sim4)}_{G_Ld\bar{e}\bar{N}\bar{u}D}(0,-2)\begin{vmatrix} i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu}\left(\overline{e}_p\gamma^\nu d_{tb}\right)\left(\overline{N}_r CD_\mu\overline{u}_s^{\ a}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu}\left(\overline{e}_p\gamma^\nu d_{tb}\right)\left(D_\mu\overline{N}_r C\overline{u}_s^{\ a}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu}\left(\overline{e}_p C\overline{u}_s^{\ a}\right)\left(D_\mu\overline{N}_r\gamma^\nu d_{tb}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu}\left(\overline{N}_r\gamma^\nu d_{tb}\right)\left(\overline{e}_p CD_\mu\overline{u}_s^{\ a}\right) \end{vmatrix} \tag{4.292}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{N}^2\bar{u}uD}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu u_{tb}\right)\left(\overline{N}_r C D_\mu \overline{u}_s{}^a\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu u_{tb}\right)\left(D_\mu\overline{N}_r C \overline{u}_s{}^a\right)\\[4pt]\mathcal{Y}\left[\overline{p\,r}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu u_{tb}\right)\left(\overline{N}_r C D_\mu \overline{u}_s{}^a\right)\\[4pt]\mathcal{Y}\left[\overline{p\,r}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu u_{tb}\right)\left(D_\mu\overline{N}_r C \overline{u}_s{}^a\right)\end{array}\right.\tag{4.293}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}d\bar{N}^2D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_r C D_\mu \overline{N}_s\right)\left(\overline{d}_p{}^a\gamma^\nu d_{tb}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{d}_p{}^a C \overline{N}_s\right)\left(D_\mu\overline{N}_r\gamma^\nu d_{tb}\right)\\[4pt]\mathcal{Y}\left[\overline{r\,s}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_r C D_\mu \overline{N}_s\right)\left(\overline{d}_p{}^a\gamma^\nu d_{tb}\right)\\[4pt]\mathcal{Y}\left[\overline{r\,s}\right]i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{d}_p{}^a C \overline{N}_s\right)\left(D_\mu\overline{N}_r\gamma^\nu d_{tb}\right)\end{array}\right.\tag{4.294}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm{L}}d\bar{N}q^2D}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\overline{r\,s}\right]i\left(\tau^I\right)^i_k \epsilon^{abc}\epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}C D_\mu q_{sbj})\\[4pt]\mathcal{Y}\left[\overline{r\,s}\right]i\left(\tau^I\right)^i_k \epsilon^{abc}\epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc})\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\tau^I\right)^i_k \epsilon^{abc}\epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p\gamma^\nu d_{tc}\right)(q_{rai}C D_\mu q_{sbj})\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\tau^I\right)^i_k \epsilon^{abc}\epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p q_{sbj}\right)(D_\mu q_{rai}C\gamma^\nu d_{tc})\end{array}\right.\tag{4.295}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm{L}}\bar{l}\bar{N}q\bar{u}D}(0,-2)\left|\begin{array}{l}i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{u}_s{}^a q_{rai}\right)\left(\overline{N}_p\gamma^\nu C\bar{l}_t{}^j\right)\\[4pt]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{u}_s{}^a D_\mu q_{rai}\right)\left(\overline{N}_p\gamma^\nu C\bar{l}_t{}^j\right)\\[4pt]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p C\overline{u}_s{}^a\right)\left(\bar{l}_t{}^j\gamma^\nu D_\mu q_{rai}\right)\\[4pt]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_p C D_\mu\overline{u}_s{}^a\right)\left(\bar{l}_t{}^j\gamma^\nu q_{rai}\right)\end{array}\right.\tag{4.296}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm{L}}\bar{d}lNqD}(0,2)\left|\begin{array}{l}i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{d}_p{}^a\gamma^\nu N_t\right)(l_{ri}C D_\mu q_{saj})\\[4pt]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{d}_p{}^a\gamma^\nu N_t\right)(D_\mu l_{ri}C q_{saj})\\[4pt]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{d}_p{}^a q_{saj}\right)(D_\mu l_{ri}C\gamma^\nu N_t)\\[4pt]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(l_{ri}C\gamma^\nu N_t\right)\left(\overline{d}_p{}^a D_\mu q_{saj}\right)\end{array}\right.\tag{4.297}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm{L}}\bar{N}^2q\bar{q}D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\bar{q}_t^{aj}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_r q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\bar{q}_t^{aj}\right)\\[4pt]\mathcal{Y}\left[\overline{p\,r}\right]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\bar{q}_t^{aj}\right)\\[4pt]\mathcal{Y}\left[\overline{p\,r}\right]i\left(\tau^I\right)^i_j W^{I\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_r q_{sai}\right)\left(\overline{N}_p\gamma^\nu C\bar{q}_t^{aj}\right)\end{array}\right.\tag{4.298}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm{L}}\bar{e}l^2ND}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{e}_p\gamma^\nu N_t\right)(l_{ri}C D_\mu l_{sj})\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{e}_p l_{sj}\right)(D_\mu l_{ri}C\gamma^\nu N_t)\\[4pt]\mathcal{Y}\left[\overline{r\,s}\right]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{e}_p\gamma^\nu N_t\right)(l_{ri}C D_\mu l_{sj})\\[4pt]\mathcal{Y}\left[\overline{r\,s}\right]i\left(\tau^I\right)^i_k \epsilon^{jk}W^{I\mu}_{\mathrm{L}\ \nu}\left(\overline{e}_p l_{sj}\right)(D_\mu l_{ri}C\gamma^\nu N_t)\end{array}\right.\tag{4.299}$$

$$\mathcal{O}^{(1\sim4)}_{W_{\mathrm L}l\bar l\bar N^2 D}(0,-2)\begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm L}^{I\mu}{}_\nu \left(\overline{N}_r C D_\mu \overline{N}_s\right)\left(\bar l_t^j \gamma^\nu l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm L}^{I\mu}{}_\nu \left(\overline{N}_s l_{pi}\right)\left(D_\mu \overline{N}_r \gamma^\nu C\bar l_t^j\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm L}^{I\mu}{}_\nu \left(\overline{N}_r C D_\mu \overline{N}_s\right)\left(\bar l_t^j \gamma^\nu l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm L}^{I\mu}{}_\nu \left(\overline{N}_s l_{pi}\right)\left(D_\mu \overline{N}_r \gamma^\nu C\bar l_t^j\right) \end{vmatrix}\tag{4.300}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}d\bar N q^2 D}(1,-1)\begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu d_{tc}\right)\left(q_{rai} C D_\mu q_{sbj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p q_{sbj}\right)\left(D_\mu q_{rai} C \gamma^\nu d_{tc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu d_{tc}\right)\left(q_{rai} C D_\mu q_{sbj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p q_{sbj}\right)\left(D_\mu q_{rai} C \gamma^\nu d_{tc}\right) \end{vmatrix}\tag{4.301}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}\bar l\bar N q\bar u D}(0,-2)\begin{vmatrix} iB_{\mathrm L}^{\mu}{}_\nu \left(D_\mu \overline{u}_s{}^a q_{rai}\right)\left(\overline{N}_p \gamma^\nu C\bar l_t^i\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{u}_s{}^a D_\mu q_{rai}\right)\left(\overline{N}_p \gamma^\nu C\bar l_t^i\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p C\overline{u}_s{}^a\right)\left(\bar l_t^i \gamma^\nu D_\mu q_{rai}\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p C D_\mu \overline{u}_s{}^a\right)\left(\bar l_t^i \gamma^\nu q_{rai}\right) \end{vmatrix}\tag{4.302}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}\bar d l N q D}(0,2)\begin{vmatrix} i\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(l_{ri} C D_\mu q_{saj}\right) \\ i\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(D_\mu l_{ri} C q_{saj}\right) \\ i\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a q_{saj}\right)\left(D_\mu l_{ri} C \gamma^\nu N_t\right) \\ i\epsilon^{ij} B_{\mathrm L}^{\mu}{}_\nu \left(l_{ri} C \gamma^\nu N_t\right)\left(\overline{d}_p{}^a D_\mu q_{saj}\right) \end{vmatrix}\tag{4.303}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}\bar N^2 q\bar q D}(0,-2)\begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C\overline{q}_t^{ai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(D_\mu \overline{N}_r q_{sai}\right)\left(\overline{N}_p \gamma^\nu C\overline{q}_t^{ai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C\overline{q}_t^{ai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(D_\mu \overline{N}_r q_{sai}\right)\left(\overline{N}_p \gamma^\nu C\overline{q}_t^{ai}\right) \end{vmatrix}\tag{4.304}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}\bar d^2 N\bar u D}(-1,1)\begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\epsilon_{abc} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(\overline{d}_r{}^b C D_\mu \overline{u}_s{}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\epsilon_{abc} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(D_\mu \overline{d}_r{}^b C\overline{u}_s{}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(\overline{d}_r{}^b C D_\mu \overline{u}_s{}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc} B_{\mathrm L}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(D_\mu \overline{d}_r{}^b C\overline{u}_s{}^c\right) \end{vmatrix}\tag{4.305}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}d\bar e\bar N\bar u D}(0,-2)\begin{vmatrix} iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{e}_p \gamma^\nu d_{ta}\right)\left(\overline{N}_r C D_\mu \overline{u}_s{}^a\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{e}_p \gamma^\nu d_{ta}\right)\left(D_\mu \overline{N}_r C\overline{u}_s{}^a\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{e}_p C\overline{u}_s{}^a\right)\left(D_\mu \overline{N}_r \gamma^\nu d_{ta}\right) \\ iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_r \gamma^\nu d_{ta}\right)\left(\overline{e}_p C D_\mu \overline{u}_s{}^a\right) \end{vmatrix}\tag{4.306}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm L}\bar N^2 \bar u u D}(0,-2)\begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu u_{ta}\right)\left(\overline{N}_r C D_\mu \overline{u}_s{}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu u_{ta}\right)\left(D_\mu \overline{N}_r C\overline{u}_s{}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu u_{ta}\right)\left(\overline{N}_r C D_\mu \overline{u}_s{}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] iB_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_p \gamma^\nu u_{ta}\right)\left(D_\mu \overline{N}_r C\overline{u}_s{}^a\right) \end{vmatrix}\tag{4.307}$$

$$
\mathcal{O}^{(1\sim4)}_{B_{\mathrm{L}}\bar{d}d\bar{N}^2D}(0,-2)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_r CD_\mu \overline{N}_s\right)\left(\overline{d}_p{}^a \gamma^\nu d_{ta}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{d}_p{}^a C\overline{N}_s\right)\left(D_\mu \overline{N}_r \gamma^\nu d_{ta}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_r CD_\mu \overline{N}_s\right)\left(\overline{d}_p{}^a \gamma^\nu d_{ta}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{d}_p{}^a C\overline{N}_s\right)\left(D_\mu \overline{N}_r \gamma^\nu d_{ta}\right)
\end{array}\right.
\tag{4.308}
$$

$$
\mathcal{O}^{(1\sim4)}_{B_{\mathrm{L}}\bar{e}l^2ND}(0,2)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] i\epsilon^{ij}B_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p \gamma^\nu N_t\right)\left(l_{ri}CD_\mu l_{sj}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] i\epsilon^{ij}B_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p l_{sj}\right)\left(D_\mu l_{ri}C\gamma^\nu N_t\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon^{ij}B_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p \gamma^\nu N_t\right)\left(l_{ri}CD_\mu l_{sj}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon^{ij}B_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p l_{sj}\right)\left(D_\mu l_{ri}C\gamma^\nu N_t\right)
\end{array}\right.
\tag{4.309}
$$

$$
\mathcal{O}^{(1\sim4)}_{B_{\mathrm{L}}l\bar{l}\bar{N}^2D}(0,-2)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_r CD_\mu \overline{N}_s\right)\left(\bar{l}_t{}^i \gamma^\nu l_{pi}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_s l_{pi}\right)\left(D_\mu \overline{N}_r \gamma^\nu C\bar{l}_t{}^i\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_r CD_\mu \overline{N}_s\right)\left(\bar{l}_t{}^i \gamma^\nu l_{pi}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_s l_{pi}\right)\left(D_\mu \overline{N}_r \gamma^\nu C\bar{l}_t{}^i\right)
\end{array}\right.
\tag{4.310}
$$

$$
\mathcal{O}^{(1\sim4)}_{B_{\mathrm{L}}\bar{e}e\bar{N}^2D}(0,-2)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p \gamma^\nu e_t\right)\left(\overline{N}_r CD_\mu \overline{N}_s\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p C\overline{N}_s\right)\left(D_\mu \overline{N}_r \gamma^\nu e_t\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p \gamma^\nu e_t\right)\left(\overline{N}_r CD_\mu \overline{N}_s\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{e}_p C\overline{N}_s\right)\left(D_\mu \overline{N}_r \gamma^\nu e_t\right)
\end{array}\right.
\tag{4.311}
$$

$$
\mathcal{O}^{(1\sim3)}_{B_{\mathrm{L}}\bar{N}^3ND}(0,-2)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_p \gamma^\nu N_t\right)\left(\overline{N}_r CD_\mu \overline{N}_s\right)\\
\mathcal{Y}\left[\begin{smallmatrix}p\,\vline\,r\\s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_p \gamma^\nu N_t\right)\left(D_\mu \overline{N}_r C\overline{N}_s\right)\\
\mathcal{Y}\left[\begin{smallmatrix}p\,\vline\,r\,\vline\,s\end{smallmatrix}\right] iB_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_p \gamma^\nu N_t\right)\left(\overline{N}_r CD_\mu \overline{N}_s\right)
\end{array}\right.
\tag{4.312}
$$

Class $\psi^4\phi D^2$: 6 types

$$
\mathcal{O}^{(1\sim13)}_{\bar{N}q^3H^\dagger D^2}(1,-1)\left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}CD^\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ij}H^{\dagger k}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}CD^\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ij}D^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}CD_\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ij}D^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}CD_\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\\t\end{smallmatrix}\right] i\epsilon^{abc}\epsilon^{ik}D_\nu H^{\dagger j}\left(q_{rai}CD_\mu q_{sbj}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\,\vline\,t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}CD^\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\,\vline\,t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\,\vline\,s\,\vline\,t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ij}D^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}CD^\mu q_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ij}D^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)\left(D_\mu q_{sbj}Cq_{tck}\right)
\end{array}\right.
\tag{4.313}
$$

$$\mathcal{O}^{(1\sim10)}_{\bar{e}\overline{N}q\bar{u}H^\dagger D^2}(0,-2)\left|\begin{array}{l}
H^{\dagger i}\left(\bar{e}_p C\overline{N}_r\right)\left(D^\mu\overline{u}_t{}^a D_\mu q_{sai}\right)\\[4pt]
D^\mu H^{\dagger i}\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{u}_t{}^a D_\mu q_{sai}\right)\\[4pt]
D^\mu H^{\dagger i}\left(\bar{e}_p C\overline{N}_r\right)\left(D_\mu\overline{u}_t{}^a q_{sai}\right)\\[4pt]
H^{\dagger i}\left(\bar{e}_p q_{sai}\right)\left(D_\mu\overline{N}_r C D^\mu\overline{u}_t{}^a\right)\\[4pt]
D^\mu H^{\dagger i}\left(\bar{e}_p q_{sai}\right)\left(D_\mu\overline{N}_r C\overline{u}_t{}^a\right)\\[4pt]
iD_\nu H^{\dagger i}\left(\overline{N}_r D_\mu q_{sai}\right)\left(\bar{e}_p\sigma^{\mu\nu}C\overline{u}_t{}^a\right)\\[4pt]
D^\mu H^{\dagger i}\left(\bar{e}_p C\overline{u}_t{}^a\right)\left(\overline{N}_r D_\mu q_{sai}\right)\\[4pt]
D^\mu H^{\dagger i}\left(\bar{e}_p q_{sai}\right)\left(\overline{N}_r C D_\mu\overline{u}_t{}^a\right)\\[4pt]
iD_\nu H^{\dagger i}\left(\overline{N}_r C D_\mu\overline{u}_t{}^a\right)\left(\bar{e}_p\sigma^{\mu\nu}q_{sai}\right)\\[4pt]
iH^{\dagger i}\left(\bar{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\left(D_\nu\overline{u}_t{}^a D_\mu q_{sai}\right)
\end{array}\right.\tag{4.314}$$

$$\mathcal{O}^{(1\sim10)}_{\overline{N}^2q\bar{u}HD^2}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}H_j\left(\overline{N}_p q_{sai}\right)\left(D_\mu\overline{N}_r C D^\mu\overline{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}D^\mu H_j\left(\overline{N}_p q_{sai}\right)\left(D_\mu\overline{N}_r C\overline{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon^{ij}D_\nu H_j\left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}D^\mu H_j\left(\overline{N}_p C\overline{u}_t{}^a\right)\left(\overline{N}_r D_\mu q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}D^\mu H_j\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r C D_\mu\overline{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}H_j\left(\overline{N}_p C\overline{N}_r\right)\left(D^\mu\overline{u}_t{}^a D_\mu q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(\overline{u}_t{}^a D_\mu q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(D_\mu\overline{u}_t{}^a q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}H_j\left(\overline{N}_p q_{sai}\right)\left(D_\mu\overline{N}_r C D^\mu\overline{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ij}D^\mu H_j\left(\overline{N}_p q_{sai}\right)\left(D_\mu\overline{N}_r C\overline{u}_t{}^a\right)
\end{array}\right.\tag{4.315}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}\overline{N}^2qH^\dagger D^2}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(D_\mu\overline{N}_s D^\mu q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]D^\mu H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(D_\mu\overline{N}_s q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]D^\mu H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s D_\mu q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iD_\nu H^{\dagger i}\left(\overline{N}_r C D_\mu\overline{N}_s\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]D^\mu H^{\dagger i}\left(\overline{N}_r C D_\mu\overline{N}_s\right)\left(\bar{d}_p{}^a q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{r\,s}\right]H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(D_\mu\overline{N}_s D^\mu q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{r\,s}\right]D^\mu H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(D_\mu\overline{N}_s q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{r\,s}\right]D^\mu H^{\dagger i}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s D_\mu q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{r\,s}\right]iD_\nu H^{\dagger i}\left(\overline{N}_r C D_\mu\overline{N}_s\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}q_{tai}\right)\\[4pt]
\mathcal{Y}\left[\boxed{r\,s}\right]iH^{\dagger i}\left(D_\mu\overline{N}_s D_\nu q_{tai}\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right)
\end{array}\right.\tag{4.316}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{e}l\bar{N}^2H^\dagger D^2}(0,-2) \begin{vmatrix} \mathcal{Y}\,\young(s,t)\, D^\mu H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(D_\mu \overline{N}_s C \overline{N}_t\right) \\ \mathcal{Y}\,\young(s,t)\, H^{\dagger i}\left(\bar{e}_p C \overline{N}_s\right)\left(D^\mu \overline{N}_t D_\mu l_{ri}\right) \\ \mathcal{Y}\,\young(s,t)\, D^\mu H^{\dagger i}\left(\bar{e}_p C \overline{N}_s\right)\left(\overline{N}_t D_\mu l_{ri}\right) \\ \mathcal{Y}\,\young(s,t)\, iD_\nu H^{\dagger i}\left(D_\mu \overline{N}_s l_{ri}\right)\left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_t\right) \\ \mathcal{Y}\,\young(s,t)\, D^\mu H^{\dagger i}\left(\bar{e}_p C \overline{N}_t\right)\left(D_\mu \overline{N}_s l_{ri}\right) \\ \mathcal{Y}\,\young(st)\, H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(D_\mu \overline{N}_s C D^\mu \overline{N}_t\right) \\ \mathcal{Y}\,\young(st)\, D^\mu H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(D_\mu \overline{N}_s C \overline{N}_t\right) \\ \mathcal{Y}\,\young(st)\, H^{\dagger i}\left(\bar{e}_p C \overline{N}_s\right)\left(D^\mu \overline{N}_t D_\mu l_{ri}\right) \\ \mathcal{Y}\,\young(st)\, D^\mu H^{\dagger i}\left(\bar{e}_p C \overline{N}_s\right)\left(\overline{N}_t D_\mu l_{ri}\right) \\ \mathcal{Y}\,\young(st)\, iD_\nu H^{\dagger i}\left(D_\mu \overline{N}_s l_{ri}\right)\left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_t\right) \end{vmatrix} \tag{4.317}$$

$$\mathcal{O}^{(1\sim7)}_{l\bar{N}^3HD^2}(0,-2) \begin{vmatrix} \mathcal{Y}\,\young(r,s,t)\, \epsilon^{ij}D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu \overline{N}_s C \overline{N}_t\right) \\ \mathcal{Y}\,\young(r,s,t)\, i\epsilon^{ij}D_\nu H_j\left(\overline{N}_r C D_\mu \overline{N}_s\right)\left(\overline{N}_t \sigma^{\mu\nu} l_{pi}\right) \\ \mathcal{Y}\,\young(rs,t)\, \epsilon^{ij}H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu \overline{N}_s C D^\mu \overline{N}_t\right) \\ \mathcal{Y}\,\young(rs,t)\, \epsilon^{ij}D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu \overline{N}_s C \overline{N}_t\right) \\ \mathcal{Y}\,\young(rs,t)\, \epsilon^{ij}D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s C D_\mu \overline{N}_t\right) \\ \mathcal{Y}\,\young(rst)\, \epsilon^{ij}H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu \overline{N}_s C D^\mu \overline{N}_t\right) \\ \mathcal{Y}\,\young(rst)\, \epsilon^{ij}D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu \overline{N}_s C \overline{N}_t\right) \end{vmatrix} \tag{4.318}$$

Class $F_{\rm R}\psi^3\psi^\dagger D$: 26 types

$$\mathcal{O}^{(1\sim6)}_{G_{\rm R}d\bar{N}q^2D}(1,-1) \begin{vmatrix} \mathcal{Y}\,\young(rs)\, i\left(\lambda^A\right)^a_e \epsilon^{bce}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(rs)\, i\left(\lambda^A\right)^e_a \epsilon^{abe}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(rs)\, i\left(\lambda^A\right)^a_e \epsilon^{bce}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p \gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\young(r,s)\, i\left(\lambda^A\right)^{ae} \epsilon^{bce}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(r,s)\, i\left(\lambda^A\right)^e_a \epsilon^{abe}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(r,s)\, i\left(\lambda^A\right)^a_e \epsilon^{bce}\epsilon^{ij}G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p \gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \end{vmatrix} \tag{4.319}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\rm R}d\bar{N}q^2D}(1,-1) \begin{vmatrix} \mathcal{Y}\,\young(rs)\, i\left(\tau^I\right)^j_k \epsilon^{abc}\epsilon^{ik}W_{\rm R}^{I\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(rs)\, i\left(\tau^I\right)^j_k \epsilon^{abc}\epsilon^{ik}W_{\rm R}^{I\mu}{}_\nu\left(\overline{N}_p \gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\young(r,s)\, i\left(\tau^I\right)^j_k \epsilon^{abc}\epsilon^{ik}W_{\rm R}^{I\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \end{vmatrix} \tag{4.320}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\rm R}d\bar{N}q^2D}(1,-1) \begin{vmatrix} \mathcal{Y}\,\young(r,s)\, i\epsilon^{abc}\epsilon^{ij}B_{\rm R}^\mu{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \\ \mathcal{Y}\,\young(r,s)\, i\epsilon^{abc}\epsilon^{ij}B_{\rm R}^\mu{}_\nu\left(\overline{N}_p \gamma^\nu d_{tc}\right)(q_{rai}CD_\mu q_{sbj}) \\ \mathcal{Y}\,\young(rs)\, i\epsilon^{abc}\epsilon^{ij}B_{\rm R}^\mu{}_\nu\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma^\nu D_\mu d_{tc}) \end{vmatrix} \tag{4.321}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm R}\bar{l}\bar{N}q\bar{u}D}(0,-2) \begin{vmatrix} i\left(\lambda^A\right)^a_b G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p q_{rai}\right)\left(\bar{u}_s{}^b\gamma^\nu C D_\mu \bar{l}_t{}^i\right) \\ i\left(\lambda^A\right)^a_b G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p C \bar{u}_s{}^b\right)\left(D_\mu \bar{l}_t{}^i \gamma^\nu q_{rai}\right) \\ i\left(\lambda^A\right)^a_b G_{\rm R}^{A\mu}{}_\nu\left(\overline{N}_p \gamma^\nu C \bar{l}_t{}^i\right)\left(D_\mu \bar{u}_s{}^b q_{rai}\right) \end{vmatrix} \tag{4.322}$$

$$\mathcal{O}_{W_{\mathrm{R}}\bar{l}\bar{N}q\bar{u}D}^{(1\sim3)}(0,-2) \begin{vmatrix} i\left(\tau^I\right)^i_j W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{N}_p q_{rai}\right)\left(\overline{u}_s{}^a \gamma^\nu C D_\mu \bar{l}_t{}^j\right) \\ i\left(\tau^I\right)^i_j W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{N}_p C\overline{u}_s{}^a\right)\left(D_\mu \bar{l}_t{}^j \gamma^\nu q_{rai}\right) \\ i\left(\tau^I\right)^i_j W_{\mathrm{R}}^{I\mu}{}_\nu \left(D_\mu \overline{u}_s{}^a q_{rai}\right)\left(\overline{N}_p \gamma^\nu C\bar{l}_t{}^j\right) \end{vmatrix} \tag{4.323}$$

$$\mathcal{O}_{B_{\mathrm{R}}\bar{l}\bar{N}q\bar{u}D}^{(1\sim3)}(0,-2) \begin{vmatrix} iB_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_p q_{rai}\right)\left(\overline{u}_s{}^a \gamma^\nu C D_\mu \bar{l}_t{}^i\right) \\ iB_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_p C\overline{u}_s{}^a\right)\left(D_\mu \bar{l}_t{}^i \gamma^\nu q_{rai}\right) \\ iB_{\mathrm{R}}^{\mu}{}_\nu \left(D_\mu \overline{u}_s{}^a q_{rai}\right)\left(\overline{N}_p \gamma^\nu C\bar{l}_t{}^i\right) \end{vmatrix} \tag{4.324}$$

$$\mathcal{O}_{G_{\mathrm{R}}\bar{d}lNqD}^{(1\sim3)}(0,2) \begin{vmatrix} i\left(\lambda^A\right)^b_a \epsilon^{ij} G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a l_{ri}\right)(q_{sbj} C\gamma^\nu D_\mu N_t) \\ i\left(\lambda^A\right)^b_a \epsilon^{ij} G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a q_{sbj}\right)(l_{ri} C\gamma^\nu D_\mu N_t) \\ i\left(\lambda^A\right)^b_a \epsilon^{ij} G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)(l_{ri} C D_\mu q_{sbj}) \end{vmatrix} \tag{4.325}$$

$$\mathcal{O}_{W_{\mathrm{R}}\bar{d}lNqD}^{(1\sim3)}(0,2) \begin{vmatrix} i\left(\tau^I\right)^j_k \epsilon^{ik} W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{d}_p{}^a l_{ri}\right)(q_{saj} C\gamma^\nu D_\mu N_t) \\ i\left(\tau^I\right)^j_k \epsilon^{ik} W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{d}_p{}^a q_{saj}\right)(l_{ri} C\gamma^\nu D_\mu N_t) \\ i\left(\tau^I\right)^j_k \epsilon^{ik} W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)(l_{ri} C D_\mu q_{saj}) \end{vmatrix} \tag{4.326}$$

$$\mathcal{O}_{B_{\mathrm{R}}\bar{d}lNqD}^{(1\sim3)}(0,2) \begin{vmatrix} i\epsilon^{ij} B_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{d}_p{}^a l_{ri}\right)(q_{saj} C\gamma^\nu D_\mu N_t) \\ i\epsilon^{ij} B_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{d}_p{}^a q_{saj}\right)(l_{ri} C\gamma^\nu D_\mu N_t) \\ i\epsilon^{ij} B_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)(l_{ri} C D_\mu q_{saj}) \end{vmatrix} \tag{4.327}$$

$$\mathcal{O}_{G_{\mathrm{R}}\bar{N}^2 q\bar{q}D}^{(1\sim3)}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r \gamma^\nu C D_\mu \overline{q}_t{}^{bi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C \overline{q}_t{}^{bi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b \left(\overline{N}_p C\overline{N}_r\right) G_{\mathrm{R}}^{A\mu}{}_\nu \left(D_\mu \overline{q}_t{}^{bi} \gamma^\nu q_{sai}\right) \end{vmatrix} \tag{4.328}$$

$$\mathcal{O}_{W_{\mathrm{R}}\bar{N}^2 q\bar{q}D}^{(1\sim3)}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r \gamma^\nu C D_\mu \overline{q}_t{}^{aj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\tau^I\right)^i_j W_{\mathrm{R}}^{I\mu}{}_\nu \left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C \overline{q}_t{}^{aj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\left(\tau^I\right)^i_j \left(\overline{N}_p C\overline{N}_r\right) W_{\mathrm{R}}^{I\mu}{}_\nu \left(D_\mu \overline{q}_t{}^{aj} \gamma^\nu q_{sai}\right) \end{vmatrix} \tag{4.329}$$

$$\mathcal{O}_{B_{\mathrm{R}}\bar{N}^2 q\bar{q}D}^{(1\sim3)}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r \gamma^\nu C D_\mu \overline{q}_t{}^{ai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iB_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_r D_\mu q_{sai}\right)\left(\overline{N}_p \gamma^\nu C \overline{q}_t{}^{ai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] iB_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_p C\overline{N}_r\right)\left(D_\mu \overline{q}_t{}^{ai} \gamma^\nu q_{sai}\right) \end{vmatrix} \tag{4.330}$$

$$\mathcal{O}_{G_{\mathrm{R}}\bar{d}^2 N\bar{u}D}^{(1\sim6)}(-1,1) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a C\overline{d}_r{}^b\right)(\overline{u}_s{}^c \gamma^\nu D_\mu N_t) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a C\overline{u}_s{}^c\right)\left(\overline{d}_r{}^b \gamma^\nu D_\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(\overline{d}_r{}^b C D_\mu \overline{u}_s{}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a C\overline{d}_r{}^b\right)(\overline{u}_s{}^c \gamma^\nu D_\mu N_t) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a C\overline{u}_s{}^c\right)\left(\overline{d}_r{}^b \gamma^\nu D_\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\end{smallmatrix}\right] i\epsilon_{ace} \left(\lambda^A\right)^e_b G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{d}_p{}^a \gamma^\nu N_t\right)\left(\overline{d}_r{}^b C D_\mu \overline{u}_s{}^c\right) \end{vmatrix} \tag{4.331}$$

$$\mathcal{O}_{B_{\mathrm{R}}\bar{d}^2 N\bar{u}D}^{(1\sim3)}(-1,1)\left|\begin{array}{l}\mathcal{Y}\,[\overline{p\,r}]\,i\epsilon_{abc}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{d}_p{}^a C\bar{u}_s{}^c\right)\left(\bar{d}_r{}^b\gamma^\nu D_\mu N_t\right)\\ \mathcal{Y}\,[\overline{p\,r}]\,i\epsilon_{abc}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{d}_p{}^a\gamma^\nu N_t\right)\left(\bar{d}_r{}^b CD_\mu\bar{u}_s{}^c\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right]\,i\epsilon_{abc}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{u}_s{}^c\gamma^\nu D_\mu N_t\right)\end{array}\right.$$

(4.332)

$$\mathcal{O}_{G_{\mathrm{R}}d\bar{e}\bar{N}\bar{u}D}^{(1\sim3)}(0,-2)\left|\begin{array}{l}i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{e}_p C\overline{N}_r\right)\left(\bar{u}_s{}^a\gamma^\nu D_\mu d_{tb}\right)\\ i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{e}_p C\bar{u}_s{}^a\right)\left(\overline{N}_r\gamma^\nu D_\mu d_{tb}\right)\\ i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{e}_p\gamma^\nu d_{tb}\right)\left(\overline{N}_r CD_\mu\bar{u}_s{}^a\right)\end{array}\right.$$

(4.333)

$$\mathcal{O}_{B_{\mathrm{R}}d\bar{e}\bar{N}\bar{u}D}^{(1\sim3)}(0,-2)\left|\begin{array}{l}iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p C\overline{N}_r\right)\left(\bar{u}_s{}^a\gamma^\nu D_\mu d_{ta}\right)\\ iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p C\bar{u}_s{}^a\right)\left(\overline{N}_r\gamma^\nu D_\mu d_{ta}\right)\\ iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p\gamma^\nu d_{ta}\right)\left(\overline{N}_r CD_\mu\bar{u}_s{}^a\right)\end{array}\right.$$

(4.334)

$$\mathcal{O}_{G_{\mathrm{R}}\bar{N}^2\bar{u}uD}^{(1\sim3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right]i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_p C\bar{u}_s{}^a\right)\left(\overline{N}_r\gamma^\nu D_\mu u_{tb}\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right]i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_p\gamma^\nu u_{tb}\right)\left(\overline{N}_r CD_\mu\bar{u}_s{}^a\right)\\ \mathcal{Y}\,[\overline{p\,r}]\,i\left(\lambda^A\right)_a{}^b\left(\overline{N}_p C\overline{N}_r\right)G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{u}_s{}^a\gamma^\nu D_\mu u_{tb}\right)\end{array}\right.$$

(4.335)

$$\mathcal{O}_{B_{\mathrm{R}}\bar{N}^2\bar{u}uD}^{(1\sim3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right]iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\overline{N}_p C\bar{u}_s{}^a\right)\left(\overline{N}_r\gamma^\nu D_\mu u_{ta}\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{p}{r}\right]iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\overline{N}_p\gamma^\nu u_{ta}\right)\left(\overline{N}_r CD_\mu\bar{u}_s{}^a\right)\\ \mathcal{Y}\,[\overline{p\,r}]\,iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\overline{N}_p C\overline{N}_r\right)\left(\bar{u}_s{}^a\gamma^\nu D_\mu u_{ta}\right)\end{array}\right.$$

(4.336)

$$\mathcal{O}_{G_{\mathrm{R}}\bar{d}d\bar{N}^2D}^{(1\sim3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu d_{tb}\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_r CD_\mu\overline{N}_s\right)\left(\bar{d}_p{}^a\gamma^\nu d_{tb}\right)\\ \mathcal{Y}\,[\overline{r\,s}]\,i\left(\lambda^A\right)_a{}^b G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu d_{tb}\right)\end{array}\right.$$

(4.337)

$$\mathcal{O}_{B_{\mathrm{R}}\bar{d}d\bar{N}^2D}^{(1\sim3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu d_{ta}\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\overline{N}_r CD_\mu\overline{N}_s\right)\left(\bar{d}_p{}^a\gamma^\nu d_{ta}\right)\\ \mathcal{Y}\,[\overline{r\,s}]\,iB_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu d_{ta}\right)\end{array}\right.$$

(4.338)

$$\mathcal{O}_{W_{\mathrm{R}}\bar{e}l^2 ND}^{(1\sim3)}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\tau^I\right)_k{}^j\epsilon^{ik}W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\bar{e}_p l_{ri}\right)\left(l_{sj}C\gamma^\nu D_\mu N_t\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\tau^I\right)_k{}^j\epsilon^{ik}W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\bar{e}_p\gamma^\nu N_t\right)\left(l_{ri}CD_\mu l_{sj}\right)\\ \mathcal{Y}\,[\overline{r\,s}]\,i\left(\tau^I\right)_k{}^j\epsilon^{ik}W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\bar{e}_p l_{ri}\right)\left(l_{sj}C\gamma^\nu D_\mu N_t\right)\end{array}\right.$$

(4.339)

$$\mathcal{O}_{B_{\mathrm{R}}\bar{e}l^2 ND}^{(1\sim3)}(0,2)\left|\begin{array}{l}\mathcal{Y}\,[\overline{r\,s}]\,i\epsilon^{ij}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p l_{ri}\right)\left(l_{sj}C\gamma^\nu D_\mu N_t\right)\\ \mathcal{Y}\,[\overline{r\,s}]\,i\epsilon^{ij}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p\gamma^\nu N_t\right)\left(l_{ri}CD_\mu l_{sj}\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\epsilon^{ij}B_{\mathrm{R}}^{\mu}{}_{\nu}\left(\bar{e}_p l_{ri}\right)\left(l_{sj}C\gamma^\nu D_\mu N_t\right)\end{array}\right.$$

(4.340)

$$\mathcal{O}_{W_{\mathrm{R}}l\bar{l}\bar{N}^2D}^{(1\sim3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\tau^I\right)_j{}^i W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s\gamma^\nu CD_\mu\bar{l}_t{}^j\right)\\ \mathcal{Y}\left[\genfrac{}{}{0pt}{}{r}{s}\right]i\left(\tau^I\right)_j{}^i W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\overline{N}_r CD_\mu\overline{N}_s\right)\left(\bar{l}_t{}^j\gamma^\nu l_{pi}\right)\\ \mathcal{Y}\,[\overline{r\,s}]\,i\left(\tau^I\right)_j{}^i W_{\mathrm{R}}^{I\mu}{}_{\nu}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s\gamma^\nu CD_\mu\bar{l}_t{}^j\right)\end{array}\right.$$

(4.341)

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{R}}l\bar{l}\bar{N}^2 D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s\gamma^\nu CD_\mu\bar{l}_t{}^i\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{N}_r CD_\mu\overline{N}_s\right)\left(\bar{l}_t{}^i\gamma^\nu l_{pi}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s\gamma^\nu CD_\mu\bar{l}_t{}^i\right)\end{array}\right. \tag{4.342}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{R}}\bar{e}e\bar{N}^2 D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{e}_p C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu e_t\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{e}_p\gamma^\nu e_t\right)\left(\overline{N}_r CD_\mu\overline{N}_s\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{e}_p C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu e_t\right)\end{array}\right. \tag{4.343}$$

$$\mathcal{O}^{(1,2)}_{B_{\mathrm{R}}\bar{N}^3 ND}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{N}_p\gamma^\nu N_t\right)\left(\overline{N}_r CD_\mu\overline{N}_s\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\mid r\\s\end{smallmatrix}\right]iB_{\mathrm{R}}{}^\mu{}_\nu\left(\overline{N}_p C\overline{N}_r\right)\left(\overline{N}_s\gamma^\nu D_\mu N_t\right)\end{array}\right. \tag{4.344}$$

Class $\psi^2\psi^{\dagger 2}\phi D^2$: 13 types

$$\mathcal{O}^{(1\sim7)}_{N^2q\bar{u}HD^2}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ij}D_\mu H_j\left(N_s CD^\mu N_t\right)\left(\overline{u}_r{}^a q_{pai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\epsilon^{ij}H_j\left(D_\mu N_s CD_\nu N_t\right)\left(\overline{u}_r{}^a\sigma^{\mu\nu}q_{pai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ij}D_\mu D_\nu H_j\left(\overline{u}_r{}^a\gamma^\nu N_t\right)\left(q_{pai}C\gamma^\mu N_s\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\epsilon^{ij}D_\mu H_j\left(N_s CD_\nu N_t\right)\left(\overline{u}_r{}^a\sigma^{\mu\nu}q_{pai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]\epsilon^{ij}H_j\left(D_\mu N_s CD^\mu N_t\right)\left(\overline{u}_r{}^a q_{pai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]\epsilon^{ij}D_\mu H_j\left(N_s CD^\mu N_t\right)\left(\overline{u}_r{}^a q_{pai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]i\epsilon^{ij}D_\mu H_j\left(N_s CD_\nu N_t\right)\left(\overline{u}_r{}^a\sigma^{\mu\nu}q_{pai}\right)\end{array}\right. \tag{4.345}$$

$$\mathcal{O}^{(1\sim7)}_{\bar{d}eNqHD^2}(0,2)\left|\begin{array}{l}\epsilon^{ij}H_j\left(\overline{d}_p{}^a q_{rai}\right)\left(D_\mu e_s CD^\mu N_t\right)\\ \epsilon^{ij}D_\mu H_j\left(\overline{d}_p{}^a q_{rai}\right)\left(e_s CD^\mu N_t\right)\\ \epsilon^{ij}D_\mu H_j\left(\overline{d}_p{}^a q_{rai}\right)\left(D^\mu e_s CN_t\right)\\ i\epsilon^{ij}H_j\left(D_\mu e_s CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rai}\right)\\ \epsilon^{ij}D_\mu D_\nu H_j\left(\overline{d}_p{}^a\gamma^\mu e_s\right)\left(q_{rai}C\gamma^\nu N_t\right)\\ i\epsilon^{ij}D_\mu H_j\left(e_s CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rai}\right)\\ \epsilon^{ij}D_\mu H_j\left(q_{rai}C\gamma^\nu N_t\right)\left(\overline{d}_p{}^a\gamma^\mu D_\nu e_s\right)\end{array}\right. \tag{4.346}$$

$$\mathcal{O}^{(1\sim7)}_{\bar{d}N^2qH^\dagger D^2}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]D_\mu H^{\dagger i}\left(N_s CD^\mu N_t\right)\left(\overline{d}_p{}^a q_{rai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]iH^{\dagger i}\left(D_\mu N_s CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]D_\mu D_\nu H^{\dagger i}\left(\overline{d}_p{}^a\gamma^\mu N_s\right)\left(q_{rai}C\gamma^\nu N_t\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]iD_\mu H^{\dagger i}\left(N_s CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]H^{\dagger i}\left(D_\mu N_s CD^\mu N_t\right)\left(\overline{d}_p{}^a q_{rai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]D_\mu H^{\dagger i}\left(N_s CD^\mu N_t\right)\left(\overline{d}_p{}^a q_{rai}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\mid t\end{smallmatrix}\right]iD_\mu H^{\dagger i}\left(N_s CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rai}\right)\end{array}\right. \tag{4.347}$$

$$\mathcal{O}^{(1\sim14)}_{lNq\bar{q}HD^2}(0,2) \begin{vmatrix} \epsilon^{ik} H_k \left(l_{pi} C q_{raj} \right) \left(D^\mu \bar{q}_t^{aj} D_\mu N_s \right) \\ \epsilon^{ij} H_k \left(l_{pi} C q_{raj} \right) \left(D^\mu \bar{q}_t^{ak} D_\mu N_s \right) \\ \epsilon^{ik} D_\mu H_k \left(l_{pi} C q_{raj} \right) \left(D^\mu \bar{q}_t^{aj} N_s \right) \\ \epsilon^{ij} D_\mu H_k \left(l_{pi} C q_{raj} \right) \left(D^\mu \bar{q}_t^{ak} N_s \right) \\ \epsilon^{ik} D_\mu H_k \left(l_{pi} C q_{raj} \right) \left(\bar{q}_t^{aj} D^\mu N_s \right) \\ \epsilon^{ij} D_\mu H_k \left(l_{pi} C q_{raj} \right) \left(\bar{q}_t^{ak} D^\mu N_s \right) \\ i\epsilon^{ik} H_k \left(D_\nu \bar{q}_t^{aj} D_\mu N_s \right) \left(l_{pi} C \sigma^{\mu\nu} q_{raj} \right) \\ i\epsilon^{ij} H_k \left(D_\nu \bar{q}_t^{ak} D_\mu N_s \right) \left(l_{pi} C \sigma^{\mu\nu} q_{raj} \right) \\ \epsilon^{ik} D_\mu D_\nu H_k \left(l_{pi} C \gamma^\mu N_s \right) \left(\bar{q}_t^{aj} \gamma^\nu q_{raj} \right) \\ \epsilon^{ij} D_\mu D_\nu H_k \left(l_{pi} C \gamma^\mu N_s \right) \left(\bar{q}_t^{ak} \gamma^\nu q_{raj} \right) \\ i\epsilon^{ik} D_\mu H_k \left(D_\nu \bar{q}_t^{aj} N_s \right) \left(l_{pi} C \sigma^{\mu\nu} q_{raj} \right) \\ i\epsilon^{ij} D_\mu H_k \left(D_\nu \bar{q}_t^{ak} N_s \right) \left(l_{pi} C \sigma^{\mu\nu} q_{raj} \right) \\ \epsilon^{ik} D_\mu H_k \left(\bar{q}_t^{aj} \gamma^\nu q_{raj} \right) \left(l_{pi} C \gamma^\mu D_\nu N_s \right) \\ \epsilon^{ij} D_\mu H_k \left(\bar{q}_t^{ak} \gamma^\nu q_{raj} \right) \left(l_{pi} C \gamma^\mu D_\nu N_s \right) \end{vmatrix} \tag{4.348}$$

$$\mathcal{O}^{(1\sim7)}_{d^2\bar{N}qHD^2}(1,-1) \begin{vmatrix} \mathcal{Y} \,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\, \epsilon^{abc} \epsilon^{ij} D_\mu H_j \left(\overline{N}_p q_{rai} \right) \left(d_{sb} C D^\mu d_{tc} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\, i\epsilon^{abc} \epsilon^{ij} H_j \left(D_\mu d_{sb} C D_\nu d_{tc} \right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\, \epsilon^{abc} \epsilon^{ij} D_\mu D_\nu H_j \left(\overline{N}_p \gamma^\mu d_{sb} \right) \left(q_{rai} C \gamma^\nu d_{tc} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\, i\epsilon^{abc} \epsilon^{ij} D_\mu H_j \left(d_{sb} C D_\nu d_{tc} \right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\, \epsilon^{abc} \epsilon^{ij} H_j \left(\overline{N}_p q_{rai} \right) \left(D_\mu d_{sb} C D^\mu d_{tc} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\, \epsilon^{abc} \epsilon^{ij} D_\mu H_j \left(\overline{N}_p q_{rai} \right) \left(d_{sb} C D^\mu d_{tc} \right) \\ \mathcal{Y} \,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\, i\epsilon^{abc} \epsilon^{ij} D_\mu H_j \left(d_{sb} C D_\nu d_{tc} \right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai} \right) \end{vmatrix} \tag{4.349}$$

$$\mathcal{O}^{(1\sim7)}_{d\bar{N}quH^\dagger D^2}(1,-1) \begin{vmatrix} \epsilon^{abc} H^{\dagger i} \left(\overline{N}_p q_{rai} \right) \left(D_\mu d_{sb} C D^\mu u_{tc} \right) \\ \epsilon^{abc} D_\mu H^{\dagger i} \left(\overline{N}_p q_{rai} \right) \left(d_{sb} C D^\mu u_{tc} \right) \\ \epsilon^{abc} D_\mu H^{\dagger i} \left(\overline{N}_p q_{rai} \right) \left(D^\mu d_{sb} C u_{tc} \right) \\ i\epsilon^{abc} H^{\dagger i} \left(D_\mu d_{sb} C D_\nu u_{tc} \right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai} \right) \\ \epsilon^{abc} D_\mu D_\nu H^{\dagger i} \left(\overline{N}_p \gamma^\mu d_{sb} \right) \left(q_{rai} C \gamma^\nu u_{tc} \right) \\ i\epsilon^{abc} D_\mu H^{\dagger i} \left(d_{sb} C D_\nu u_{tc} \right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai} \right) \\ \epsilon^{abc} D_\mu H^{\dagger i} \left(\overline{N}_p \gamma^\mu D_\nu d_{sb} \right) \left(q_{rai} C \gamma^\nu u_{tc} \right) \end{vmatrix} \tag{4.350}$$

$$\mathcal{O}^{(1\sim7)}_{lN\bar{u}uHD^2}(0,2) \begin{vmatrix} \epsilon^{ij} H_j \left(\overline{u}_r{}^a l_{pi} \right) \left(D_\mu N_s C D^\mu u_{ta} \right) \\ \epsilon^{ij} D_\mu H_j \left(\overline{u}_r{}^a l_{pi} \right) \left(N_s C D^\mu u_{ta} \right) \\ \epsilon^{ij} D_\mu H_j \left(\overline{u}_r{}^a l_{pi} \right) \left(D^\mu N_s C u_{ta} \right) \\ i\epsilon^{ij} H_j \left(D_\mu N_s C D_\nu u_{ta} \right) \left(\overline{u}_r{}^a \sigma^{\mu\nu} l_{pi} \right) \\ \epsilon^{ij} D_\mu D_\nu H_j \left(\overline{u}_r{}^a \gamma^\nu u_{ta} \right) \left(l_{pi} C \gamma^\mu N_s \right) \\ i\epsilon^{ij} D_\mu H_j \left(N_s C D_\nu u_{ta} \right) \left(\overline{u}_r{}^a \sigma^{\mu\nu} l_{pi} \right) \\ \epsilon^{ij} D_\mu H_j \left(\overline{u}_r{}^a \gamma^\nu u_{ta} \right) \left(l_{pi} C \gamma^\mu D_\nu N_s \right) \end{vmatrix} \tag{4.351}$$

$$\mathcal{O}^{(1\sim7)}_{d\bar{l}\bar{N}\bar{u}HD^2}(0,-2) \begin{vmatrix} H_i\left(\overline{N}_p C\overline{u}_r{}^a\right)\left(D^\mu\bar{l}_t{}^i D_\mu d_{sa}\right) \\ D_\mu H_i\left(\overline{N}_p C\overline{u}_r{}^a\right)\left(D^\mu\bar{l}_t{}^i d_{sa}\right) \\ D_\mu H_i\left(\overline{N}_p C\overline{u}_r{}^a\right)\left(\bar{l}_t{}^i D^\mu d_{sa}\right) \\ iH_i\left(\overline{N}_p \sigma^{\mu\nu} C\overline{u}_r{}^a\right)\left(D_\nu\bar{l}_t{}^i D_\mu d_{sa}\right) \\ D_\mu D_\nu H_i\left(\overline{N}_p \gamma^\mu d_{sa}\right)\left(\overline{u}_r{}^a\gamma^\nu C\bar{l}_t{}^i\right) \\ iD_\mu H_i\left(D_\nu\bar{l}_t{}^i d_{sa}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r{}^a\right) \\ D_\mu H_i\left(\overline{N}_p\gamma^\mu D_\nu d_{sa}\right)\left(\overline{u}_r{}^a\gamma^\nu C\bar{l}_t{}^i\right) \end{vmatrix} \tag{4.352}$$

$$\mathcal{O}^{(1\sim7)}_{\bar{d}dlNHD^2}(0,2) \begin{vmatrix} \epsilon^{ij}H_j\left(\overline{d}_p{}^a l_{ri}\right)(D_\mu d_{sa}CD^\mu N_t) \\ \epsilon^{ij}D_\mu H_j\left(\overline{d}_p{}^a l_{ri}\right)(d_{sa}CD^\mu N_t) \\ \epsilon^{ij}D_\mu H_j\left(\overline{d}_p{}^a l_{ri}\right)(D^\mu d_{sa}CN_t) \\ i\epsilon^{ij}H_j\left(D_\mu d_{sa}CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right) \\ \epsilon^{ij}D_\mu D_\nu H_j\left(\overline{d}_p{}^a\gamma^\mu d_{sa}\right)(l_{ri}C\gamma^\nu N_t) \\ i\epsilon^{ij}D_\mu H_j\left(d_{sa}CD_\nu N_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right) \\ \epsilon^{ij}D_\mu H_j\left(l_{ri}C\gamma^\nu N_t\right)\left(\overline{d}_p{}^a\gamma^\mu D_\nu d_{sa}\right) \end{vmatrix} \tag{4.353}$$

$$\mathcal{O}^{(1\sim14)}_{l^2\bar{l}NHD^2}(0,2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon^{ik}H_k(l_{pi}Cl_{rj})\left(D_\mu\bar{l}_s{}^j D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon^{ik}D_\mu H_k(l_{pi}Cl_{rj})\left(\bar{l}_s{}^j D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon^{ik}D_\mu H_k(l_{pi}Cl_{rj})\left(D^\mu\bar{l}_s{}^j N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]i\epsilon^{ik}H_k\left(D_\mu\bar{l}_s{}^j D_\nu N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj}) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon^{ik}D_\mu D_\nu H_k(l_{rj}C\gamma^\nu N_t)\left(\bar{l}_s{}^j\gamma^\mu l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]i\epsilon^{ik}D_\mu H_k\left(\bar{l}_s{}^j D_\nu N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj}) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon^{ik}D_\mu H_k(l_{rj}C\gamma^\nu N_t)\left(D_\nu\bar{l}_s{}^j\gamma^\mu l_{pi}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ik}H_k(l_{pi}Cl_{rj})\left(D_\mu\bar{l}_s{}^j D^\mu N_t\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ik}D_\mu H_k(l_{pi}Cl_{rj})\left(\bar{l}_s{}^j D^\mu N_t\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ik}D_\mu H_k(l_{pi}Cl_{rj})\left(D^\mu\bar{l}_s{}^j N_t\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon^{ik}H_k\left(D_\mu\bar{l}_s{}^j D_\nu N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj}) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ik}D_\mu D_\nu H_k(l_{rj}C\gamma^\nu N_t)\left(\bar{l}_s{}^j\gamma^\mu l_{pi}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon^{ik}D_\mu H_k\left(\bar{l}_s{}^j D_\nu N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj}) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\epsilon^{ik}D_\mu H_k(l_{rj}C\gamma^\nu N_t)\left(D_\nu\bar{l}_s{}^j\gamma^\mu l_{pi}\right) \end{vmatrix} \tag{4.354}$$

$$\mathcal{O}^{(1\sim7)}_{\bar{e}elNHD^2}(0,2) \begin{vmatrix} \epsilon^{ij}H_j\left(\overline{e}_p l_{ri}\right)(D_\mu e_s CD^\mu N_t) \\ \epsilon^{ij}D_\mu H_j\left(\overline{e}_p l_{ri}\right)(e_s CD^\mu N_t) \\ \epsilon^{ij}D_\mu H_j\left(\overline{e}_p l_{ri}\right)(D^\mu e_s CN_t) \\ i\epsilon^{ij}H_j\left(D_\mu e_s CD_\nu N_t\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right) \\ \epsilon^{ij}D_\mu D_\nu H_j\left(\overline{e}_p\gamma^\mu e_s\right)(l_{ri}C\gamma^\nu N_t) \\ i\epsilon^{ij}D_\mu H_j\left(e_s CD_\nu N_t\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right) \\ \epsilon^{ij}D_\mu H_j\left(\overline{e}_p\gamma^\mu D_\nu e_s\right)(l_{ri}C\gamma^\nu N_t) \end{vmatrix} \tag{4.355}$$

$$\mathcal{O}^{(1\sim7)}_{\bar{e}lN^2H^\dagger D^2}(0,2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] D_\mu H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iH^{\dagger i}\left(D_\mu N_s C D_\nu N_t\right)\left(\bar{e}_p \sigma^{\mu\nu} l_{ri}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] D_\mu D_\nu H^{\dagger i}\left(\bar{e}_p \gamma^\mu N_s\right)\left(l_{ri} C \gamma^\nu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iD_\mu H^{\dagger i}\left(N_s C D_\nu N_t\right)\left(\bar{e}_p \sigma^{\mu\nu} l_{ri}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(D_\mu N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] D_\mu H^{\dagger i}\left(\bar{e}_p l_{ri}\right)\left(N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] iD_\mu H^{\dagger i}\left(N_s C D_\nu N_t\right)\left(\bar{e}_p \sigma^{\mu\nu} l_{ri}\right) \end{array}\right. \tag{4.356}$$

$$\mathcal{O}^{(1\sim7)}_{l\bar{N}N^2HD^2}(0,2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] \epsilon^{ij} D_\mu H_j\left(\overline{N}_r l_{pi}\right)\left(N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\epsilon^{ij} H_j\left(D_\mu N_s C D_\nu N_t\right)\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] \epsilon^{ij} D_\mu D_\nu H_j\left(\overline{N}_r \gamma^\nu N_t\right)\left(l_{pi} C \gamma^\mu N_s\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\epsilon^{ij} D_\mu H_j\left(N_s C D_\nu N_t\right)\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] \epsilon^{ij} H_j\left(\overline{N}_r l_{pi}\right)\left(D_\mu N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] \epsilon^{ij} D_\mu H_j\left(\overline{N}_r l_{pi}\right)\left(N_s C D^\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\,t\end{smallmatrix}\right] i\epsilon^{ij} D_\mu H_j\left(N_s C D_\nu N_t\right)\left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \end{array}\right. \tag{4.357}$$

Class $F_{\rm L}\psi^4\phi$: 16 types

$$\mathcal{O}^{(1\sim8)}_{G_{\rm L}\bar{N}q^3H^\dagger}(1,-1) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\,s\,t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(q_{sbj} C q_{tck}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\,t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ij} H^{\dagger k} G^A_{{\rm L}\mu\nu}\left(\overline{N}_p q_{tck}\right)\left(q_{rai} C \sigma^{\mu\nu} q_{sbj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(q_{sbj} C q_{tck}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ij} H^{\dagger k} G^A_{{\rm L}\mu\nu}\left(q_{sbj} C q_{tck}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^a_e \epsilon^{bce}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(q_{sbj} C q_{tck}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(\overline{N}_p q_{tck}\right)\left(q_{rai} C \sigma^{\mu\nu} q_{sbj}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(q_{sbj} C q_{tck}\right)\left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_e \epsilon^{ace}\epsilon^{ik} H^{\dagger j} G^A_{{\rm L}\mu\nu}\left(\overline{N}_p q_{tck}\right)\left(q_{rai} C \sigma^{\mu\nu} q_{sbj}\right) \end{array}\right. \tag{4.358}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm L}\bar{e}\bar{N}q\bar{u}H^\dagger}(0,-2) \left|\begin{array}{l} i\left(\lambda^A\right)^a_b H^{\dagger i} G^A_{{\rm L}\mu\nu}\left(\bar{u}_t{}^b q_{sai}\right)\left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right) \\ i\left(\lambda^A\right)^a_b H^{\dagger i} G^{A\mu\nu}_{\rm L}\left(\overline{N}_r C \bar{u}_t{}^b\right)\left(\bar{e}_p \sigma_{\mu\nu} q_{sai}\right) \\ i\left(\lambda^A\right)^a_b H^{\dagger i} G^A_{{\rm L}\mu\nu}\left(\bar{e}_p C \bar{u}_t{}^b\right)\left(\overline{N}_r \sigma^{\mu\nu} q_{sai}\right) \end{array}\right. \tag{4.359}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm L}\bar{N}^2q\bar{u}H}(0,-2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b \epsilon^{ij} H_j G^A_{{\rm L}\mu\nu}\left(\bar{u}_t{}^b q_{sai}\right)\left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b \epsilon^{ij} H_j G^{A\mu\nu}_{\rm L}\left(\overline{N}_r C \bar{u}_t{}^b\right)\left(\overline{N}_p \sigma_{\mu\nu} q_{sai}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\,r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b \epsilon^{ij} H_j G^{A\mu\nu}_{\rm L}\left(\overline{N}_r C \bar{u}_t{}^b\right)\left(\overline{N}_p \sigma_{\mu\nu} q_{sai}\right) \end{array}\right. \tag{4.360}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm L}\bar{d}\bar{N}^2qH^\dagger}(0,-2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{{\rm L}\mu\nu}\left(\overline{N}_s q_{tbi}\right)\left(\bar{d}_p{}^a \sigma^{\mu\nu} C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{{\rm L}\mu\nu}\left(\bar{d}_p{}^a q_{tbi}\right)\left(\overline{N}_r \sigma^{\mu\nu} C \overline{N}_s\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{{\rm L}\mu\nu}\left(\overline{N}_s q_{tbi}\right)\left(\bar{d}_p{}^a \sigma^{\mu\nu} C \overline{N}_r\right) \end{array}\right. \tag{4.361}$$

$$\mathcal{O}^{(1\sim6)}_{W_{\mathrm{L}}\bar{N}q^3H^\dagger}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{r\,s\,t}}\,i\left(\tau^I\right)^i_{\ n}\epsilon^{abc}\epsilon^{kn}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{r\,s\,t}}\,i\left(\tau^I\right)^j_{\ n}\epsilon^{abc}\epsilon^{kn}H^{\dagger i}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_pq_{tck}\right)\left(q_{rai}C\sigma^{\mu\nu}q_{sbj}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^j_{\ n}\epsilon^{abc}\epsilon^{kn}H^{\dagger i}W^I_{\mathrm{L}\mu\nu}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ n}\epsilon^{abc}\epsilon^{jn}H^{\dagger k}W^I_{\mathrm{L}\mu\nu}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^j_{\ n}\epsilon^{abc}\epsilon^{kn}H^{\dagger i}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_pq_{tck}\right)\left(q_{rai}C\sigma^{\mu\nu}q_{sbj}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r\\s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^j_{\ n}\epsilon^{abc}\epsilon^{kn}H^{\dagger i}W^I_{\mathrm{L}\mu\nu}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)
\end{array}\right.\tag{4.362}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{e}\bar{N}q\bar{u}H^\dagger}(0,-2)\left|\begin{array}{l}
i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{u}_t^{\ a}q_{sai}\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\[4pt]
i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^{I\mu\nu}_{\mathrm{L}}\left(\overline{N}_rC\overline{u}_t^{\ a}\right)\left(\overline{e}_p\sigma_{\mu\nu}q_{sai}\right)\\[4pt]
i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{e}_pC\overline{u}_t^{\ a}\right)\left(\overline{N}_r\sigma^{\mu\nu}q_{sai}\right)
\end{array}\right.\tag{4.363}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{N}^2q\bar{u}H}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ k}\epsilon^{jk}H_jW^I_{\mathrm{L}\mu\nu}\left(\overline{u}_t^{\ a}q_{sai}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ k}\epsilon^{jk}H_jW^{I\mu\nu}_{\mathrm{L}}\left(\overline{N}_rC\overline{u}_t^{\ a}\right)\left(\overline{N}_p\sigma_{\mu\nu}q_{sai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{p\,r}}\,i\left(\tau^I\right)^i_{\ k}\epsilon^{jk}H_jW^{I\mu\nu}_{\mathrm{L}}\left(\overline{N}_rC\overline{u}_t^{\ a}\right)\left(\overline{N}_p\sigma_{\mu\nu}q_{sai}\right)
\end{array}\right.\tag{4.364}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{d}\bar{N}^2qH^\dagger}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p^{\ a}\sigma^{\mu\nu}C\overline{N}_r\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{d}_p^{\ a}q_{tai}\right)\left(\overline{N}_r\sigma^{\mu\nu}C\overline{N}_s\right)\\[4pt]
\mathcal{Y}\,_{\boxed{r\,s}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p^{\ a}\sigma^{\mu\nu}C\overline{N}_r\right)
\end{array}\right.\tag{4.365}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{e}l\bar{N}^2H^\dagger}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^{I\mu\nu}_{\mathrm{L}}\left(\overline{N}_tl_{ri}\right)\left(\overline{e}_p\sigma_{\mu\nu}C\overline{N}_s\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}W^I_{\mathrm{L}\mu\nu}\left(\overline{e}_pC\overline{N}_t\right)\left(\overline{N}_s\sigma^{\mu\nu}l_{ri}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{s\,t}}\,i\left(\tau^I\right)^i_{\ j}H^{\dagger j}\left(\overline{N}_sC\overline{N}_t\right)W^I_{\mathrm{L}\mu\nu}\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)
\end{array}\right.\tag{4.366}$$

$$\mathcal{O}^{(1,2)}_{W_{\mathrm{L}}l\bar{N}^3H}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r\\s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ k}\epsilon^{jk}H_jW^I_{\mathrm{L}\mu\nu}\left(\overline{N}_tl_{pi}\right)\left(\overline{N}_r\sigma^{\mu\nu}C\overline{N}_s\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\left(\tau^I\right)^i_{\ k}\epsilon^{jk}H_j\left(\overline{N}_sC\overline{N}_t\right)W^I_{\mathrm{L}\mu\nu}\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)
\end{array}\right.\tag{4.367}$$

$$\mathcal{O}^{(1\sim4)}_{B_{\mathrm{L}}\bar{N}q^3H^\dagger}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\epsilon^{abc}\epsilon^{ik}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r&s\\t\end{smallmatrix}}}\,i\epsilon^{abc}\epsilon^{ik}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(\overline{N}_pq_{tck}\right)\left(q_{rai}C\sigma^{\mu\nu}q_{sbj}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{r\,s\,t}}\,i\epsilon^{abc}\epsilon^{ik}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\[4pt]
\mathcal{Y}\,_{\boxed{\begin{smallmatrix}r\\s\\t\end{smallmatrix}}}\,i\epsilon^{abc}\epsilon^{ik}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(q_{sbj}Cq_{tck}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)
\end{array}\right.\tag{4.368}$$

$$\mathcal{O}^{(1\sim3)}_{B_{\mathrm{L}}\bar{e}\bar{N}q\bar{u}H^\dagger}(0,-2)\left|\begin{array}{l}
iB_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\overline{u}_t^{\ a}q_{sai}\right)\left(\overline{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\[4pt]
iH^{\dagger i}B^{\mu\nu}_{\mathrm{L}}\left(\overline{N}_rC\overline{u}_t^{\ a}\right)\left(\overline{e}_p\sigma_{\mu\nu}q_{sai}\right)\\[4pt]
iB_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\overline{e}_pC\overline{u}_t^{\ a}\right)\left(\overline{N}_r\sigma^{\mu\nu}q_{sai}\right)
\end{array}\right.\tag{4.369}$$

$$\mathcal{O}^{(1\sim3)}_{B_L\bar{N}^2q\bar{u}H}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon^{ij}H_jB_{L\mu\nu}\left(\overline{u}_t{}^aq_{sai}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon^{ij}H_jB_L{}^{\mu\nu}\left(\overline{N}_rC\overline{u}_t{}^a\right)\left(\overline{N}_p\sigma_{\mu\nu}q_{sai}\right)\\\mathcal{Y}\left[\underline{p|r}\right]i\epsilon^{ij}H_jB_L{}^{\mu\nu}\left(\overline{N}_rC\overline{u}_t{}^a\right)\left(\overline{N}_p\sigma_{\mu\nu}q_{sai}\right)\end{array}\right.\tag{4.370}$$

$$\mathcal{O}^{(1\sim3)}_{B_L\bar{d}\bar{N}^2qH^\dagger}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{L\mu\nu}H^{\dagger i}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right)\\\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iB_{L\mu\nu}H^{\dagger i}\left(\overline{d}_p{}^aq_{tai}\right)\left(\overline{N}_r\sigma^{\mu\nu}C\overline{N}_s\right)\\\mathcal{Y}\left[\underline{r|s}\right]iB_{L\mu\nu}H^{\dagger i}\left(\overline{N}_sq_{tai}\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right)\end{array}\right.\tag{4.371}$$

$$\mathcal{O}^{(1\sim3)}_{B_L\bar{e}l\bar{N}^2H^\dagger}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]iH^{\dagger i}B_L{}^{\mu\nu}\left(\overline{N}_tl_{ri}\right)\left(\overline{e}_p\sigma_{\mu\nu}C\overline{N}_s\right)\\\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]iB_{L\mu\nu}H^{\dagger i}\left(\overline{e}_pC\overline{N}_t\right)\left(\overline{N}_s\sigma^{\mu\nu}l_{ri}\right)\\\mathcal{Y}\left[\underline{s|t}\right]iB_{L\mu\nu}H^{\dagger i}\left(\overline{N}_sC\overline{N}_t\right)\left(\overline{e}_p\sigma^{\mu\nu}l_{ri}\right)\end{array}\right.\tag{4.372}$$

$$\mathcal{O}^{(1,2)}_{B_Ll\bar{N}^3H}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right]i\epsilon^{ij}H_jB_{L\mu\nu}\left(\overline{N}_tl_{pi}\right)\left(\overline{N}_r\sigma^{\mu\nu}C\overline{N}_s\right)\\\mathcal{Y}\left[\begin{smallmatrix}r|s\\t\end{smallmatrix}\right]i\epsilon^{ij}H_jB_{L\mu\nu}\left(\overline{N}_sC\overline{N}_t\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\end{array}\right.\tag{4.373}$$

Class $F_L\psi^2\psi^{\dagger2}\phi$: 70 types

$$\mathcal{O}_{G_LN^2q\bar{u}H}(0,2)\left|\mathcal{Y}\left[\underline{s|t}\right]i\left(\lambda^A\right)^a_b\epsilon^{ij}H_j\left(N_sCN_t\right)G^A_{L\mu\nu}\left(\overline{u}_r{}^b\sigma^{\mu\nu}q_{pai}\right)\right.\tag{4.374}$$

$$\mathcal{O}_{G_L\bar{d}eNqH}(0,2)\left|i\left(\lambda^A\right)^b_a\epsilon^{ij}H_jG^A_{L\mu\nu}\left(e_sCN_t\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rbi}\right)\right.\tag{4.375}$$

$$\mathcal{O}_{G_L\bar{d}N^2qH^\dagger}(0,2)\left|\mathcal{Y}\left[\underline{s|t}\right]i\left(\lambda^A\right)^b_aH^{\dagger i}\left(N_sCN_t\right)G^A_{L\mu\nu}\left(\overline{d}_p{}^a\sigma^{\mu\nu}q_{rbi}\right)\right.\tag{4.376}$$

$$\mathcal{O}^{(1,2)}_{G_LlNq\bar{q}H}(0,2)\left|\begin{array}{l}i\left(\lambda^A\right)^a_b\epsilon^{ik}H_kG^A_{L\mu\nu}\left(\overline{q}_t^{bj}N_s\right)\left(l_{pi}C\sigma^{\mu\nu}q_{raj}\right)\\i\left(\lambda^A\right)^a_b\epsilon^{ij}H_kG^A_{L\mu\nu}\left(\overline{q}_t^{bk}N_s\right)\left(l_{pi}C\sigma^{\mu\nu}q_{raj}\right)\end{array}\right.\tag{4.377}$$

$$\mathcal{O}^{(1,2)}_{G_Ld^2\bar{N}qH}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\underline{s|t}\right]i\left(\lambda^A\right)^b_e\epsilon^{ace}\epsilon^{ij}H_jG^A_{L\mu\nu}\left(d_{sb}Cd_{tc}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\left(\lambda^A\right)^b_e\epsilon^{ace}\epsilon^{ij}H_jG^A_{L\mu\nu}\left(d_{sb}Cd_{tc}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\end{array}\right.\tag{4.378}$$

$$\mathcal{O}^{(1,2)}_{G_L\bar{l}\bar{N}q\bar{q}H^\dagger}(0,-2)\left|\begin{array}{l}i\epsilon_{jm}\left(\lambda^A\right)^a_bH^{\dagger j}G^A_{L\mu\nu}\left(\overline{l}_s{}^iC\overline{q}_t^{bm}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\i\epsilon_{km}\left(\lambda^A\right)^a_bH^{\dagger i}G^A_{L\mu\nu}\left(\overline{l}_s{}^kC\overline{q}_t^{bm}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\end{array}\right.\tag{4.379}$$

$$\mathcal{O}^{(1,2)}_{G_Ld\bar{N}quH^\dagger}(1,-1)\left|\begin{array}{l}i\left(\lambda^A\right)^b_e\epsilon^{ace}H^{\dagger i}G^A_{L\mu\nu}\left(d_{sb}Cu_{tc}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\\i\left(\lambda^A\right)^a_e\epsilon^{bce}H^{\dagger i}G^A_{L\mu\nu}\left(d_{sb}Cu_{tc}\right)\left(\overline{N}_p\sigma^{\mu\nu}q_{rai}\right)\end{array}\right.\tag{4.380}$$

$$\mathcal{O}^{(1,2)}_{G_L\bar{d}N\bar{q}\bar{u}H}(-1,1)\left|\begin{array}{l}i\epsilon_{ace}\left(\lambda^A\right)^e_bH_iG^A_{L\mu\nu}\left(\overline{q}_t^{ci}N_s\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{u}_r{}^b\right)\\i\epsilon_{abe}\left(\lambda^A\right)^e_cH_iG^A_{L\mu\nu}\left(\overline{q}_t^{ci}N_s\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{u}_r{}^b\right)\end{array}\right.\tag{4.381}$$

$$\mathcal{O}_{G_LlN\bar{u}uH}(0,2)\left|i\left(\lambda^A\right)^b_a\epsilon^{ij}H_jG^A_{L\mu\nu}\left(N_sCu_{tb}\right)\left(\overline{u}_r{}^a\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.382}$$

$$\mathcal{O}_{G_Ld\bar{l}\bar{N}\bar{u}H}(0,-2)\left|i\left(\lambda^A\right)^b_aH_iG^A_{L\mu\nu}\left(\overline{l}_t{}^id_{sb}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r{}^a\right)\right.\tag{4.383}$$

$$\mathcal{O}_{G_L\bar{l}\bar{N}\bar{u}uH^\dagger}(0,-2)\left|i\epsilon_{ij}\left(\lambda^A\right)^b_aH^{\dagger i}G^A_{L\mu\nu}\left(\overline{l}_s{}^ju_{tb}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{u}_r{}^a\right)\right.\tag{4.384}$$

$$\mathcal{O}^{(1,2)}_{G_L\bar{d}^2N\bar{q}H^\dagger}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{ace}\epsilon_{ij}\left(\lambda^A\right)^e_bH^{\dagger i}G^A_{L\mu\nu}\left(\overline{q}_t^{cj}N_s\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{d}_r{}^b\right)\\\mathcal{Y}\left[\underline{p|r}\right]i\epsilon_{ace}\epsilon_{ij}\left(\lambda^A\right)^e_bH^{\dagger i}G^A_{L\mu\nu}\left(\overline{q}_t^{cj}N_s\right)\left(\overline{d}_p{}^a\sigma^{\mu\nu}C\overline{d}_r{}^b\right)\end{array}\right.\tag{4.385}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}dlNH}(0,2) \left| i\left(\lambda^A\right)^b_a \epsilon^{ij} H_j G^A_{\mathrm{L}\mu\nu} \left(d_{sb}CN_t\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} l_{ri}\right) \right. \tag{4.386}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}lNuH^\dagger}(0,2) \left| i\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{\mathrm{L}\mu\nu} \left(N_sCu_{tb}\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} l_{ri}\right) \right. \tag{4.387}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{d}d\bar{l}\bar{N}H^\dagger}(0,-2) \left| i\epsilon_{ij}\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{\mathrm{L}\mu\nu} \left(\bar{l}_t{}^j d_{sb}\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} C\overline{N}_r\right) \right. \tag{4.388}$$

$$\mathcal{O}_{G_{\mathrm{L}}d\bar{e}\bar{N}\bar{q}H^\dagger}(0,-2) \left| i\epsilon_{ij}\left(\lambda^A\right)^a_b H^{\dagger i} G^A_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{bj} d_{sa}\right) \left(\bar{e}_p \sigma^{\mu\nu} C\overline{N}_r\right) \right. \tag{4.389}$$

$$\mathcal{O}_{G_{\mathrm{L}}d\bar{N}^2\bar{q}H}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b H_i G^A_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{bi} d_{sa}\right) \left(\overline{N}_p \sigma^{\mu\nu} C\overline{N}_r\right) \right. \tag{4.390}$$

$$\mathcal{O}_{G_{\mathrm{L}}\bar{N}^2\bar{q}uH^\dagger}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ij}\left(\lambda^A\right)^b_a H^{\dagger i} G^A_{\mathrm{L}\mu\nu} \left(\overline{q}_s^{aj} u_{tb}\right) \left(\overline{N}_p \sigma^{\mu\nu} C\overline{N}_r\right) \right. \tag{4.391}$$

$$\mathcal{O}_{W_{\mathrm{L}}N^2q\bar{u}H}(0,2) \left| \mathcal{Y}\left[\underline{s\,t}\right] i\left(\tau^I\right)^i_k \epsilon^{jk} H_j \left(N_sCN_t\right) W^I_{\mathrm{L}\mu\nu} \left(\overline{u}_r{}^a \sigma^{\mu\nu} q_{pai}\right) \right. \tag{4.392}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}eNqH}(0,2) \left| i\left(\tau^I\right)^i_k \epsilon^{jk} H_j \left(e_sCN_t\right) W^I_{\mathrm{L}\mu\nu} \left(\bar{d}_p{}^a \sigma^{\mu\nu} q_{rai}\right) \right. \tag{4.393}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}N^2qH^\dagger}(0,2) \left| \mathcal{Y}\left[\underline{s\,t}\right] i\left(\tau^I\right)^i_j H^{\dagger j} \left(N_sCN_t\right) W^I_{\mathrm{L}\mu\nu} \left(\bar{d}_p{}^a \sigma^{\mu\nu} q_{rai}\right) \right. \tag{4.394}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}lNq\bar{q}H}(0,2) \left| \begin{array}{l} i\left(\tau^I\right)^j_n \epsilon^{kn} H_k W^I_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{ai} N_s\right) \left(l_{pi}C\sigma^{\mu\nu} q_{raj}\right) \\ i\left(\tau^I\right)^i_n \epsilon^{kn} H_k W^I_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{aj} N_s\right) \left(l_{pi}C\sigma^{\mu\nu} q_{raj}\right) \\ i\left(\tau^I\right)^i_n \epsilon^{jn} H_k W^I_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{ak} N_s\right) \left(l_{pi}C\sigma^{\mu\nu} q_{raj}\right) \end{array} \right. \tag{4.395}$$

$$\mathcal{O}_{W_{\mathrm{L}}d^2\bar{N}qH}(1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\left(\tau^I\right)^i_k \epsilon^{abc}\epsilon^{jk} H_j W^I_{\mathrm{L}\mu\nu} \left(d_{sb}Cd_{tc}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \right. \tag{4.396}$$

$$\mathcal{O}^{(1\sim3)}_{W_{\mathrm{L}}\bar{l}\bar{N}q\bar{q}H^\dagger}(0,-2) \left| \begin{array}{l} i\epsilon_{kn}\left(\tau^I\right)^n_j H^{\dagger j} W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_s{}^k C\overline{q}_t^{ai}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ i\epsilon_{kn}\left(\tau^I\right)^n_m H^{\dagger i} W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_s{}^k C\overline{q}_t^{am}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ i\epsilon_{jn}\left(\tau^I\right)^n_m H^{\dagger j} W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_s{}^i C\overline{q}_t^{am}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \end{array} \right. \tag{4.397}$$

$$\mathcal{O}_{W_{\mathrm{L}}d\bar{N}quH^\dagger}(1,-1) \left| i\left(\tau^I\right)^i_j \epsilon^{abc} H^{\dagger j} W^I_{\mathrm{L}\mu\nu} \left(d_{sb}Cu_{tc}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \right. \tag{4.398}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}Nq\bar{u}H}(-1,1) \left| i\epsilon_{abc}\left(\tau^I\right)^i_j H_i W^I_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{cj} N_s\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} C\overline{u}_r{}^b\right) \right. \tag{4.399}$$

$$\mathcal{O}_{W_{\mathrm{L}}lN\bar{u}uH}(0,2) \left| i\left(\tau^I\right)^i_k \epsilon^{jk} H_j W^I_{\mathrm{L}\mu\nu} \left(N_sCu_{ta}\right) \left(\overline{u}_r{}^a \sigma^{\mu\nu} l_{pi}\right) \right. \tag{4.400}$$

$$\mathcal{O}_{W_{\mathrm{L}}d\bar{l}\bar{N}\bar{u}H}(0,-2) \left| i\left(\tau^I\right)^i_j H_i W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_t{}^j d_{sa}\right) \left(\overline{N}_p \sigma^{\mu\nu} C\overline{u}_r{}^a\right) \right. \tag{4.401}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{l}\bar{N}\bar{u}uH^\dagger}(0,-2) \left| i\epsilon_{jk}\left(\tau^I\right)^k_i H^{\dagger i} W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_s{}^j u_{ta}\right) \left(\overline{N}_p \sigma^{\mu\nu} C\overline{u}_r{}^a\right) \right. \tag{4.402}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}^2N\bar{q}H^\dagger}(-1,1) \left| \mathcal{Y}\left[\underline{p\,r}\right] i\epsilon_{abc}\epsilon_{jk}\left(\tau^I\right)^k_i H^{\dagger i} W^I_{\mathrm{L}\mu\nu} \left(\overline{q}_t^{cj} N_s\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} C\overline{d}_r{}^b\right) \right. \tag{4.403}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}dlNH}(0,2) \left| i\left(\tau^I\right)^i_k \epsilon^{jk} H_j W^I_{\mathrm{L}\mu\nu} \left(d_{sa}CN_t\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} l_{ri}\right) \right. \tag{4.404}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}lNuH^\dagger}(0,2) \left| i\left(\tau^I\right)^i_j H^{\dagger j} W^I_{\mathrm{L}\mu\nu} \left(N_sCu_{ta}\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} l_{ri}\right) \right. \tag{4.405}$$

$$\mathcal{O}_{W_{\mathrm{L}}\bar{d}d\bar{l}\bar{N}H^\dagger}(0,-2) \left| i\epsilon_{jk}\left(\tau^I\right)^k_i H^{\dagger i} W^I_{\mathrm{L}\mu\nu} \left(\bar{l}_t{}^j d_{sa}\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} C\overline{N}_r\right) \right. \tag{4.406}$$

$$\mathcal{O}^{(1\sim3)}_{W_L l^2 \bar{l} N H}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_n^j \epsilon^{kn} H_k W^I_{L\mu\nu} \left(\bar{l}_s{}^i N_t\right) (l_{pi} C \sigma^{\mu\nu} l_{rj}) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_n^i \epsilon^{jn} H_k W^I_{L\mu\nu} \left(\bar{l}_s{}^k N_t\right) (l_{pi} C \sigma^{\mu\nu} l_{rj}) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\left(\tau^I\right)_n^j \epsilon^{kn} H_k W^I_{L\mu\nu} \left(\bar{l}_s{}^i N_t\right) (l_{pi} C \sigma^{\mu\nu} l_{rj}) \end{array} \right.$$

(4.407)

$$\mathcal{O}_{W_L \bar{e} e l N H}(0,2) \left| i\left(\tau^I\right)_k^i \epsilon^{jk} H_j \left(e_s C N_t\right) W^I_{L\mu\nu} \left(\bar{e}_p \sigma^{\mu\nu} l_{ri}\right) \right.$$

(4.408)

$$\mathcal{O}_{W_L \bar{e} l N^2 H^\dagger}(0,2) \left| \mathcal{Y}\left[\boxed{s\,t}\right] i\left(\tau^I\right)_j^i H^{\dagger j} \left(N_s C N_t\right) W^I_{L\mu\nu} \left(\bar{e}_p \sigma^{\mu\nu} l_{ri}\right) \right.$$

(4.409)

$$\mathcal{O}_{W_L l \bar{N} N^2 H}(0,2) \left| \mathcal{Y}\left[\boxed{s\,t}\right] i\left(\tau^I\right)_k^i \epsilon^{jk} H_j \left(N_s C N_t\right) W^I_{L\mu\nu} \left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \right.$$

(4.410)

$$\mathcal{O}^{(1\sim3)}_{W_L l \bar{l}^2 \bar{N} H^\dagger}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{s\,t}\right] i\epsilon_{kn}\left(\tau^I\right)_j^n H^{\dagger j} W^I_{L\mu\nu} \left(\bar{l}_s{}^k C \bar{l}_t{}^i\right) \left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right] i\epsilon_{kn}\left(\tau^I\right)_m^n H^{\dagger i} W^I_{L\mu\nu} \left(\bar{l}_s{}^k C \bar{l}_t{}^m\right) \left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] i\epsilon_{kn}\left(\tau^I\right)_j^n H^{\dagger j} W^I_{L\mu\nu} \left(\bar{l}_s{}^k C \bar{l}_t{}^i\right) \left(\overline{N}_r \sigma^{\mu\nu} l_{pi}\right) \end{array} \right.$$

(4.411)

$$\mathcal{O}_{W_L d \bar{e} \bar{N} \bar{q} H^\dagger}(0,-2) \left| i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i} W^I_{L\mu\nu} \left(\bar{q}_t^{aj} d_{sa}\right) \left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.412)

$$\mathcal{O}_{W_L \bar{e} e l \bar{N} H^\dagger}(0,-2) \left| i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i} W^I_{L\mu\nu} \left(\bar{l}_t{}^j e_s\right) \left(\bar{e}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.413)

$$\mathcal{O}_{W_L d \bar{N}^2 \bar{q} H}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_j^i H_i W^I_{L\mu\nu} \left(\bar{q}_t^{aj} d_{sa}\right) \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.414)

$$\mathcal{O}_{W_L e l \bar{N}^2 H}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\left(\tau^I\right)_j^i H_i W^I_{L\mu\nu} \left(\bar{l}_t{}^j e_s\right) \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.415)

$$\mathcal{O}_{W_L \bar{N}^2 \bar{q} u H^\dagger}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i} W^I_{L\mu\nu} \left(\bar{q}_s^{aj} u_{ta}\right) \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.416)

$$\mathcal{O}_{W_L \bar{l} \bar{N}^2 N H^\dagger}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] i\epsilon_{jk}\left(\tau^I\right)_i^k H^{\dagger i} W^I_{L\mu\nu} \left(\bar{l}_s{}^j N_t\right) \left(\overline{N}_p \sigma^{\mu\nu} C \overline{N}_r\right) \right.$$

(4.417)

$$\mathcal{O}_{B_L N^2 q \bar{u} H}(0,2) \left| \mathcal{Y}\left[\boxed{s\,t}\right] i\epsilon^{ij} H_j B_{L\mu\nu} \left(N_s C N_t\right) \left(\bar{u}_r{}^a \sigma^{\mu\nu} q_{pai}\right) \right.$$

(4.418)

$$\mathcal{O}_{B_L \bar{d} e N q H}(0,2) \left| i\epsilon^{ij} H_j B_{L\mu\nu} \left(e_s C N_t\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} q_{rai}\right) \right.$$

(4.419)

$$\mathcal{O}_{B_L \bar{d} N^2 q H^\dagger}(0,2) \left| \mathcal{Y}\left[\boxed{s\,t}\right] i B_{L\mu\nu} H^{\dagger i} \left(N_s C N_t\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} q_{rai}\right) \right.$$

(4.420)

$$\mathcal{O}^{(1,2)}_{B_L l N q \bar{q} H}(0,2) \left| \begin{array}{l} i\epsilon^{ik} H_k B_{L\mu\nu} \left(\bar{q}_t^{aj} N_s\right) (l_{pi} C \sigma^{\mu\nu} q_{raj}) \\ i\epsilon^{ij} H_k B_{L\mu\nu} \left(\bar{q}_t^{ak} N_s\right) (l_{pi} C \sigma^{\mu\nu} q_{raj}) \end{array} \right.$$

(4.421)

$$\mathcal{O}_{B_L d^2 \bar{N} q H}(1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] i\epsilon^{abc} \epsilon^{ij} H_j B_{L\mu\nu} \left(d_{sb} C d_{tc}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \right.$$

(4.422)

$$\mathcal{O}^{(1,2)}_{B_L \bar{l} \bar{N} q \bar{q} H^\dagger}(0,-2) \left| \begin{array}{l} i\epsilon_{jm} B_{L\mu\nu} H^{\dagger j} \left(\bar{l}_s{}^i C \bar{q}_t^{am}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \\ i\epsilon_{km} B_{L\mu\nu} H^{\dagger i} \left(\bar{l}_s{}^k C \bar{q}_t^{am}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \end{array} \right.$$

(4.423)

$$\mathcal{O}_{B_L d \bar{N} q u H^\dagger}(1,-1) \left| i\epsilon^{abc} B_{L\mu\nu} H^{\dagger i} \left(d_{sb} C u_{tc}\right) \left(\overline{N}_p \sigma^{\mu\nu} q_{rai}\right) \right.$$

(4.424)

$$\mathcal{O}_{B_L \bar{d} N \bar{q} \bar{u} H}(-1,1) \left| i\epsilon_{abc} H_i B_{L\mu\nu} \left(\bar{q}_t^{ci} N_s\right) \left(\bar{d}_p{}^a \sigma^{\mu\nu} C \bar{u}_r{}^b\right) \right.$$

(4.425)

$$\mathcal{O}_{B_L l N \bar{u} u H}(0,2) \left| i\epsilon^{ij} H_j B_{L\mu\nu} \left(N_s C u_{ta}\right) \left(\bar{u}_r{}^a \sigma^{\mu\nu} l_{pi}\right) \right.$$

(4.426)

$$\mathcal{O}_{B_L d \bar{l} \bar{N} \bar{u} H}(0,-2) \left| i H_i B_{L\mu\nu} \left(\bar{l}_t{}^i d_{sa}\right) \left(\overline{N}_p \sigma^{\mu\nu} C \bar{u}_r{}^a\right) \right.$$

(4.427)

$$\mathcal{O}_{B_L \bar{l} \bar{N} \bar{u} u H^\dagger}(0,-2) \left| i\epsilon_{ij} B_{L\mu\nu} H^{\dagger i} \left(\bar{l}_s{}^j u_{ta}\right) \left(\overline{N}_p \sigma^{\mu\nu} C \bar{u}_r{}^a\right) \right.$$

(4.428)

$$\mathcal{O}_{B_{\mathrm{L}}\bar{d}^2 N\bar{q}H^\dagger}(-1,1)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline p\,r\\\hline\end{array}\right]i\epsilon_{abc}\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{q}_t^{cj}N_s\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}C\bar{d}_r{}^b\right)\right.\tag{4.429}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{d}dlNH}(0,2)\left|i\epsilon^{ij}H_jB_{\mathrm{L}\mu\nu}\left(d_{sa}CN_t\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\right.\tag{4.430}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{d}lNuH^\dagger}(0,2)\left|iB_{\mathrm{L}\mu\nu}H^{\dagger i}\left(N_sCu_{ta}\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}l_{ri}\right)\right.\tag{4.431}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{d}d\bar{l}\bar{N}H^\dagger}(0,-2)\left|i\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{l}_t{}^j d_{sa}\right)\left(\bar{d}_p{}^a\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.432}$$

$$\mathcal{O}_{B_{\mathrm{L}}l^2\bar{l}NH}^{(1,2)}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right]i\epsilon^{ik}H_kB_{\mathrm{L}\mu\nu}\left(\bar{l}_s{}^j N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj})\\[8pt]\mathcal{Y}\left[\begin{array}{|c|}\hline p\,r\\\hline\end{array}\right]i\epsilon^{ik}H_kB_{\mathrm{L}\mu\nu}\left(\bar{l}_s{}^j N_t\right)(l_{pi}C\sigma^{\mu\nu}l_{rj})\end{array}\right.\tag{4.433}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{e}elNH}(0,2)\left|i\epsilon^{ij}H_jB_{\mathrm{L}\mu\nu}\left(e_sCN_t\right)\left(\bar{e}_p\sigma^{\mu\nu}l_{ri}\right)\right.\tag{4.434}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{e}lN^2H^\dagger}(0,2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline s\,t\\\hline\end{array}\right]iB_{\mathrm{L}\mu\nu}H^{\dagger i}\left(N_sCN_t\right)\left(\bar{e}_p\sigma^{\mu\nu}l_{ri}\right)\right.\tag{4.435}$$

$$\mathcal{O}_{B_{\mathrm{L}}l\bar{N}N^2H}(0,2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline s\,t\\\hline\end{array}\right]i\epsilon^{ij}H_jB_{\mathrm{L}\mu\nu}\left(N_sCN_t\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\right.\tag{4.436}$$

$$\mathcal{O}_{B_{\mathrm{L}}l\bar{l}^2\bar{N}H^\dagger}^{(1,2)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{|c|}\hline s\,t\\\hline\end{array}\right]i\epsilon_{jm}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(\bar{l}_s{}^i C\bar{l}_t{}^m\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\\[8pt]\mathcal{Y}\left[\begin{array}{|c|}\hline s\\\hline t\\\hline\end{array}\right]i\epsilon_{jm}B_{\mathrm{L}\mu\nu}H^{\dagger j}\left(\bar{l}_s{}^i C\bar{l}_t{}^m\right)\left(\overline{N}_r\sigma^{\mu\nu}l_{pi}\right)\end{array}\right.\tag{4.437}$$

$$\mathcal{O}_{B_{\mathrm{L}}d\bar{e}\bar{N}\bar{q}H^\dagger}(0,-2)\left|i\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{q}_t^{aj}d_{sa}\right)\left(\bar{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.438}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{e}e\bar{l}\bar{N}H^\dagger}(0,-2)\left|i\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{l}_t{}^j e_s\right)\left(\bar{e}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.439}$$

$$\mathcal{O}_{B_{\mathrm{L}}d\bar{N}^2\bar{q}H}(0,-2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right]iH_iB_{\mathrm{L}\mu\nu}\left(\bar{q}_t^{ai}d_{sa}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.440}$$

$$\mathcal{O}_{B_{\mathrm{L}}e\bar{l}\bar{N}^2H}(0,-2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right]iH_iB_{\mathrm{L}\mu\nu}\left(\bar{l}_t{}^i e_s\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.441}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{N}^2\bar{q}uH^\dagger}(0,-2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right]i\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{q}_s^{aj}u_{ta}\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.442}$$

$$\mathcal{O}_{B_{\mathrm{L}}\bar{l}\bar{N}^2NH^\dagger}(0,-2)\left|\mathcal{Y}\left[\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}\right]i\epsilon_{ij}B_{\mathrm{L}\mu\nu}H^{\dagger i}\left(\bar{l}_s{}^j N_t\right)\left(\overline{N}_p\sigma^{\mu\nu}C\overline{N}_r\right)\right.\tag{4.443}$$

Class $\psi^3\psi^\dagger\phi^2 D$: 27 types

$$\mathcal{O}_{d\bar{N}q^2HH^\dagger D}^{(1\sim10)}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H_kH^{\dagger j}\left(\overline{N}_p\gamma_\mu d_{tc}\right)(q_{rai}CD^\mu q_{sbj})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu d_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}\epsilon^{ik}H_kH^{\dagger j}\left(\overline{N}_p\gamma_\mu d_{tc}\right)(q_{rai}CD^\mu q_{sbj})\end{array}\right.\tag{4.444}$$

$$\mathcal{O}_{\bar{N}q^2uH^{\dagger2}D}^{(1\sim5)}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}H^{\dagger i}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu u_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}H^{\dagger j}D^\mu H^{\dagger i}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu u_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\,s\\\hline\end{array}\right]i\epsilon^{abc}H^{\dagger i}H^{\dagger j}\left(\overline{N}_p\gamma_\mu u_{tc}\right)(q_{rai}CD^\mu q_{sbj})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}H^{\dagger i}D^\mu H^{\dagger j}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu u_{tc})\\[6pt]\mathcal{Y}\left[\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}\right]i\epsilon^{abc}H^{\dagger j}D^\mu H^{\dagger i}\left(\overline{N}_p q_{rai}\right)(q_{sbj}C\gamma_\mu u_{tc})\end{array}\right.\tag{4.445}$$

$$\mathcal{O}^{(1\sim5)}_{lNq\bar{u}H^2D}(0,2)\left|\begin{array}{l} i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(l_{pi}Cq_{raj}\right)\left(\overline{u}_s{}^a\gamma_\mu N_t\right)\\ i\epsilon^{ij}\epsilon^{km}H_kD^\mu H_m\left(l_{pi}Cq_{raj}\right)\left(\overline{u}_s{}^a\gamma_\mu N_t\right)\\ i\epsilon^{ik}\epsilon^{jm}H_kH_m\left(l_{pi}C\gamma_\mu N_t\right)\left(D^\mu\overline{u}_s{}^aq_{raj}\right)\\ i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(\overline{u}_s{}^a l_{pi}\right)\left(q_{raj}C\gamma_\mu N_t\right)\\ i\epsilon^{ij}\epsilon^{km}H_kD^\mu H_m\left(\overline{u}_s{}^a l_{pi}\right)\left(q_{raj}C\gamma_\mu N_t\right) \end{array}\right. \tag{4.446}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{l}\bar{N}q\bar{u}HH^\dagger D}(0,-2)\left|\begin{array}{l} iH_jD^\mu H^{\dagger i}\left(\overline{N}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu C\bar{l}_t{}^j\right)\\ iH_jD^\mu H^{\dagger j}\left(\overline{N}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu C\bar{l}_t{}^i\right)\\ iH^{\dagger i}D^\mu H_j\left(\overline{N}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu C\bar{l}_t{}^j\right)\\ iH^{\dagger j}D^\mu H_j\left(\overline{N}_pq_{rai}\right)\left(\overline{u}_s{}^a\gamma_\mu C\bar{l}_t{}^i\right)\\ iH_jH^{\dagger i}\left(D^\mu\overline{u}_s{}^aq_{rai}\right)\left(\overline{N}_p\gamma_\mu C\bar{l}_t{}^j\right)\\ iH_jH^{\dagger j}\left(D^\mu\overline{u}_s{}^aq_{rai}\right)\left(\overline{N}_p\gamma_\mu C\bar{l}_t{}^i\right)\\ iH_jD^\mu H^{\dagger i}\left(\overline{N}_pC\overline{u}_s{}^a\right)\left(\bar{l}_t{}^j\gamma_\mu q_{rai}\right)\\ iH_jD^\mu H^{\dagger j}\left(\overline{N}_pC\overline{u}_s{}^a\right)\left(\bar{l}_t{}^i\gamma_\mu q_{rai}\right)\\ iH^{\dagger i}D^\mu H_j\left(\overline{N}_pC\overline{u}_s{}^a\right)\left(\bar{l}_t{}^j\gamma_\mu q_{rai}\right)\\ iH^{\dagger j}D^\mu H_j\left(\overline{N}_pC\overline{u}_s{}^a\right)\left(\bar{l}_t{}^i\gamma_\mu q_{rai}\right) \end{array}\right. \tag{4.447}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}lNqHH^\dagger D}(0,2)\left|\begin{array}{l} i\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\overline{d}_p{}^a l_{ri}\right)(q_{saj}C\gamma_\mu N_t)\\ i\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\overline{d}_p{}^a l_{ri}\right)(q_{saj}C\gamma_\mu N_t)\\ i\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\overline{d}_p{}^a l_{ri}\right)(q_{saj}C\gamma_\mu N_t)\\ i\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\overline{d}_p{}^a l_{ri}\right)(q_{saj}C\gamma_\mu N_t)\\ i\epsilon^{ik}H_kH^{\dagger j}\left(\overline{d}_p{}^a\gamma_\mu N_t\right)(l_{ri}CD^\mu q_{saj})\\ i\epsilon^{ij}H_kH^{\dagger k}\left(\overline{d}_p{}^a\gamma_\mu N_t\right)(l_{ri}CD^\mu q_{saj})\\ i\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\overline{d}_p{}^a q_{saj}\right)(l_{ri}C\gamma_\mu N_t)\\ i\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\overline{d}_p{}^a q_{saj}\right)(l_{ri}C\gamma_\mu N_t)\\ i\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\overline{d}_p{}^a q_{saj}\right)(l_{ri}C\gamma_\mu N_t)\\ i\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\overline{d}_p{}^a q_{saj}\right)(l_{ri}C\gamma_\mu N_t) \end{array}\right. \tag{4.448}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}l\bar{N}qH^{\dagger 2}D}(0,-2)\left|\begin{array}{l} i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\overline{d}_p{}^aC\overline{N}_r\right)\left(\bar{l}_t{}^m\gamma_\mu q_{sai}\right)\\ i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\overline{d}_p{}^aC\overline{N}_r\right)\left(\bar{l}_t{}^i\gamma_\mu q_{sai}\right)\\ i\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(\overline{N}_rD^\mu q_{sai}\right)\left(\overline{d}_p{}^a\gamma_\mu C\bar{l}_t{}^m\right)\\ i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\overline{d}_p{}^a q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\bar{l}_t{}^m\right)\\ i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\overline{d}_p{}^a q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\bar{l}_t{}^i\right) \end{array}\right. \tag{4.449}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}\bar{N}q\bar{q}H^{\dagger 2}D}(0,-2)\left|\begin{array}{l} i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\overline{e}_pC\overline{N}_r\right)(\overline{q}_t^{am}\gamma_\mu q_{sai})\\ i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\overline{e}_pC\overline{N}_r\right)(\overline{q}_t^{ai}\gamma_\mu q_{sai})\\ i\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(\overline{N}_rD^\mu q_{sai}\right)(\overline{e}_p\gamma_\mu C\overline{q}_t^{am})\\ i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\overline{e}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{am}\right)\\ i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\overline{e}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{ai}\right) \end{array}\right. \tag{4.450}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{N}^2 q\bar{q}HH^\dagger D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_j H^{\dagger i}\left(\overline{N}_r D^\mu q_{sai}\right)\left(\overline{N}_p\gamma_\mu C\overline{q}_t^{aj}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_j H^{\dagger j}\left(\overline{N}_r D^\mu q_{sai}\right)\left(\overline{N}_p\gamma_\mu C\overline{q}_t^{ai}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_j D^\mu H^{\dagger i}\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{aj}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_j D^\mu H^{\dagger j}\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{ai}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_j\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{aj}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH^{\dagger j} D^\mu H_j\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r\gamma_\mu C\overline{q}_t^{ai}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH_j\left(\overline{N}_p C\overline{N}_r\right)D^\mu H^{\dagger i}\left(\overline{q}_t^{aj}\gamma_\mu q_{sai}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH_j\left(\overline{N}_p C\overline{N}_r\right)D^\mu H^{\dagger j}\left(\overline{q}_t^{ai}\gamma_\mu q_{sai}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH^{\dagger i}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(\overline{q}_t^{aj}\gamma_\mu q_{sai}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH^{\dagger j}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(\overline{q}_t^{ai}\gamma_\mu q_{sai}\right) \end{array}\right. \tag{4.451}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}N\bar{u}^2 H^2 D}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\overline{r\,s}\right] i\epsilon_{abc}\epsilon^{ij}H_i D^\mu H_j\left(\overline{d}_p^{\,a}C\overline{u}_r^{\,b}\right)\left(\overline{u}_s^{\,c}\gamma_\mu N_t\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon_{abc}\epsilon^{ij}H_i D^\mu H_j\left(\overline{d}_p^{\,a}C\overline{u}_r^{\,b}\right)\left(\overline{u}_s^{\,c}\gamma_\mu N_t\right) \end{array}\right. \tag{4.452}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}^2 N\bar{u}HH^\dagger D}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abc}H_i H^{\dagger i}\left(\overline{d}_p^{\,a}\gamma_\mu N_t\right)\left(\overline{d}_r^{\,b}CD^\mu\overline{u}_s^{\,c}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abc}H_i D^\mu H^{\dagger i}\left(\overline{d}_p^{\,a}C\overline{u}_s^{\,c}\right)\left(\overline{d}_r^{\,b}\gamma_\mu N_t\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{abc}H^{\dagger i} D^\mu H_i\left(\overline{d}_p^{\,a}C\overline{u}_s^{\,c}\right)\left(\overline{d}_r^{\,b}\gamma_\mu N_t\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}H_i D^\mu H^{\dagger i}\left(\overline{d}_p^{\,a}C\overline{d}_r^{\,b}\right)\left(\overline{u}_s^{\,c}\gamma_\mu N_t\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}H^{\dagger i} D^\mu H_i\left(\overline{d}_p^{\,a}C\overline{d}_r^{\,b}\right)\left(\overline{u}_s^{\,c}\gamma_\mu N_t\right) \end{array}\right. \tag{4.453}$$

$$\mathcal{O}^{(1\sim5)}_{d\bar{e}\bar{N}\bar{u}HH^\dagger D}(0,-2) \left| \begin{array}{l} iH_i D^\mu H^{\dagger i}\left(\overline{e}_p C\overline{N}_r\right)\left(\overline{u}_s^{\,a}\gamma_\mu d_{ta}\right)\\[4pt] iH^{\dagger i} D^\mu H_i\left(\overline{e}_p C\overline{N}_r\right)\left(\overline{u}_s^{\,a}\gamma_\mu d_{ta}\right)\\[4pt] iH_i H^{\dagger i}\left(\overline{e}_p\gamma_\mu d_{ta}\right)\left(\overline{N}_r CD^\mu\overline{u}_s^{\,a}\right)\\[4pt] iH_i D^\mu H^{\dagger i}\left(\overline{e}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu d_{ta}\right)\\[4pt] iH^{\dagger i} D^\mu H_i\left(\overline{e}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu d_{ta}\right) \end{array}\right. \tag{4.454}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}\bar{N}\bar{u}uH^{\dagger 2} D}(0,-2) \left| \begin{array}{l} i\epsilon_{ij}H^{\dagger i} D^\mu H^{\dagger j}\left(\overline{e}_p C\overline{N}_r\right)\left(\overline{u}_s^{\,a}\gamma_\mu u_{ta}\right)\\[4pt] i\epsilon_{ij}H^{\dagger i} D^\mu H^{\dagger j}\left(\overline{e}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu u_{ta}\right) \end{array}\right. \tag{4.455}$$

$$\mathcal{O}^{(1,2)}_{d\bar{N}^2\bar{u}H^2 D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon^{ij}H_i D^\mu H_j\left(\overline{N}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu d_{ta}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon^{ij}H_i\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(\overline{u}_s^{\,a}\gamma_\mu d_{ta}\right) \end{array}\right. \tag{4.456}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{N}^2\bar{u}uHH^\dagger D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_i H^{\dagger i}\left(\overline{N}_p\gamma_\mu u_{ta}\right)\left(\overline{N}_r CD^\mu\overline{u}_s^{\,a}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH_i D^\mu H^{\dagger i}\left(\overline{N}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu u_{ta}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_i\left(\overline{N}_p C\overline{u}_s^{\,a}\right)\left(\overline{N}_r\gamma_\mu u_{ta}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH_i\left(\overline{N}_p C\overline{N}_r\right)D^\mu H^{\dagger i}\left(\overline{u}_s^{\,a}\gamma_\mu u_{ta}\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right] iH^{\dagger i}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_i\left(\overline{u}_s^{\,a}\gamma_\mu u_{ta}\right) \end{array}\right. \tag{4.457}$$

$$\mathcal{O}_{\bar{d}^3 NH^{\dagger 2} D}(-1,1) \left| \mathcal{Y}\left[\begin{smallmatrix}p\,r\\s\end{smallmatrix}\right] i\epsilon_{abc}\epsilon_{ij}H^{\dagger i} D^\mu H^{\dagger j}\left(\overline{d}_p^{\,a}C\overline{d}_r^{\,b}\right)\left(\overline{d}_s^{\,c}\gamma_\mu N_t\right) \right. \tag{4.458}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}d\bar{e}\bar{N}H^{\dagger 2} D}(0,-2) \left| \begin{array}{l} i\epsilon_{ij}H^{\dagger i} D^\mu H^{\dagger j}\left(\overline{d}_p^{\,a}C\overline{e}_r\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\\[4pt] i\epsilon_{ij}H^{\dagger i} D^\mu H^{\dagger j}\left(\overline{d}_p^{\,a}C\overline{N}_s\right)\left(\overline{e}_r\gamma_\mu d_{ta}\right) \end{array}\right. \tag{4.459}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}d\bar{N}^2HH^\dagger D}(0,-2)\begin{vmatrix}\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}iH_iD^\mu H^{\dagger i}\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}iH^{\dagger i}D^\mu H_i\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}iH_iH^{\dagger i}\left(\bar{d}_p{}^a\gamma_\mu d_{ta}\right)\left(\overline{N}_rCD^\mu\overline{N}_s\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}iH_iD^\mu H^{\dagger i}\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}iH^{\dagger i}D^\mu H_i\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu d_{ta}\right)\end{vmatrix}$$ (4.460)

$$\mathcal{O}^{(1,2)}_{\bar{d}\bar{N}^2uH^{\dagger2}D}(0,-2)\begin{vmatrix}\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon_{ij}H^{\dagger i}D^\mu H^{\dagger j}\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu u_{ta}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon_{ij}H^{\dagger i}D^\mu H^{\dagger j}\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\overline{N}_s\gamma_\mu u_{ta}\right)\end{vmatrix}$$ (4.461)

$$\mathcal{O}^{(1\sim10)}_{\bar{e}l^2NHH^\dagger D}(0,2)\begin{vmatrix}\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r}\\\boxed{s}\end{bmatrix}i\epsilon^{ik}H_kH^{\dagger j}\left(\bar{e}_p\gamma_\mu N_t\right)\left(l_{ri}CD^\mu l_{sj}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon^{ik}H_kD^\mu H^{\dagger j}\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon^{ij}H_kD^\mu H^{\dagger k}\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon^{ik}H^{\dagger j}D^\mu H_k\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon^{ij}H^{\dagger k}D^\mu H_k\left(\bar{e}_pl_{ri}\right)\left(l_{sj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{r\,s}\end{bmatrix}i\epsilon^{ik}H_kH^{\dagger j}\left(\bar{e}_p\gamma_\mu N_t\right)\left(l_{ri}CD^\mu l_{sj}\right)\end{vmatrix}$$ (4.462)

$$\mathcal{O}^{(1\sim5)}_{l^2\bar{N}NH^2D}(0,2)\begin{vmatrix}\mathcal{Y}\begin{bmatrix}\boxed{p}\\\boxed{r}\end{bmatrix}i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(\overline{N}_s\gamma_\mu N_t\right)\left(l_{pi}Cl_{rj}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{p}\\\boxed{r}\end{bmatrix}i\epsilon^{ik}\epsilon^{jm}H_kH_m\left(l_{pi}C\gamma_\mu N_t\right)\left(D^\mu\overline{N}_sl_{rj}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{p}\\\boxed{r}\end{bmatrix}i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(\overline{N}_sl_{pi}\right)\left(l_{rj}C\gamma_\mu N_t\right)\\\mathcal{Y}\begin{bmatrix}\boxed{p\,r}\end{bmatrix}i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(\overline{N}_s\gamma_\mu N_t\right)\left(l_{pi}Cl_{rj}\right)\\\mathcal{Y}\begin{bmatrix}\boxed{p\,r}\end{bmatrix}i\epsilon^{ik}\epsilon^{jm}H_kD^\mu H_m\left(\overline{N}_sl_{pi}\right)\left(l_{rj}C\gamma_\mu N_t\right)\end{vmatrix}$$ (4.463)

$$\mathcal{O}^{(1\sim5)}_{\bar{e}l\bar{l}\bar{N}H^{\dagger2}D}(0,-2)\begin{vmatrix}i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\bar{e}_pl_{ri}\right)\left(\overline{N}_s\gamma_\mu C\bar{l}_t{}^m\right)\\i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\bar{e}_pl_{ri}\right)\left(\overline{N}_s\gamma_\mu C\bar{l}_t{}^i\right)\\i\epsilon_{km}H^{\dagger i}H^{\dagger k}\left(D^\mu\overline{N}_sl_{ri}\right)\left(\bar{e}_p\gamma_\mu C\bar{l}_t{}^m\right)\\i\epsilon_{km}H^{\dagger i}D^\mu H^{\dagger k}\left(\bar{e}_pC\overline{N}_s\right)\left(\bar{l}_t{}^m\gamma_\mu l_{ri}\right)\\i\epsilon_{jk}H^{\dagger j}D^\mu H^{\dagger k}\left(\bar{e}_pC\overline{N}_s\right)\left(\bar{l}_t{}^i\gamma_\mu l_{ri}\right)\end{vmatrix}$$ (4.464)

$$\mathcal{O}^{(1\sim10)}_{l\bar{l}\bar{N}^2HH^\dagger D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_j D^\mu H^{\dagger i}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ j}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_j D^\mu H^{\dagger j}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ i}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ j}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH^{\dagger j} D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ i}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_j H^{\dagger i}\left(\overline{N}_r CD^\mu \overline{N}_s\right)\left(\bar{l}_t^{\ j}\gamma_\mu l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_j H^{\dagger j}\left(\overline{N}_r CD^\mu \overline{N}_s\right)\left(\bar{l}_t^{\ i}\gamma_\mu l_{pi}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH_j D^\mu H^{\dagger i}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ j}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH_j D^\mu H^{\dagger j}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ i}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ j}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH^{\dagger j} D^\mu H_j\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s \gamma_\mu C\bar{l}_t^{\ i}\right) \end{vmatrix} \tag{4.465}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}^2 e\bar{N}H^{\dagger 2}D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{ij}H^{\dagger i}D^\mu H^{\dagger j}\left(\bar{e}_p C\overline{N}_s\right)\left(\bar{e}_r \gamma_\mu e_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right] i\epsilon_{ij}H^{\dagger i}\left(\bar{e}_p C\bar{e}_r\right)D^\mu H^{\dagger j}\left(\overline{N}_s \gamma_\mu e_t\right) \end{vmatrix} \tag{4.466}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}e\bar{N}^2HH^\dagger D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_i D^\mu H^{\dagger i}\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu e_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_i\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu e_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iH_i H^{\dagger i}\left(\bar{e}_p \gamma_\mu e_t\right)\left(\overline{N}_r CD^\mu \overline{N}_s\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH_i D^\mu H^{\dagger i}\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu e_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iH^{\dagger i} D^\mu H_i\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu e_t\right) \end{vmatrix} \tag{4.467}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}\bar{N}^2NH^{\dagger 2}D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\epsilon_{ij}H^{\dagger i}D^\mu H^{\dagger j}\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] i\epsilon_{ij}H^{\dagger i}D^\mu H^{\dagger j}\left(\bar{e}_p C\overline{N}_r\right)\left(\overline{N}_s \gamma_\mu N_t\right) \end{vmatrix} \tag{4.468}$$

$$\mathcal{O}_{e\bar{N}^3H^2D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right] i\epsilon^{ij}H_i\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_j\left(\overline{N}_s \gamma_\mu e_t\right) \end{vmatrix} \tag{4.469}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{N}^3NHH^\dagger D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right] iH_i H^{\dagger i}\left(\overline{N}_p \gamma_\mu N_t\right)\left(\overline{N}_r CD^\mu \overline{N}_s\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right] iH_i\left(\overline{N}_p C\overline{N}_r\right)D^\mu H^{\dagger i}\left(\overline{N}_s \gamma_\mu N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right] iH^{\dagger i}\left(\overline{N}_p C\overline{N}_r\right)D^\mu H_i\left(\overline{N}_s \gamma_\mu N_t\right) \end{vmatrix} \tag{4.470}$$

Class $\psi^4\phi^3$: 7 types

$$\mathcal{O}^{(1\sim4)}_{\bar{N}q^3HH^{\dagger 2}}(1,-1) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{km}H_m H^{\dagger i}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}Cq_{tck}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{jk}H_m H^{\dagger i}H^{\dagger m}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}Cq_{tck}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s&t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{km}H_m H^{\dagger i}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}Cq_{tck}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] \epsilon^{abc}\epsilon^{km}H_m H^{\dagger i}H^{\dagger j}\left(\overline{N}_p q_{rai}\right)\left(q_{sbj}Cq_{tck}\right) \end{vmatrix} \tag{4.471}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}\bar{N}q\bar{u}HH^{\dagger 2}}(0,-2) \begin{vmatrix} H_j H^{\dagger i}H^{\dagger j}\left(\bar{e}_p C\overline{N}_r\right)\left(\bar{u}_t^{\ a}q_{sai}\right) \\ H_j H^{\dagger i}H^{\dagger j}\left(\bar{e}_p q_{sai}\right)\left(\overline{N}_r C\bar{u}_t^{\ a}\right) \end{vmatrix} \tag{4.472}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}^2q\bar{u}H^2H^\dagger}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] \epsilon^{ik}H_j H_k H^{\dagger j}\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r C\bar{u}_t^{\ a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right] \epsilon^{ik}H_j H_k H^{\dagger j}\left(\overline{N}_p C\overline{N}_r\right)\left(\bar{u}_t^{\ a}q_{sai}\right) \end{vmatrix} \tag{4.473}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}N^2qHH^{\dagger 2}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(\overline{N}_s q_{tai}\right) \left(\overline{d}_p{}^a C \overline{N}_r\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(\overline{N}_s q_{tai}\right) \left(\overline{d}_p{}^a C \overline{N}_r\right) \end{array} \right. \tag{4.474}$$

$$\mathcal{O}_{l^3 \bar{N}H^3}(0,2) \left| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon^{im}\epsilon^{jn}\epsilon^{ko} H_m H_n H_o \left(\overline{N}_t l_{sk}\right) \left(l_{pi} C l_{rj}\right) \right. \tag{4.475}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l\bar{N}^2HH^{\dagger 2}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(\overline{e}_p C \overline{N}_s\right) \left(\overline{N}_t l_{ri}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(\overline{N}_s C \overline{N}_t\right) \left(\overline{e}_p l_{ri}\right) \end{array} \right. \tag{4.476}$$

$$\mathcal{O}_{l\bar{N}^3H^2H^{\dagger}}(0,-2) \left| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{ik} H_j H_k H^{\dagger j} \left(\overline{N}_s C \overline{N}_t\right) \left(\overline{N}_r l_{pi}\right) \right. \tag{4.477}$$

Class $\psi^2 \psi^{\dagger 2} \phi^3$: 13 types

$$\mathcal{O}_{N^2q\bar{u}H^2H^{\dagger}}(0,2) \left| \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon^{ik} H_j H_k H^{\dagger j} \left(N_s C N_t\right) \left(\overline{u}_r{}^a q_{pai}\right) \right. \tag{4.478}$$

$$\mathcal{O}_{\bar{d}eNqH^2H^{\dagger}}(0,2) \left| \epsilon^{ik} H_j H_k H^{\dagger j} \left(e_s C N_t\right) \left(\overline{d}_p{}^a q_{rai}\right) \right. \tag{4.479}$$

$$\mathcal{O}_{\bar{d}N^2qHH^{\dagger 2}}(0,2) \left| \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(N_s C N_t\right) \left(\overline{d}_p{}^a q_{rai}\right) \right. \tag{4.480}$$

$$\mathcal{O}^{(1\sim3)}_{lNq\bar{q}H^2H^{\dagger}}(0,2) \left| \begin{array}{l} \epsilon^{im} H_k H_m H^{\dagger j} \left(\overline{q}_t^{ak} N_s\right) \left(l_{pi} C q_{raj}\right) \\ \epsilon^{jm} H_k H_m H^{\dagger k} \left(\overline{q}_t^{ai} N_s\right) \left(l_{pi} C q_{raj}\right) \\ \epsilon^{jm} H_k H_m H^{\dagger i} \left(\overline{q}_t^{ak} N_s\right) \left(l_{pi} C q_{raj}\right) \end{array} \right. \tag{4.481}$$

$$\mathcal{O}_{d^2\bar{N}qH^2H^{\dagger}}(1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik} H_j H_k H^{\dagger j} \left(d_{sb} C d_{tc}\right) \left(\overline{N}_p q_{rai}\right) \right. \tag{4.482}$$

$$\mathcal{O}_{d\bar{N}quHH^{\dagger 2}}(1,-1) \left| \epsilon^{abc} H_j H^{\dagger i} H^{\dagger j} \left(\overline{N}_p q_{rai}\right) \left(d_{sb} C u_{tc}\right) \right. \tag{4.483}$$

$$\mathcal{O}_{lN\bar{u}uH^2H^{\dagger}}(0,2) \left| \epsilon^{ik} H_j H_k H^{\dagger j} \left(N_s C u_{ta}\right) \left(\overline{u}_r{}^a l_{pi}\right) \right. \tag{4.484}$$

$$\mathcal{O}_{d\bar{l}\bar{N}\bar{u}H^2H^{\dagger}}(0,-2) \left| H_i H_j H^{\dagger i} \left(\overline{N}_p C \overline{u}_r{}^a\right) \left(\overline{l}_t{}^j d_{sa}\right) \right. \tag{4.485}$$

$$\mathcal{O}_{\bar{d}dlNH^2H^{\dagger}}(0,2) \left| \epsilon^{ik} H_j H_k H^{\dagger j} \left(d_{sa} C N_t\right) \left(\overline{d}_p{}^a l_{ri}\right) \right. \tag{4.486}$$

$$\mathcal{O}^{(1\sim3)}_{l^2\bar{l}NH^2H^{\dagger}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{im} H_k H_m H^{\dagger j} \left(l_{pi} C l_{rj}\right) \left(\overline{l}_s{}^k N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{jm} H_k H_m H^{\dagger k} \left(l_{pi} C l_{rj}\right) \left(\overline{l}_s{}^i N_t\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{im} H_k H_m H^{\dagger j} \left(l_{pi} C l_{rj}\right) \left(\overline{l}_s{}^k N_t\right) \end{array} \right. \tag{4.487}$$

$$\mathcal{O}_{\bar{e}elNH^2H^{\dagger}}(0,2) \left| \epsilon^{ik} H_j H_k H^{\dagger j} \left(e_s C N_t\right) \left(\overline{e}_p l_{ri}\right) \right. \tag{4.488}$$

$$\mathcal{O}_{\bar{e}lN^2HH^{\dagger 2}}(0,2) \left| \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] H_j H^{\dagger i} H^{\dagger j} \left(N_s C N_t\right) \left(\overline{e}_p l_{ri}\right) \right. \tag{4.489}$$

$$\mathcal{O}_{l\bar{N}N^2H^2H^{\dagger}}(0,2) \left| \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon^{ik} H_j H_k H^{\dagger j} \left(N_s C N_t\right) \left(\overline{N}_r l_{pi}\right) \right. \tag{4.490}$$

4.5.3 Classes involving six-fermions

Class $\psi^4 \psi^{\dagger 2}$: 80 types

$$\mathcal{O}^{(1\sim3)}_{lN^2q^3}(1,3) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r & s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}\epsilon^{jm} \left(N_u C N_v\right) \left(l_{pi} C q_{raj}\right) \left(q_{sbk} C q_{tcm}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}\epsilon^{jm} \left(N_u C N_v\right) \left(l_{pi} C q_{raj}\right) \left(q_{sbk} C q_{tcm}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon^{abc}\epsilon^{ik}\epsilon^{jm} \left(N_u C N_v\right) \left(l_{pi} C q_{raj}\right) \left(q_{sbk} C q_{tcm}\right) \end{array} \right. \tag{4.491}$$

$$\mathcal{O}^{(1\sim8)}_{d\bar{N}q^3\bar{q}}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(3)}\,\epsilon^{bce}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{aj}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(3)}\,\epsilon^{abe}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{cj}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(2,1)}\,\epsilon^{bce}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{aj}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(2,1)}\,\epsilon^{bce}\epsilon^{ij}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{ak}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(2,1)}\,\epsilon^{abe}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{cj}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(2,1)}\,\epsilon^{abe}\epsilon^{ij}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{ck}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(1,1,1)}\,\epsilon^{bce}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{aj}_vd_{ue}\right)\\
\mathcal{Y}\,{\tiny\yng(1,1,1)}\,\epsilon^{abe}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)(q_{sbj}Cq_{tck})\left(\overline{q}^{cj}_vd_{ue}\right)
\end{array}\right.\tag{4.492}$$

$$\mathcal{O}^{(1\sim3)}_{e\bar{l}\bar{N}q^3}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(3)}\,\epsilon^{abc}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)\left(\bar{l}^j_ve_u\right)(q_{sbj}Cq_{tck})\\
\mathcal{Y}\,{\tiny\yng(2,1)}\,\epsilon^{abc}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)\left(\bar{l}^j_ve_u\right)(q_{sbj}Cq_{tck})\\
\mathcal{Y}\,{\tiny\yng(1,1,1)}\,\epsilon^{abc}\epsilon^{ik}\left(\overline{N}_pq_{rai}\right)\left(\bar{l}^j_ve_u\right)(q_{sbj}Cq_{tck})
\end{array}\right.\tag{4.493}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}N^2q^2\bar{u}}(0,2)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(2)},{\tiny\yng(2)}\,\epsilon^{ij}(N_uCN_v)\left(\overline{d}_p{}^aq_{rbi}\right)\left(\overline{u}_t{}^bq_{saj}\right)\\
\mathcal{Y}\,{\tiny\yng(2)},{\tiny\yng(2)}\,\epsilon^{ij}(N_uCN_v)\left(\overline{d}_p{}^aq_{rai}\right)\left(\overline{u}_t{}^cq_{scj}\right)\\
\mathcal{Y}\,{\tiny\yng(1,1)},{\tiny\yng(2)}\,\epsilon^{ij}(N_uCN_v)\left(\overline{d}_p{}^aq_{rbi}\right)\left(\overline{u}_t{}^bq_{saj}\right)\\
\mathcal{Y}\,{\tiny\yng(1,1)},{\tiny\yng(2)}\,\epsilon^{ij}(N_uCN_v)\left(\overline{d}_p{}^aq_{rai}\right)\left(\overline{u}_t{}^cq_{scj}\right)
\end{array}\right.\tag{4.494}$$

$$\mathcal{O}^{(1\sim8)}_{\bar{l}\bar{N}q^2\bar{q}\bar{u}}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(1,1)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\left(\bar{l}_u{}^iC\overline{q}^{bj}_v\right)\\
\mathcal{Y}\,{\tiny\yng(1,1)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\left(\bar{l}_u{}^jC\overline{q}^{bi}_v\right)\\
\mathcal{Y}\,{\tiny\yng(1,1)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\left(\bar{l}_u{}^iC\overline{q}^{aj}_v\right)\\
\mathcal{Y}\,{\tiny\yng(1,1)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\left(\bar{l}_u{}^jC\overline{q}^{ai}_v\right)\\
\mathcal{Y}\,{\tiny\yng(2)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\left(\bar{l}_u{}^iC\overline{q}^{bj}_v\right)\\
\mathcal{Y}\,{\tiny\yng(2)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\left(\bar{l}_u{}^jC\overline{q}^{bi}_v\right)\\
\mathcal{Y}\,{\tiny\yng(2)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\left(\bar{l}_u{}^iC\overline{q}^{aj}_v\right)\\
\mathcal{Y}\,{\tiny\yng(2)}\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\left(\bar{l}_u{}^jC\overline{q}^{ai}_v\right)
\end{array}\right.\tag{4.495}$$

$$\mathcal{O}^{(1\sim6)}_{d\bar{N}q^2\bar{u}u}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(2)}\,\epsilon^{bef}\epsilon^{ij}(d_{ue}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\\
\mathcal{Y}\,{\tiny\yng(2)}\,\epsilon^{aef}\epsilon^{ij}(d_{ue}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\\
\mathcal{Y}\,{\tiny\yng(2)}\,\epsilon^{abf}\epsilon^{ij}(d_{uc}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^cq_{sbj})\\
\mathcal{Y}\,{\tiny\yng(1,1)}\,\epsilon^{bef}\epsilon^{ij}(d_{ue}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^aq_{sbj})\\
\mathcal{Y}\,{\tiny\yng(1,1)}\,\epsilon^{aef}\epsilon^{ij}(d_{ue}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^bq_{sbj})\\
\mathcal{Y}\,{\tiny\yng(1,1)}\,\epsilon^{abf}\epsilon^{ij}(d_{uc}Cu_{vf})\left(\overline{N}_pq_{rai}\right)(\overline{u}_t{}^cq_{sbj})
\end{array}\right.\tag{4.496}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^2eNq^2}(0,2)\left|\begin{array}{l}
\mathcal{Y}\,{\tiny\yng(1,1)},{\tiny\yng(2)}\,\epsilon^{ij}(b_uCN_v)\left(\overline{d}_p{}^aC\overline{d}_r{}^b\right)(q_{sai}Cq_{tbj})\\
\mathcal{Y}\,{\tiny\yng(1,1)},{\tiny\yng(2)}\,\epsilon^{ij}(b_uCN_v)\left(\overline{d}_p{}^aq_{sai}\right)\left(\overline{d}_r{}^bq_{tbj}\right)\\
\mathcal{Y}\,{\tiny\yng(2)},{\tiny\yng(1,1)}\,\epsilon^{ij}(b_uCN_v)\left(\overline{d}_p{}^aC\overline{d}_r{}^b\right)(q_{sai}Cq_{tbj})\\
\mathcal{Y}\,{\tiny\yng(2)},{\tiny\yng(1,1)}\,\epsilon^{ij}(b_uCN_v)\left(\overline{d}_p{}^aq_{sai}\right)\left(\overline{d}_r{}^bq_{tbj}\right)
\end{array}\right.\tag{4.497}$$

$$\mathcal{O}^{(1\sim8)}_{\bar{d}lNq^2\bar{q}}(0,2)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{ik}\left(\bar{d}_p{}^a l_{ri}\right)\left(\bar{q}_v^{bj}N_u\right)(q_{sbj}Cq_{tak})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{ij}\left(\bar{d}_p{}^a l_{ri}\right)\left(\bar{q}_v^{bk}N_u\right)(q_{sbj}Cq_{tak})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{ik}\left(\bar{q}_v^{bj}N_u\right)(l_{ri}Cq_{tak})\left(\bar{d}_p{}^a q_{sbj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{ij}\left(\bar{q}_v^{bk}N_u\right)(l_{ri}Cq_{tak})\left(\bar{d}_p{}^a q_{sbj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{ik}\left(\bar{d}_p{}^a l_{ri}\right)\left(\bar{q}_v^{bj}N_u\right)(q_{sbj}Cq_{tak})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{ij}\left(\bar{d}_p{}^a l_{ri}\right)\left(\bar{q}_v^{bk}N_u\right)(q_{sbj}Cq_{tak})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{ik}\left(\bar{q}_v^{bj}N_u\right)(l_{ri}Cq_{tak})\left(\bar{d}_p{}^a q_{sbj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{ij}\left(\bar{q}_v^{bk}N_u\right)(l_{ri}Cq_{tak})\left(\bar{d}_p{}^a q_{sbj}\right)
\end{array}\right.\tag{4.498}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}d^2\bar{N}q^2}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\,\epsilon^{cef}\epsilon^{ij}(d_{ue}Cd_{vf})\left(\bar{d}_p{}^a C\bar{N}_r\right)(q_{sai}Cq_{tcj})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\,\epsilon^{cef}\epsilon^{ij}(d_{ue}Cd_{vf})\left(\bar{N}_r q_{tcj}\right)\left(\bar{d}_p{}^a q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\,\epsilon^{bce}\epsilon^{ij}(d_{ue}Cd_{va})\left(\bar{N}_r q_{tcj}\right)\left(\bar{d}_p{}^a q_{sbi}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\,\epsilon^{cef}\epsilon^{ij}(d_{ue}Cd_{vf})\left(\bar{d}_p{}^a C\bar{N}_r\right)(q_{sai}Cq_{tcj})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\,\epsilon^{cef}\epsilon^{ij}(d_{ue}Cd_{vf})\left(\bar{N}_r q_{tcj}\right)\left(\bar{d}_p{}^a q_{sai}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\,\epsilon^{bce}\epsilon^{ij}(d_{ue}Cd_{va})\left(\bar{d}_p{}^a C\bar{N}_r\right)(q_{sbi}Cq_{tcj})
\end{array}\right.\tag{4.499}$$

$$\mathcal{O}^{(1\sim4)}_{l^2Nq^2u}(1,3)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}(N_uCu_{vc})(l_{pi}Cl_{rj})(q_{sak}Cq_{tbm})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}(N_uCu_{vc})(l_{pi}Cq_{sak})(l_{rj}Cq_{tbm})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}(N_uCu_{vc})(l_{pi}Cl_{rj})(q_{sak}Cq_{tbm})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}(N_uCu_{vc})(l_{pi}Cq_{sak})(l_{rj}Cq_{tbm})
\end{array}\right.\tag{4.500}$$

$$\mathcal{O}^{(1\sim4)}_{dll\bar{N}q^2}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\left(\bar{N}_r l_{pi}\right)\left(\bar{l}_v{}^j d_{uc}\right)(q_{saj}Cq_{tbk})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\left(\bar{N}_r q_{tbk}\right)\left(\bar{l}_v{}^j d_{uc}\right)(l_{pi}Cq_{saj})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\left(\bar{N}_r l_{pi}\right)\left(\bar{l}_v{}^j d_{uc}\right)(q_{saj}Cq_{tbk})\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ik}\left(\bar{N}_r q_{tbk}\right)\left(\bar{l}_v{}^j d_{uc}\right)(l_{pi}Cq_{saj})
\end{array}\right.\tag{4.501}$$

$$\mathcal{O}^{(1,2)}_{d\bar{e}e\bar{N}q^2}(1,-1)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ij}(d_{uc}Ce_v)(\bar{e}_p q_{sai})\left(\bar{N}_r q_{tbj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\,\epsilon^{abc}\epsilon^{ij}\left(\bar{e}_p C\bar{N}_r\right)(d_{uc}Ce_v)(q_{sai}Cq_{tbj})
\end{array}\right.\tag{4.502}$$

$$\mathcal{O}^{(1\sim8)}_{\bar{N}^2q^2\bar{q}^2}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\left(\bar{N}_p q_{sai}\right)\left(\bar{N}_r q_{tbj}\right)\left(\bar{q}_u^{ai}C\bar{q}_v^{bj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\left(\bar{N}_p q_{sai}\right)\left(\bar{N}_r q_{tbj}\right)\left(\bar{q}_u^{aj}C\bar{q}_v^{bi}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\bar{N}_p q_{sai}\right)\left(\bar{N}_r q_{tbj}\right)\left(\bar{q}_u^{ai}C\bar{q}_v^{bj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\bar{N}_p q_{sai}\right)\left(\bar{N}_r q_{tbj}\right)\left(\bar{q}_u^{aj}C\bar{q}_v^{bi}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\left(\bar{N}_p C\bar{N}_r\right)(q_{sai}Cq_{tbj})\left(\bar{q}_u^{ai}C\bar{q}_v^{bj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\left(\bar{N}_p C\bar{N}_r\right)(q_{sai}Cq_{tbj})\left(\bar{q}_u^{aj}C\bar{q}_v^{bi}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\bar{N}_p C\bar{N}_r\right)(q_{sai}Cq_{tbj})\left(\bar{q}_u^{ai}C\bar{q}_v^{bj}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\bar{N}_p C\bar{N}_r\right)(q_{sai}Cq_{tbj})\left(\bar{q}_u^{aj}C\bar{q}_v^{bi}\right)
\end{array}\right.\tag{4.503}$$

$$\mathcal{O}^{(1,2)}_{e\bar{N}^2q^2u}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\substack{p \\ r},\substack{s \\ t}\right] \epsilon^{abc}\epsilon^{ij}\left(e_u C u_{vc}\right)\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r q_{tbj}\right) \\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right] \epsilon^{abc}\epsilon^{ij}\left(\overline{N}_p C \overline{N}_r\right)\left(e_u C u_{vc}\right)\left(q_{sai} C q_{tbj}\right) \end{array} \right. \tag{4.504}$$

$$\mathcal{O}^{(1,2)}_{d\bar{N}^2Nq^2}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\substack{p \\ r},\substack{s \\ t}\right] \epsilon^{abc}\epsilon^{ij}\left(d_{uc} C N_v\right)\left(\overline{N}_p q_{sai}\right)\left(\overline{N}_r q_{tbj}\right) \\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right] \epsilon^{abc}\epsilon^{ij}\left(\overline{N}_p C \overline{N}_r\right)\left(d_{uc} C N_v\right)\left(q_{sai} C q_{tbj}\right) \end{array} \right. \tag{4.505}$$

$$\mathcal{O}^{(1\sim4)}_{l\bar{N}q\bar{u}^2u}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\substack{s \\ t}\right]\left(\overline{N}_p q_{rai}\right)\left(\bar{l}_u{}^i u_{vb}\right)\left(\overline{u}_s{}^b C \overline{u}_t{}^a\right) \\ \mathcal{Y}\left[\substack{s \\ t}\right]\left(\bar{l}_u{}^i u_{vb}\right)\left(\overline{u}_t{}^a q_{rai}\right)\left(\overline{N}_p C \overline{u}_s{}^b\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_p q_{rai}\right)\left(\bar{l}_u{}^i u_{vb}\right)\left(\overline{u}_s{}^b C \overline{u}_t{}^a\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\bar{l}_u{}^i u_{vb}\right)\left(\overline{u}_t{}^a q_{rai}\right)\left(\overline{N}_p C \overline{u}_s{}^b\right) \end{array} \right. \tag{4.506}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}^2Nq\bar{q}\bar{u}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\substack{p \\ r}\right] \epsilon_{bef}\left(\bar{d}_p{}^a C \bar{d}_r{}^b\right)\left(\bar{q}_v^{fi} N_u\right)\left(\overline{u}_t{}^e q_{sai}\right) \\ \mathcal{Y}\left[\substack{p \\ r}\right] \epsilon_{abe}\left(\bar{d}_p{}^a C \bar{d}_r{}^b\right)\left(\bar{q}_v^{ci} N_u\right)\left(\overline{u}_t{}^e q_{sci}\right) \\ \mathcal{Y}\left[\substack{p \\ r}\right] \epsilon_{bef}\left(\bar{d}_p{}^a q_{sai}\right)\left(\bar{q}_v^{fi} N_u\right)\left(\bar{d}_r{}^b C \overline{u}_t{}^e\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{bef}\left(\bar{d}_p{}^a C \bar{d}_r{}^b\right)\left(\bar{q}_v^{fi} N_u\right)\left(\overline{u}_t{}^e q_{sai}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{bef}\left(\bar{d}_p{}^a q_{sai}\right)\left(\bar{q}_v^{fi} N_u\right)\left(\bar{d}_r{}^b C \overline{u}_t{}^e\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abe}\left(\bar{q}_v^{ci} N_u\right)\left(\bar{d}_p{}^a q_{sci}\right)\left(\bar{d}_r{}^b C \overline{u}_t{}^e\right) \end{array} \right. \tag{4.507}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}lNq\bar{u}u}(0,2) \left| \begin{array}{l} \epsilon^{ij}\left(N_u C u_{va}\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(\overline{u}_t{}^b q_{sbj}\right) \\ \epsilon^{ij}\left(N_u C u_{vc}\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(\overline{u}_t{}^c q_{saj}\right) \\ \epsilon^{ij}\left(N_u C u_{va}\right)\left(\overline{u}_t{}^b l_{ri}\right)\left(\bar{d}_p{}^a q_{sbj}\right) \\ \epsilon^{ij}\left(N_u C u_{vc}\right)\left(\bar{d}_p{}^a q_{saj}\right)\left(\overline{u}_t{}^c l_{ri}\right) \end{array} \right. \tag{4.508}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}dl\bar{N}q\bar{u}}(0,-2) \left| \begin{array}{l} \left(\bar{d}_p{}^a C \overline{N}_r\right)\left(\bar{l}_v{}^i d_{ua}\right)\left(\overline{u}_t{}^b q_{sbi}\right) \\ \left(\bar{d}_p{}^a C \overline{N}_r\right)\left(\bar{l}_v{}^i d_{uc}\right)\left(\overline{u}_t{}^c q_{sai}\right) \\ \left(\bar{l}_v{}^i d_{ua}\right)\left(\overline{N}_r C \overline{u}_t{}^b\right)\left(\bar{d}_p{}^a q_{sbi}\right) \\ \left(\bar{d}_p{}^a q_{sai}\right)\left(\overline{N}_r C \overline{u}_t{}^c\right)\left(\bar{l}_v{}^i d_{uc}\right) \end{array} \right. \tag{4.509}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}lN^2q\bar{u}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right] \epsilon^{ij}\left(N_u C N_v\right)\left(\bar{e}_p l_{ri}\right)\left(\overline{u}_t{}^a q_{saj}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right] \epsilon^{ij}\left(N_u C N_v\right)\left(\bar{e}_p q_{saj}\right)\left(\overline{u}_t{}^a l_{ri}\right) \end{array} \right. \tag{4.510}$$

$$\mathcal{O}^{(1\sim4)}_{l\bar{l}^2\bar{N}q\bar{u}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{N}_r l_{pi}\right)\left(\overline{u}_t{}^a q_{saj}\right)\left(\bar{l}_u{}^i C \bar{l}_v{}^j\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{N}_r C \overline{u}_t{}^a\right)\left(\bar{l}_u{}^i C \bar{l}_v{}^j\right)\left(l_{pi} C q_{saj}\right) \\ \mathcal{Y}\left[\substack{u \\ v}\right]\left(\overline{N}_r l_{pi}\right)\left(\overline{u}_t{}^a q_{saj}\right)\left(\bar{l}_u{}^i C \bar{l}_v{}^j\right) \\ \mathcal{Y}\left[\substack{u \\ v}\right]\left(\overline{N}_r C \overline{u}_t{}^a\right)\left(\bar{l}_u{}^i C \bar{l}_v{}^j\right)\left(l_{pi} C q_{saj}\right) \end{array} \right. \tag{4.511}$$

$$\mathcal{O}^{(1\sim4)}_{d\bar{e}\bar{N}q\bar{q}\bar{u}}(0,-2) \left| \begin{array}{l} \left(\bar{a}_p C \overline{N}_r\right)\left(\bar{q}_v^{ai} d_{ub}\right)\left(\overline{u}_t{}^b q_{sai}\right) \\ \left(\bar{c}_p C \overline{N}_r\right)\left(\overline{u}_t{}^a q_{sai}\right)\left(\bar{q}_v^{ci} d_{uc}\right) \\ \left(\bar{a}_p q_{sai}\right)\left(\overline{N}_r C \overline{u}_t{}^b\right)\left(\bar{q}_v^{ai} d_{ub}\right) \\ \left(\bar{c}_p q_{sai}\right)\left(\overline{N}_r C \overline{u}_t{}^a\right)\left(\bar{q}_v^{ci} d_{uc}\right) \end{array} \right. \tag{4.512}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}el\bar{N}q\bar{u}}(0,-2)\left|\begin{array}{l}\left(\bar{e}_p C\overline{N}_r\right)\left(\bar{l}_v{}^i e_u\right)\left(\bar{u}_t{}^a q_{sai}\right)\\[4pt]\left(\bar{e}_p q_{sai}\right)\left(\bar{l}_v{}^i e_u\right)\left(\overline{N}_r C\bar{u}_t{}^a\right)\end{array}\right. \tag{4.513}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}^2q\bar{q}\bar{u}u}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_p q_{sai}\right)\left(\bar{q}_u^{ai}u_{vb}\right)\left(\overline{N}_r C\bar{u}_t{}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_p q_{sai}\right)\left(\bar{q}_u^{ci}u_{vc}\right)\left(\overline{N}_r C\bar{u}_t{}^a\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\left(\overline{N}_p C\overline{N}_r\right)\left(\bar{q}_u^{ai}u_{vb}\right)\left(\bar{u}_t{}^b q_{sai}\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\left(\overline{N}_p C\overline{N}_r\right)\left(\bar{q}_u^{ci}u_{vc}\right)\left(\bar{u}_t{}^a q_{sai}\right)\end{array}\right. \tag{4.514}$$

$$\mathcal{O}^{(1,2)}_{l\bar{N}^2 Nq\bar{u}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_p q_{sai}\right)\left(\bar{l}_u{}^i N_v\right)\left(\overline{N}_r C\bar{u}_t{}^a\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\left(\overline{N}_p C\overline{N}_r\right)\left(\bar{l}_u{}^i N_v\right)\left(\bar{u}_t{}^a q_{sai}\right)\end{array}\right. \tag{4.515}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^2 dlNq}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}\left(d_{ub}CN_v\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(l_{si}Cq_{taj}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{ij}\left(d_{ub}CN_v\right)\left(\bar{d}_p{}^a l_{si}\right)\left(\bar{d}_r{}^b q_{taj}\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\epsilon^{ij}\left(d_{ub}CN_v\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(l_{si}Cq_{taj}\right)\\[4pt]\mathcal{Y}\left[\boxed{p|r}\right]\epsilon^{ij}\left(d_{ub}CN_v\right)\left(\bar{d}_p{}^a l_{si}\right)\left(\bar{d}_r{}^b q_{taj}\right)\end{array}\right. \tag{4.516}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}l^2\bar{l}Nq}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\epsilon^{ik}\left(\bar{l}_u{}^j N_v\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\epsilon^{ij}\left(\bar{l}_u{}^k N_v\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\epsilon^{ik}\left(\bar{l}_u{}^j N_v\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\epsilon^{ij}\left(\bar{l}_u{}^k N_v\right)\left(\bar{d}_p{}^a l_{ri}\right)\left(l_{sj}Cq_{tak}\right)\end{array}\right. \tag{4.517}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}\bar{e}elNq}(0,2)\left|\begin{array}{l}\epsilon^{ij}\left(e_u CN_v\right)\left(\bar{d}_p{}^a C\bar{e}_r\right)\left(l_{si}Cq_{taj}\right)\\[4pt]\epsilon^{ij}\left(e_u CN_v\right)\left(\bar{e}_r q_{taj}\right)\left(\bar{d}_p{}^a l_{si}\right)\end{array}\right. \tag{4.518}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}l\bar{N}N^2q}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{u|v}\right]\epsilon^{ij}\left(N_u CN_v\right)\left(\overline{N}_s q_{taj}\right)\left(\bar{d}_p{}^a l_{ri}\right)\\[4pt]\mathcal{Y}\left[\boxed{u|v}\right]\epsilon^{ij}\left(N_u CN_v\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\left(l_{ri}Cq_{taj}\right)\end{array}\right. \tag{4.519}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}d\bar{N}^2q\bar{q}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_s q_{tbi}\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\bar{q}_v^{bi}d_{ua}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_s q_{tai}\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\bar{q}_v^{ci}d_{uc}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\left(\overline{N}_s q_{tbi}\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\bar{q}_v^{bi}d_{ua}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\left(\overline{N}_s q_{tai}\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\left(\bar{q}_v^{ci}d_{uc}\right)\end{array}\right. \tag{4.520}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}el\bar{N}^2q}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_s q_{tai}\right)\left(\bar{l}_v{}^i e_u\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\left(\overline{N}_s q_{tai}\right)\left(\bar{l}_v{}^i e_u\right)\left(\bar{d}_p{}^a C\overline{N}_r\right)\end{array}\right. \tag{4.521}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{e}l^2Nq\bar{q}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\epsilon^{ik}\left(\bar{e}_p l_{ri}\right)\left(\bar{q}_v^{aj}N_u\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\epsilon^{ij}\left(\bar{e}_p l_{ri}\right)\left(\bar{q}_v^{ak}N_u\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\epsilon^{ik}\left(\bar{e}_p l_{ri}\right)\left(\bar{q}_v^{aj}N_u\right)\left(l_{sj}Cq_{tak}\right)\\[4pt]\mathcal{Y}\left[\boxed{r|s}\right]\epsilon^{ij}\left(\bar{e}_p l_{ri}\right)\left(\bar{q}_v^{ak}N_u\right)\left(l_{sj}Cq_{tak}\right)\end{array}\right. \tag{4.522}$$

$$\mathcal{O}^{(1,2)}_{d^2\bar{e}l\bar{N}q}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon^{abc}\epsilon^{ij}\left(\bar{e}_p l_{ri}\right)\left(d_{ub}Cd_{vc}\right)\left(\overline{N}_s q_{taj}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon^{abc}\epsilon^{ij}\left(\bar{e}_p C\overline{N}_s\right)\left(d_{ub}Cd_{vc}\right)\left(l_{ri}Cq_{taj}\right)\end{array}\right. \tag{4.523}$$

$$\mathcal{O}^{(1\sim4)}_{l\bar{l}\bar{N}^2 q\bar{q}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\overline{N}_r l_{pi}\right) \left(\overline{N}_s q_{taj}\right) \left(\bar{l}_u{}^i C \overline{q}_v^{aj}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\overline{N}_r l_{pi}\right) \left(\overline{N}_s q_{taj}\right) \left(\bar{l}_u{}^j C \overline{q}_v^{ai}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \left(\overline{N}_r l_{pi}\right) \left(\overline{N}_s q_{taj}\right) \left(\bar{l}_u{}^i C \overline{q}_v^{aj}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \left(\overline{N}_r l_{pi}\right) \left(\overline{N}_s q_{taj}\right) \left(\bar{l}_u{}^j C \overline{q}_v^{ai}\right) \end{array} \right. \tag{4.524}$$

$$\mathcal{O}^{(1,2)}_{dl\bar{N}^2 qu}(1,-1) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \epsilon^{abc} \epsilon^{ij} \left(\overline{N}_r l_{pi}\right) \left(d_{ub} C u_{vc}\right) \left(\overline{N}_s q_{taj}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon^{abc} \epsilon^{ij} \left(\overline{N}_r l_{pi}\right) \left(d_{ub} C u_{vc}\right) \left(\overline{N}_s q_{taj}\right) \end{array} \right. \tag{4.525}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}e\bar{N}^2 q\bar{q}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\bar{e}_p C \overline{N}_r\right) \left(\overline{N}_s q_{tai}\right) \left(\overline{q}_v^{ai} e_u\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \left(\bar{e}_p C \overline{N}_r\right) \left(\overline{N}_s q_{tai}\right) \left(\overline{q}_v^{ai} e_u\right) \end{array} \right. \tag{4.526}$$

$$\mathcal{O}_{\bar{N}^3 N q\bar{q}}(0,-2) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_p C \overline{N}_r\right) \left(\overline{N}_s q_{tai}\right) \left(\overline{q}_v^{ai} N_u\right) \right. \tag{4.527}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}^2 N\bar{u}^2 u}(-1,1) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abe} \left(N_u C u_{vc}\right) \left(\overline{d}_p{}^a C \overline{d}_r{}^b\right) \left(\overline{u}_s{}^c C \overline{u}_t{}^e\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{bce} \left(N_u C u_{va}\right) \left(\overline{d}_p{}^a C \overline{u}_s{}^c\right) \left(\overline{d}_r{}^b C \overline{u}_t{}^e\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{bce} \left(N_u C u_{va}\right) \left(\overline{d}_p{}^a C \overline{d}_r{}^b\right) \left(\overline{u}_s{}^c C \overline{u}_t{}^e\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{abe} \left(N_u C u_{vc}\right) \left(\overline{d}_p{}^a C \overline{u}_s{}^c\right) \left(\overline{d}_r{}^b C \overline{u}_t{}^e\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{bce} \left(N_u C u_{va}\right) \left(\overline{d}_p{}^a C \overline{u}_s{}^c\right) \left(\overline{d}_r{}^b C \overline{u}_t{}^e\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{bce} \left(N_u C u_{va}\right) \left(\overline{d}_p{}^a C \overline{d}_r{}^b\right) \left(\overline{u}_s{}^c C \overline{u}_t{}^e\right) \end{array} \right. \tag{4.528}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}\bar{e}N^2\bar{u}^2}(-1,1) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{abc} \left(N_u C N_v\right) \left(\bar{e}_r C \overline{u}_t{}^c\right) \left(\overline{d}_p{}^a C \overline{u}_s{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{abc} \left(N_u C N_v\right) \left(\overline{d}_p{}^a C \bar{e}_r\right) \left(\overline{u}_s{}^b C \overline{u}_t{}^c\right) \end{array} \right. \tag{4.529}$$

$$\mathcal{O}^{(1,2)}_{dl^2\bar{N}\bar{u}^2}(-1,-3) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc} \epsilon_{ij} \left(\overline{N}_r C \overline{u}_t{}^c\right) \left(\bar{l}_u{}^i C \bar{l}_v{}^j\right) \left(\overline{d}_p{}^a C \overline{u}_s{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc} \epsilon_{ij} \left(\overline{d}_p{}^a C \overline{N}_r\right) \left(\overline{u}_s{}^b C \overline{u}_t{}^c\right) \left(\bar{l}_u{}^i C \bar{l}_v{}^j\right) \end{array} \right. \tag{4.530}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l\bar{N}\bar{q}\bar{u}^2}(-1,-3) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abc} \epsilon_{ij} \left(\bar{e}_p C \overline{u}_s{}^a\right) \left(\overline{N}_r C \overline{u}_t{}^b\right) \left(\bar{l}_u{}^i C \overline{q}_v^{cj}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{abc} \epsilon_{ij} \left(\bar{e}_p C \overline{N}_r\right) \left(\overline{u}_s{}^a C \overline{u}_t{}^b\right) \left(\bar{l}_u{}^i C \overline{q}_v^{cj}\right) \end{array} \right. \tag{4.531}$$

$$\mathcal{O}^{(1\sim4)}_{d\bar{e}\bar{N}\bar{u}^2 u}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{b}_p C \overline{N}_r\right) \left(d_{ua} C u_{vb}\right) \left(\overline{u}_s{}^a C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(d_{ua} C u_{vb}\right) \left(\bar{b}_p C \overline{u}_s{}^a\right) \left(\overline{N}_r C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\bar{b}_p C \overline{N}_r\right) \left(d_{ua} C u_{vb}\right) \left(\overline{u}_s{}^a C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(d_{ua} C u_{vb}\right) \left(\bar{b}_p C \overline{u}_s{}^a\right) \left(\overline{N}_r C \overline{u}_t{}^b\right) \end{array} \right. \tag{4.532}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}^2\bar{u}^2 u^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(u_{ua} C u_{vb}\right) \left(\overline{N}_p C \overline{u}_s{}^a\right) \left(\overline{N}_r C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(u_{ua} C u_{vb}\right) \left(\overline{N}_p C \overline{u}_s{}^a\right) \left(\overline{N}_r C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\overline{N}_p C \overline{N}_r\right) \left(u_{ua} C u_{vb}\right) \left(\overline{u}_s{}^a C \overline{u}_t{}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_p C \overline{N}_r\right) \left(u_{ua} C u_{vb}\right) \left(\overline{u}_s{}^a C \overline{u}_t{}^b\right) \end{array} \right. \tag{4.533}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^3 dN\bar{u}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|c|}\hline p & r & s\\\hline\end{array}}}\, \epsilon_{bce}\,(d_{ua}CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c C\bar{u}_t{}^e\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline s & \\\cline{1-1}\end{array}}}\, \epsilon_{bce}\,(d_{ua}CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c C\bar{u}_t{}^e\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline s & \\\cline{1-1}\end{array}}}\, \epsilon_{abe}\,(d_{uc}CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c C\bar{u}_t{}^e\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline s\\\hline\end{array}}}\, \epsilon_{bce}\,(d_{ua}CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c C\bar{u}_t{}^e\right)
\end{array}\right. \tag{4.534}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2 llN\bar{u}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}}\, \epsilon_{abc}\left(\bar{l}_u{}^i N_v\right)\left(\bar{d}_p{}^a l_{si}\right)\left(\bar{d}_r{}^b C\bar{u}_t{}^c\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}}\, \epsilon_{abc}\left(\bar{l}_u{}^i N_v\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{u}_t{}^c l_{si}\right)
\end{array}\right. \tag{4.535}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2 \bar{e}eN\bar{u}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}}\, \epsilon_{abc}\,(e_u CN_v)\left(\bar{d}_p{}^a C\bar{e}_s\right)\left(\bar{d}_r{}^b C\bar{u}_t{}^c\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}}\, \epsilon_{abc}\,(e_u CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{e}_s C\bar{u}_t{}^c\right)
\end{array}\right. \tag{4.536}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}^2 \bar{N}N N^2\bar{u}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}},\,{\tiny\boxed{\begin{array}{|c|c|}\hline u & v\\\hline\end{array}}}\, \epsilon_{abc}\,(N_u CN_v)\left(\bar{d}_p{}^a C\bar{N}_s\right)\left(\bar{d}_r{}^b C\bar{u}_t{}^c\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}},\,{\tiny\boxed{\begin{array}{|c|c|}\hline u & v\\\hline\end{array}}}\, \epsilon_{abc}\,(N_u CN_v)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{N}_s C\bar{u}_t{}^c\right)
\end{array}\right. \tag{4.537}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}\bar{e}lN\bar{q}\bar{u}}(-1,1) \left|
\begin{array}{l}
\epsilon_{abc}\left(\bar{d}_p{}^a C\bar{e}_r\right)\left(\bar{u}_t{}^b l_{si}\right)\left(\bar{q}_v^{ci} N_u\right)\\[4pt]
\epsilon_{abc}\left(\bar{d}_p{}^a l_{si}\right)\left(\bar{e}_r C\bar{u}_t{}^b\right)\left(\bar{q}_v^{ci} N_u\right)
\end{array}\right. \tag{4.538}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}d^2 \bar{e}\bar{N}\bar{u}}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline u & v\\\hline\end{array}}}\,(d_{ua}Cd_{vb})\left(\bar{d}_p{}^a C\bar{b}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline u & v\\\hline\end{array}}}\,(d_{ua}Cd_{vb})\left(\bar{b}_r C\bar{u}_t{}^b\right)\left(\bar{d}_p{}^a C\bar{N}_s\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline u\\\hline v\\\hline\end{array}}}\,(d_{ua}Cd_{vb})\left(\bar{d}_p{}^a C\bar{b}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline u\\\hline v\\\hline\end{array}}}\,(d_{ua}Cd_{vb})\left(\bar{b}_r C\bar{u}_t{}^b\right)\left(\bar{d}_p{}^a C\bar{N}_s\right)
\end{array}\right. \tag{4.539}$$

$$\mathcal{O}^{(1,2)}_{dl\bar{N}^2\bar{q}\bar{u}}(-1,-3) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}}\, \epsilon_{abc}\epsilon_{ij}\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\left(\bar{l}_u{}^i C\bar{q}_v^{cj}\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}}\, \epsilon_{abc}\epsilon_{ij}\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\left(\bar{l}_u{}^i C\bar{q}_v^{cj}\right)
\end{array}\right. \tag{4.540}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}d\bar{N}^2\bar{u}u}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}}\,(d_{ua}Cu_{vb})\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}}\,(d_{ub}Cu_{va})\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}}\,(d_{ua}Cu_{vb})\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}}\,(d_{ub}Cu_{va})\left(\bar{d}_p{}^a C\bar{N}_r\right)\left(\bar{N}_s C\bar{u}_t{}^b\right)
\end{array}\right. \tag{4.541}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}l^2 N\bar{u}u}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}}\, \epsilon^{ij}\,(N_u Cu_{va})\,(\bar{e}_p l_{ri})\,(\bar{u}_t{}^a l_{sj})\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}}\, \epsilon^{ij}\,(N_u Cu_{va})\,(\bar{e}_p l_{ri})\,(\bar{u}_t{}^a l_{sj})
\end{array}\right. \tag{4.542}$$

$$\mathcal{O}^{(1,2)}_{d\bar{e}l\bar{l}N\bar{u}}(0,-2) \left|
\begin{array}{l}
(\bar{e}_p l_{ri})\left(\bar{N}_s C\bar{u}_t{}^a\right)\left(\bar{l}_v{}^i d_{ua}\right)\\[4pt]
(\bar{e}_p C\bar{N}_s)\left(\bar{l}_v{}^i d_{ua}\right)\left(\bar{u}_t{}^a l_{ri}\right)
\end{array}\right. \tag{4.543}$$

$$\mathcal{O}^{(1,2)}_{l\bar{l}\bar{N}^2\bar{u}u}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline r\\\hline s\\\hline\end{array}}}\,\left(\bar{N}_r l_{pi}\right)\left(\bar{l}_u{}^i u_{va}\right)\left(\bar{N}_s C\bar{u}_t{}^a\right)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline r & s\\\hline\end{array}}}\,\left(\bar{N}_r l_{pi}\right)\left(\bar{l}_u{}^i u_{va}\right)\left(\bar{N}_s C\bar{u}_t{}^a\right)
\end{array}\right. \tag{4.544}$$

$$\mathcal{O}^{(1,2)}_{d\bar{e}^2 e\bar{N}\bar{u}}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|}\hline p\\\hline r\\\hline\end{array}}}\,(\bar{e}_p C\bar{N}_s)(d_{ua}Ce_v)(\bar{e}_r C\bar{u}_t{}^a)\\[4pt]
\mathcal{Y}\,{\tiny\boxed{\begin{array}{|c|c|}\hline p & r\\\hline\end{array}}}\,(\bar{e}_p C\bar{e}_r)(d_{ua}Ce_v)\left(\bar{N}_s C\bar{u}_t{}^a\right)
\end{array}\right. \tag{4.545}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}\bar{N}^2\bar{q}^2\bar{u}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix},\boxed{u\,v}\right]\epsilon_{abc}\epsilon_{ij}\left(\bar{e}_pC\overline{N}_r\right)\left(\overline{N}_sC\overline{u}_t{}^a\right)\left(\bar{q}_u^{bi}C\bar{q}_v^{cj}\right)\\ \mathcal{Y}\left[\boxed{r\,s},\boxed{u\,v}\right]\epsilon_{abc}\epsilon_{ij}\left(\bar{e}_pC\overline{N}_r\right)\left(\overline{N}_sC\overline{u}_t{}^a\right)\left(\bar{q}_u^{bi}C\bar{q}_v^{cj}\right)\end{array}\right.$$

(4.546)

$$\mathcal{O}^{(1,2)}_{\bar{e}e\bar{N}^2\bar{u}u}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](e_uCu_{va})\left(\bar{e}_pC\overline{N}_r\right)\left(\overline{N}_sC\overline{u}_t{}^a\right)\\ \mathcal{Y}\left[\boxed{r\,s}\right](e_uCu_{va})\left(\bar{e}_pC\overline{N}_r\right)\left(\overline{N}_sC\overline{u}_t{}^a\right)\end{array}\right.$$

(4.547)

$$\mathcal{O}^{(1,2)}_{d\bar{e}\bar{N}^2N\bar{u}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\bar{e}_pC\overline{N}_r\right)(d_{ua}CN_v)\left(\overline{N}_sC\overline{u}_t{}^a\right)\\ \mathcal{Y}\left[\boxed{r\,s}\right]\left(\bar{e}_pC\overline{N}_r\right)(d_{ua}CN_v)\left(\overline{N}_sC\overline{u}_t{}^a\right)\end{array}\right.$$

(4.548)

$$\mathcal{O}_{\bar{N}^3N\bar{u}u}(0,-2)\left|\mathcal{Y}\left[\begin{smallmatrix}p\,r\\s\end{smallmatrix}\right]\left(\overline{N}_pC\overline{N}_r\right)(N_uCu_{va})\left(\overline{N}_sC\overline{u}_t{}^a\right)\right.$$

(4.549)

$$\mathcal{O}_{\bar{d}^3e\bar{N}N}(-1,1)\left|\mathcal{Y}\left[\begin{smallmatrix}p\,r\\s\end{smallmatrix}\right]\epsilon_{abc}(e_uCN_v)\left(\bar{d}_p{}^aC\bar{d}_r{}^b\right)\left(\bar{d}_s{}^cC\overline{N}_t\right)\right.$$

(4.550)

$$\mathcal{O}^{(1,2)}_{\bar{d}^2l\bar{N}N\bar{q}}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{p\,r}\right]\epsilon_{abc}\left(\bar{d}_p{}^al_{si}\right)\left(\bar{d}_r{}^bC\overline{N}_t\right)\left(\bar{q}_v^{ci}N_u\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon_{abc}\left(\overline{N}_tl_{si}\right)\left(\bar{d}_p{}^aC\bar{d}_r{}^b\right)\left(\bar{q}_v^{ci}N_u\right)\end{array}\right.$$

(4.551)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^2d^2\bar{N}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\boxed{u\,v}\right](d_{ua}Cd_{vb})\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(\bar{d}_r{}^bC\overline{N}_t\right)\\ \mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right](d_{ua}Cd_{vb})\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(\bar{d}_r{}^bC\overline{N}_t\right)\\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right]\left(\overline{N}_sC\overline{N}_t\right)(d_{ua}Cd_{vb})\left(\bar{d}_p{}^aC\bar{d}_r{}^b\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{N}_sC\overline{N}_t\right)(d_{ua}Cd_{vb})\left(\bar{d}_p{}^aC\bar{d}_r{}^b\right)\end{array}\right.$$

(4.552)

$$\mathcal{O}^{(1,2)}_{\bar{d}d\bar{e}l^2N}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{ij}\left(\bar{e}_rl_{tj}\right)(d_{ua}CN_v)\left(\bar{d}_p{}^al_{si}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ij}(d_{ua}CN_v)(l_{si}Cl_{tj})\left(\bar{d}_p{}^aC\bar{e}_r\right)\end{array}\right.$$

(4.553)

$$\mathcal{O}^{(1,2)}_{\bar{d}l^2\bar{N}Nu}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{r\,s}\right]\epsilon^{ij}(N_uCu_{va})\left(\overline{N}_tl_{sj}\right)\left(\bar{d}_p{}^al_{ri}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\epsilon^{ij}(N_uCu_{va})\left(\overline{N}_tl_{sj}\right)\left(\bar{d}_p{}^al_{ri}\right)\end{array}\right.$$

(4.554)

$$\mathcal{O}^{(1,2)}_{\bar{d}dll\bar{N}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_tl_{ri}\right)\left(\bar{d}_p{}^aC\overline{N}_s\right)\left(\bar{l}_v{}^id_{ua}\right)\\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_sC\overline{N}_t\right)\left(\bar{d}_p{}^al_{ri}\right)\left(\bar{l}_v{}^id_{ua}\right)\end{array}\right.$$

(4.555)

$$\mathcal{O}^{(1,2)}_{\bar{d}d\bar{e}e\bar{N}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\bar{e}_rC\overline{N}_t\right)(d_{ua}Ce_v)\left(\bar{d}_p{}^aC\overline{N}_s\right)\\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_sC\overline{N}_t\right)(d_{ua}Ce_v)\left(\bar{d}_p{}^aC\bar{e}_r\right)\end{array}\right.$$

(4.556)

$$\mathcal{O}_{\bar{d}\bar{N}^3\bar{q}^2}(-1,-3)\left|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix},\boxed{u\,v}\right]\epsilon_{abc}\epsilon_{ij}\left(\overline{N}_sC\overline{N}_t\right)\left(\bar{d}_p{}^aC\overline{N}_r\right)\left(\bar{q}_u^{bi}C\bar{q}_v^{cj}\right)\right.$$

(4.557)

$$\mathcal{O}_{\bar{d}e\bar{N}^3u}(0,-2)\left|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\left(\overline{N}_sC\overline{N}_t\right)(e_uCu_{va})\left(\bar{d}_p{}^aC\overline{N}_r\right)\right.$$

(4.558)

$$\mathcal{O}_{\bar{d}d\bar{N}^3N}(0,-2)\left|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\left(\overline{N}_sC\overline{N}_t\right)(d_{ua}CN_v)\left(\bar{d}_p{}^aC\overline{N}_r\right)\right.$$

(4.559)

$$\mathcal{O}^{(1\sim3)}_{\bar{e}l^3\bar{l}N}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{r\,s\,t}\right]\epsilon^{ik}\left(\bar{e}_pl_{ri}\right)(l_{sj}Cl_{tk})\left(\bar{l}_u{}^jN_v\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\epsilon^{ik}\left(\bar{e}_pl_{ri}\right)(l_{sj}Cl_{tk})\left(\bar{l}_u{}^jN_v\right)\\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right]\epsilon^{ik}\left(\bar{e}_pl_{ri}\right)(l_{sj}Cl_{tk})\left(\bar{l}_u{}^jN_v\right)\end{array}\right.$$

(4.560)

$$\mathcal{O}^{(1,2)}_{\bar{e}^2el^2N}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right]\epsilon^{ij}(e_uCN_v)\left(\bar{e}_pl_{si}\right)\left(\bar{e}_rl_{tj}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ij}\left(\bar{e}_pC\bar{e}_r\right)(e_uCN_v)(l_{si}Cl_{tj})\end{array}\right.$$

(4.561)

$$\mathcal{O}^{(1,2)}_{\bar{e}l^2\bar{N}N^2}(0,2)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{r\,s},\underline{u\,v}]\,\epsilon^{ij}\,(N_uCN_v)\,(\bar{e}_pl_{ri})\,(\overline{N}_tl_{sj})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\\s}},\underline{u\,v}]\,\epsilon^{ij}\,(N_uCN_v)\,(\bar{e}_pl_{ri})\,(\overline{N}_tl_{sj})\end{array}$$

(4.562)

$$\mathcal{O}^{(1\sim4)}_{l^2\bar{l}^2\bar{N}^2}(0,-2)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{\substack{p\\r}},\underline{\substack{s\\t}},\underline{u\,v}]\,(\overline{N}_sl_{pi})\,(\overline{N}_tl_{rj})\,(\bar{l}_u{}^iC\bar{l}_v{}^j)\\[4pt]\mathcal{Y}\,[\underline{p\,r},\underline{\substack{s\\t}},\underline{\substack{u\\v}}]\,(\overline{N}_sl_{pi})\,(\overline{N}_tl_{rj})\,(\bar{l}_u{}^iC\bar{l}_v{}^j)\\[4pt]\mathcal{Y}\,[\underline{p\,r},\underline{s\,t},\underline{u\,v}]\,(\overline{N}_sC\overline{N}_t)\,(l_{pi}Cl_{rj})\,(\bar{l}_u{}^iC\bar{l}_v{}^j)\\[4pt]\mathcal{Y}\,[\underline{\substack{p\\r}},\underline{s\,t},\underline{\substack{u\\v}}]\,(\overline{N}_sC\overline{N}_t)\,(l_{pi}Cl_{rj})\,(\bar{l}_u{}^iC\bar{l}_v{}^j)\end{array}$$

(4.563)

$$\mathcal{O}^{(1,2)}_{d\bar{e}l\bar{N}^2\bar{q}}(0,-2)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{\substack{s\\t}}]\,(\bar{e}_pC\overline{N}_s)\,(\overline{N}_tl_{ri})\,(\bar{q}_v^{ai}d_{ua})\\[4pt]\mathcal{Y}\,[\underline{s\,t}]\,(\overline{N}_sC\overline{N}_t)\,(\bar{e}_pl_{ri})\,(\bar{q}_v^{ai}d_{ua})\end{array}$$

(4.564)

$$\mathcal{O}^{(1,2)}_{\bar{e}el\bar{l}\bar{N}^2}(0,-2)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{\substack{s\\t}}]\,(\bar{e}_pC\overline{N}_s)\,(\overline{N}_tl_{ri})\,(\bar{l}_v{}^ie_u)\\[4pt]\mathcal{Y}\,[\underline{s\,t}]\,(\overline{N}_sC\overline{N}_t)\,(\bar{e}_pl_{ri})\,(\bar{l}_v{}^ie_u)\end{array}$$

(4.565)

$$\mathcal{O}_{l\bar{N}^3\bar{q}u}(0,-2)\Big|\mathcal{Y}\,[\underline{\substack{r\,s\\t}}]\,(\overline{N}_sC\overline{N}_t)\,(\overline{N}_rl_{pi})\,(\bar{q}_u^{ai}u_{va})$$

(4.566)

$$\mathcal{O}_{l\bar{l}\bar{N}^3N}(0,-2)\Big|\mathcal{Y}\,[\underline{\substack{r\,s\\t}}]\,(\overline{N}_sC\overline{N}_t)\,(\overline{N}_rl_{pi})\,(\bar{l}_u{}^iN_v)$$

(4.567)

$$\mathcal{O}^{(1,2)}_{\bar{e}^2e^2\bar{N}^2}(0,-2)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{\substack{p\\r}},\underline{\substack{s\\t}},\underline{u\,v}]\,(e_uCe_v)\,(\bar{e}_pC\overline{N}_s)\,(\bar{e}_rC\overline{N}_t)\\[4pt]\mathcal{Y}\,[\underline{p\,r},\underline{s\,t},\underline{u\,v}]\,(e_uCe_v)\,(\bar{e}_pC\bar{e}_r)\,(\overline{N}_sC\overline{N}_t)\end{array}$$

(4.568)

$$\mathcal{O}_{\bar{e}e\bar{N}^3N}(0,-2)\Big|\mathcal{Y}\,[\underline{\substack{r\,s\\t}}]\,(\overline{N}_sC\overline{N}_t)\,(e_uCN_v)\,(\bar{e}_pC\overline{N}_r)$$

(4.569)

$$\mathcal{O}_{\bar{N}^4N^2}(0,-2)\Big|\mathcal{Y}\,[\underline{\substack{p\,r\\s\,t}},\underline{u\,v}]\,(N_uCN_v)\,(\overline{N}_pC\overline{N}_r)\,(\overline{N}_sC\overline{N}_t)$$

(4.570)

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$$\mathcal{O}^{(1\sim11)}_{\bar{N}q^4\bar{u}}(1,-1)\Bigg|\begin{array}{l}\mathcal{Y}\,[\underline{r\,s\,t\,u}]\,\epsilon^{bce}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^aq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\,t\\u}}]\,\epsilon^{bce}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^aq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\,t\\u}}]\,\epsilon^{abe}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^cq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\,t\\u}}]\,\epsilon^{abe}\epsilon^{ij}\epsilon^{km}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^cq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\,t\\u}}]\,\epsilon^{bce}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(q_{sbj}Cq_{uem})\,(\bar{u}_v{}^aq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\,u}}]\,\epsilon^{bce}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^aq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\,u}}]\,\epsilon^{abe}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^cq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\\u}}]\,\epsilon^{bce}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^aq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\\u}}]\,\epsilon^{bce}\epsilon^{ij}\epsilon^{km}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^aq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\\u}}]\,\epsilon^{abe}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^cq_{uem})\,(q_{sbj}Cq_{tck})\\[4pt]\mathcal{Y}\,[\underline{\substack{r\,s\\t\\u}}]\,\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\,(\overline{N}_pq_{rai})\,(\bar{u}_v{}^eq_{uem})\,(q_{sbj}Cq_{tck})\end{array}$$

(4.571)

$$
\mathcal{O}^{(1\sim7)}_{l\bar{N}^2q^3}(1,-1)\left|
\begin{aligned}
&\mathcal{Y}\left[\young(r,s),\young(tu,v)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)\\
&\mathcal{Y}\left[\young(r,s),\young(tu,v)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r q_{ubk}\right)\left(\overline{N}_s q_{vcm}\right)\left(l_{pi}Cq_{taj}\right)\\
&\mathcal{Y}\left[\young(r,s),\young(tuv)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)\\
&\mathcal{Y}\left[\young(r,s),\young(t,u,v)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)\\
&\mathcal{Y}\left[\young(rs),\young(tuv)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)\\
&\mathcal{Y}\left[\young(rs),\young(tu,v)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)\\
&\mathcal{Y}\left[\young(rs),\young(t,u,v)\right]\epsilon^{abc}\epsilon^{ik}\epsilon^{jm}\left(\overline{N}_r l_{pi}\right)\left(\overline{N}_s q_{taj}\right)\left(q_{ubk}Cq_{vcm}\right)
\end{aligned}
\right.
\tag{4.572}
$$

$$
\mathcal{O}^{(1\sim10)}_{\bar{e}\bar{N}q^2\bar{u}^2}(0,-2)\left|
\begin{aligned}
&\mathcal{Y}\left[\young(st),\young(u,v)\right]\epsilon^{ij}\left(\overline{b}_pC\overline{N}_r\right)\left(\overline{u}_u{}^aC\overline{u}_v{}^b\right)\left(q_{sai}Cq_{tbj}\right)\\
&\mathcal{Y}\left[\young(st),\young(u,v)\right]\epsilon^{ij}\left(\overline{b}_pC\overline{N}_r\right)\left(\overline{u}_u{}^aq_{sai}\right)\left(\overline{u}_v{}^bq_{tbj}\right)\\
&\mathcal{Y}\left[\young(st),\young(u,v)\right]\epsilon^{ij}\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_u{}^a\right)\left(\overline{u}_v{}^bq_{tbj}\right)\\
&\mathcal{Y}\left[\young(s,t),\young(uv)\right]\epsilon^{ij}\left(\overline{b}_pC\overline{N}_r\right)\left(\overline{u}_u{}^aC\overline{u}_v{}^b\right)\left(q_{sai}Cq_{tbj}\right)\\
&\mathcal{Y}\left[\young(s,t),\young(uv)\right]\epsilon^{ij}\left(\overline{b}_pC\overline{N}_r\right)\left(\overline{u}_u{}^aq_{sai}\right)\left(\overline{u}_v{}^bq_{tbj}\right)\\
&\mathcal{Y}\left[\young(s,t),\young(uv)\right]\epsilon^{ij}\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_u{}^a\right)\left(\overline{u}_v{}^bq_{tbj}\right)\\
&\mathcal{Y}\left[\young(st),\young(uv)\right]\epsilon^{ij}\left(\overline{u}_u{}^aC\overline{u}_v{}^b\right)\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rq_{tbj}\right)\\
&\mathcal{Y}\left[\young(st),\young(uv)\right]\epsilon^{ij}\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_u{}^a\right)\left(\overline{u}_v{}^bq_{tbj}\right)\\
&\mathcal{Y}\left[\young(s,t),\young(u,v)\right]\epsilon^{ij}\left(\overline{u}_u{}^aC\overline{u}_v{}^b\right)\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rq_{tbj}\right)\\
&\mathcal{Y}\left[\young(s,t),\young(u,v)\right]\epsilon^{ij}\left(\overline{b}_pq_{sai}\right)\left(\overline{N}_rC\overline{u}_u{}^a\right)\left(\overline{u}_v{}^bq_{tbj}\right)
\end{aligned}
\right.
\tag{4.573}
$$

$$
\mathcal{O}^{(1\sim10)}_{\bar{d}\bar{N}^2q^2\bar{u}}(0,-2)\left|
\begin{aligned}
&\mathcal{Y}\left[\young(r,s),\young(tu)\right]\epsilon^{ij}\left(\overline{N}_sq_{tbi}\right)\left(\overline{u}_v{}^bq_{uaj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(r,s),\young(tu)\right]\epsilon^{ij}\left(\overline{N}_sq_{tai}\right)\left(\overline{u}_v{}^cq_{ucj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(r,s),\young(tu)\right]\epsilon^{ij}\left(\overline{N}_rq_{uaj}\right)\left(\overline{N}_sC\overline{u}_v{}^b\right)\left(\overline{d}_p{}^aq_{tbi}\right)\\
&\mathcal{Y}\left[\young(r,s),\young(t,u)\right]\epsilon^{ij}\left(\overline{N}_sq_{tbi}\right)\left(\overline{u}_v{}^bq_{uaj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(r,s),\young(t,u)\right]\epsilon^{ij}\left(\overline{N}_sq_{tai}\right)\left(\overline{u}_v{}^cq_{ucj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(r,s),\young(t,u)\right]\epsilon^{ij}\left(\overline{N}_rq_{uaj}\right)\left(\overline{N}_sC\overline{u}_v{}^b\right)\left(\overline{d}_p{}^aq_{tbi}\right)\\
&\mathcal{Y}\left[\young(rs),\young(tu)\right]\epsilon^{ij}\left(\overline{N}_sq_{tbi}\right)\left(\overline{u}_v{}^bq_{uaj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(rs),\young(tu)\right]\epsilon^{ij}\left(\overline{N}_sq_{tai}\right)\left(\overline{u}_v{}^cq_{ucj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(rs),\young(t,u)\right]\epsilon^{ij}\left(\overline{N}_sq_{tbi}\right)\left(\overline{u}_v{}^bq_{uaj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)\\
&\mathcal{Y}\left[\young(rs),\young(t,u)\right]\epsilon^{ij}\left(\overline{N}_sq_{tai}\right)\left(\overline{u}_v{}^cq_{ucj}\right)\left(\overline{d}_p{}^aC\overline{N}_r\right)
\end{aligned}
\right.
\tag{4.574}
$$

$$
\mathcal{O}^{(1\sim5)}_{\bar{e}l\bar{N}^2q\bar{u}}(0,-2)\left|
\begin{aligned}
&\mathcal{Y}\left[\young(s,t)\right]\epsilon^{ij}\left(\overline{e}_pl_{ri}\right)\left(\overline{N}_sq_{uaj}\right)\left(\overline{N}_tC\overline{u}_v{}^a\right)\\
&\mathcal{Y}\left[\young(s,t)\right]\epsilon^{ij}\left(\overline{e}_pC\overline{N}_s\right)\left(\overline{N}_tl_{ri}\right)\left(\overline{u}_v{}^aq_{uaj}\right)\\
&\mathcal{Y}\left[\young(s,t)\right]\epsilon^{ij}\left(\overline{e}_pC\overline{N}_s\right)\left(\overline{N}_tC\overline{u}_v{}^a\right)\left(l_{ri}Cq_{uaj}\right)\\
&\mathcal{Y}\left[\young(st)\right]\epsilon^{ij}\left(\overline{N}_sC\overline{N}_t\right)\left(\overline{e}_pl_{ri}\right)\left(\overline{u}_v{}^aq_{uaj}\right)\\
&\mathcal{Y}\left[\young(st)\right]\epsilon^{ij}\left(\overline{e}_pC\overline{N}_s\right)\left(\overline{N}_tC\overline{u}_v{}^a\right)\left(l_{ri}Cq_{uaj}\right)
\end{aligned}
\right.
\tag{4.575}
$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}l\bar{N}^3q}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\\u\end{smallmatrix}}\,\epsilon^{ij}\left(\overline{N}_t l_{ri}\right)\left(\overline{N}_u q_{vaj}\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\,\epsilon^{ij}\left(\overline{N}_s C\overline{N}_t\right)\left(\overline{N}_u q_{vaj}\right)\left(\bar{d}_p{}^a l_{ri}\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\,\epsilon^{ij}\left(\overline{N}_t l_{ri}\right)\left(\overline{N}_u q_{vaj}\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\end{array}\right.\tag{4.576}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}^2\bar{N}\bar{u}^3}(-1,-3)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{t\,u\,v}\,\epsilon_{abc}\left(\bar{e}_r C\bar{u}_u{}^b\right)\left(\bar{e}_p C\bar{u}_t{}^a\right)\left(\overline{N}_s C\bar{u}_v{}^c\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}t&u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_p C\overline{N}_s\right)\left(\bar{u}_u{}^b C\bar{u}_v{}^c\right)\left(\bar{e}_r C\bar{u}_t{}^a\right)\\ \mathcal{Y}\,\boxed{p\,r},\boxed{\begin{smallmatrix}t&u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_p C\bar{e}_r\right)\left(\bar{u}_u{}^b C\bar{u}_v{}^c\right)\left(\overline{N}_s C\bar{u}_t{}^a\right)\end{array}\right.\tag{4.577}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}\bar{e}\bar{N}^2\bar{u}^2}(-1,-3)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{u\,v}\,\epsilon_{abc}\left(\overline{N}_s C\bar{u}_u{}^b\right)\left(\bar{d}_p{}^a C\bar{e}_r\right)\left(\overline{N}_t C\bar{u}_v{}^c\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{u\,v}\,\epsilon_{abc}\left(\bar{e}_r C\bar{u}_u{}^b\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\left(\overline{N}_t C\bar{u}_v{}^c\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_r C\overline{N}_t\right)\left(\bar{u}_u{}^b C\bar{u}_v{}^c\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\\ \mathcal{Y}\,\boxed{s\,t},\boxed{u\,v}\,\epsilon_{abc}\left(\bar{e}_r C\bar{u}_u{}^b\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\left(\overline{N}_t C\bar{u}_v{}^c\right)\\ \mathcal{Y}\,\boxed{s\,t},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_s C\overline{N}_t\right)\left(\bar{u}_u{}^b C\bar{u}_v{}^c\right)\left(\bar{d}_p{}^a C\bar{e}_r\right)\end{array}\right.\tag{4.578}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}^2\bar{N}^3\bar{u}}(-1,-3)\left|\begin{array}{l} \mathcal{Y}\,\boxed{p\,r},\boxed{\begin{smallmatrix}s\\t\\u\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_u C\bar{u}_v{}^c\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\left(\bar{d}_r{}^b C\overline{N}_t\right)\\ \mathcal{Y}\,\boxed{p\,r},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_u C\bar{u}_v{}^c\right)\left(\bar{d}_p{}^a C\overline{N}_s\right)\left(\bar{d}_r{}^b C\overline{N}_t\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_s C\overline{N}_t\right)\left(\overline{N}_u C\bar{u}_v{}^c\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\end{array}\right.\tag{4.579}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}^3l^2\bar{N}}(-1,1)\left|\begin{array}{l} \mathcal{Y}\,\boxed{p\,r\,s},\boxed{t\,u}\,\epsilon_{abc}\epsilon^{ij}\left(\bar{d}_p{}^a l_{ti}\right)\left(\bar{d}_r{}^b l_{uj}\right)\left(\bar{d}_s{}^c C\overline{N}_v\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}},\boxed{t\,u}\,\epsilon_{abc}\epsilon^{ij}\left(\overline{N}_v l_{uj}\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c l_{ti}\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{abc}\epsilon^{ij}\left(\overline{N}_v l_{uj}\right)\left(\bar{d}_p{}^a C\bar{d}_r{}^b\right)\left(\bar{d}_s{}^c l_{ti}\right)\end{array}\right.\tag{4.580}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}l^2\bar{N}^3}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{r\,s},\boxed{\begin{smallmatrix}t\\u\\v\end{smallmatrix}}\,\epsilon^{ij}\left(\bar{e}_p C\overline{N}_t\right)\left(\overline{N}_u l_{ri}\right)\left(\overline{N}_v l_{sj}\right)\\ \mathcal{Y}\,\boxed{r\,s},\boxed{\begin{smallmatrix}t&u\\v\end{smallmatrix}}\,\epsilon^{ij}\left(\overline{N}_u C\overline{N}_v\right)\left(\bar{e}_p l_{ri}\right)\left(\overline{N}_t l_{sj}\right)\\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}t&u\\v\end{smallmatrix}}\,\epsilon^{ij}\left(\overline{N}_u C\overline{N}_v\right)\left(\bar{e}_p l_{ri}\right)\left(\overline{N}_t l_{sj}\right)\end{array}\right.\tag{4.581}$$

$$\mathcal{O}_{\bar{N}^6}(0,-6)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\\s&t\\u&v\end{smallmatrix}}\left(\overline{N}_p C\overline{N}_r\right)\left(\overline{N}_s C\overline{N}_t\right)\left(\overline{N}_u C\overline{N}_v\right)\right.\tag{4.582}$$

5 Lists of operators in νLEFT

In this section, we list the complete and independent operator basis in νLEFT from dimension 5 to dimension 9, and the statistic results of the operator basis are listed in table 6 and 7. We also give the relations of four-component Dirac spinors and two-component Weyl spinors here.

$$\nu_{\mathrm{L}}=\begin{pmatrix}\nu\\0\end{pmatrix},\qquad e_{\mathrm{L}}=\begin{pmatrix}e\\0\end{pmatrix},\qquad e_{\mathrm{R}}=\begin{pmatrix}0\\e_{\mathbb{C}}^\dagger\end{pmatrix},\qquad u_{\mathrm{L}}=\begin{pmatrix}u\\0\end{pmatrix},$$

$$u_{\mathrm{R}}=\begin{pmatrix}0\\u_{\mathbb{C}}^\dagger\end{pmatrix},\qquad d_{\mathrm{L}}=\begin{pmatrix}d\\0\end{pmatrix},\qquad d_{\mathrm{R}}=\begin{pmatrix}0\\d_{\mathbb{C}}^\dagger\end{pmatrix}.\tag{5.1}$$

$$\bar{\nu}_{\mathrm{L}}=\left(0,\nu^\dagger\right),\qquad \bar{e}_{\mathrm{L}}=\left(0,e^\dagger\right),\qquad \bar{e}_{\mathrm{R}}=\left(e_{\mathbb{C}},0\right),\qquad \bar{u}_{\mathrm{L}}=\left(0,u^\dagger\right),$$

$$\bar{u}_{\mathrm{R}}=\left(u_{\mathbb{C}},0\right),\qquad \bar{d}_{\mathrm{L}}=\left(0,d^\dagger\right),\qquad \bar{d}_{\mathrm{R}}=\left(d_{\mathbb{C}},0\right).\tag{5.2}$$

$$N_{\mathrm{R}}=\begin{pmatrix}0\\N_{\mathbb{C}}^\dagger\end{pmatrix},\qquad \bar{N}_{\mathrm{R}}=\left(N_{\mathbb{C}},0\right)\tag{5.3}$$

			Dim-5 operators			
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
3	$(2,0)$	$F_{\text{L}}\psi^2 + h.c.$	$2+0+2+0$	4	24	(5.4)–(5.5)
			Dim-6 operators			
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(2,0)$	$\psi^4 + h.c.$	$10+4+12+2$	50	2034	(5.6)–(5.19)
	$(1,1)$	$\psi^2\psi^{\dagger 2}$	$20+8+28+2$	58	3189	(5.20)–(5.52)
Total		5	$30+12+40+4$	108	5223	
			Dim-7 operators			
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(3,0)$	$F_{\text{L}}^2\psi^2 + h.c.$	$4+0+4+0$	8	60	(5.53)–(5.56)
	$(2,1)$	$F_{\text{L}}^2\psi^{\dagger 2} + h.c.$	$4+0+4+0$	8	60	(5.57)–(5.60)
		$\psi^3\psi^\dagger D + h.c.$	$30+12+38+4$	84	3846	(5.61)–(5.102)
Total		6	$38+12+46+4$	100	3966	
			Dim-8 operators			
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(3,1)$	$\psi^4 D^2 + h.c.$	$10+4+12+2$	78	3204	(5.103)–(5.116)
	$(2,2)$	$F_{\text{L}}F_{\text{R}}\psi\psi^\dagger D$	$2+0+4+0$	6	54	(5.117)–(5.120)
		$\psi^2\psi^{\dagger 2}D^2$	$20+8+28+2$	116	6129	(5.121)–(5.153)
5	$(3,0)$	$F_{\text{L}}\psi^4 + h.c.$	$16+8+18+2$	136	5238	(5.154)–(5.175)
	$(2,1)$	$F_{\text{L}}\psi^2\psi^{\dagger 2} + h.c.$	$68+32+92+4$	212	10800	(5.176)–(5.273)
Total		8	$116+52+154+10$	548	25425	

Table 6. The complete statistics of dimension 5, 6, 7, 8 νLEFT operators. N in the leftmost column shows the number of particles. $(n,\tilde{n})$ are the numbers of ϵ and $\tilde{\epsilon}$ in the Lorentz structure. $\mathcal{N}_{\text{type}}$, $\mathcal{N}_{\text{term}}$, and $\mathcal{N}_{\text{operator}}$ show the number of types, terms and Hermitian operators respectively (independent conjugates are counted), while the numbers under $\mathcal{N}_{\text{type}}$ describe the sum of each possible $|\Delta L|$ types/operators with $\mathcal{N} = \mathcal{N}(|\Delta L| = 0) + \mathcal{N}(|\Delta L| = 1) + \mathcal{N}(|\Delta L| = 2) + \mathcal{N}(|\Delta L| = 4)$. The links in the rightmost column refer to the list(s) of the terms in given classes.

In the following contents that list the operator basis, we should clarify that each ψ ($\psi^\dagger$) in an operator class means a two-component left-handed (right-handed) spinor in this class. The baryon number and lepton number violation pattern of each operator type are presented next to the type as $(\Delta B, \Delta L)$. The subscripts and superscripts $\{p, r, s, t, u, v\}$, $\{a, b, c, d, e, f\}$ and $\{A, B, C, D\}$ denote flavor indices, $\text{SU}(3)_C$ group (anti)fundamental representation indices and $\text{SU}(3)_C$ group adjoint representation indices respectively. The number of up-type quark fields $u_{L,R}$ flavor in this effective field theory is 2 (excluding the heavy top quark which has been integrated out), and all other fermions flavor numbers are 3.

Dim-9 operators						
N	$(n,\tilde{n})$	Classes	$\mathcal{N}_{\text{type}}$	$\mathcal{N}_{\text{term}}$	$\mathcal{N}_{\text{operator}}$	Equations
4	$(3,2)$	$F_{\text{L}}^2\psi^2 D^2 + h.c.$	$4+0+4+0+0+0$	16	120	(5.274)–(5.277)
		$F_{\text{L}}F_{\text{R}}\psi^2 D^2 + h.c.$	$4+0+4+0+0+0$	8	60	(5.278)–(5.281)
		$F_{\text{L}}^2\psi^{\dagger 2} D^2 + h.c.$	$4+0+4+0+0+0$	8	60	(5.282)–(5.285)
		$\psi^3\psi^\dagger D^3 + h.c.$	$30+12+38+0+4+0$	162	8136	(5.302)–(5.343)
5	$(4,0)$	$F_{\text{L}}^3\psi^2 + h.c.$	$6+0+6+0+0+0$	20	126	(5.286)–(5.291)
	$(3,1)$	$F_{\text{L}}^3\psi^{\dagger 2} + h.c.$	$2+0+2+0+0+0$	4	30	(5.292)–(5.293)
		$F_{\text{L}}\psi^3\psi^\dagger D + h.c.$	$50+24+62+0+4+0$	602	28854	(5.344)–(5.413)
	$(2,2)$	$F_{\text{L}}F_{\text{R}}^2\psi^2 + h.c.$	$8+0+8+0+0+0$	16	96	(5.294)–(5.301)
		$F_{\text{R}}\psi^3\psi^\dagger D + h.c.$	$50+24+62+0+4+0$	450	21300	(5.414)–(5.483)
6	$(3,0)$	$\psi^6 + h.c.$	$30+34+40+10+12+2$	676	100782	(5.484)–(5.547)
	$(2,1)$	$\psi^4\psi^{\dagger 2} + h.c.$	$252+254+344+78+72+4$	2492	629862	(5.548)–(5.1049)
Total		22	$440+348+574+88+96+6$	4454	789426	

Table 7. The complete statistics of dimension 9 νLEFT operators. The numbers under $\mathcal{N}_{\text{type}}$ describe the sum of each possible $|\Delta L|$ types/operators with $\mathcal{N} = \mathcal{N}(|\Delta L|=0) + \mathcal{N}(|\Delta L|=1) + \mathcal{N}(|\Delta L|=2) + \mathcal{N}(|\Delta L|=3) + \mathcal{N}(|\Delta L|=4) + \mathcal{N}(|\Delta L|=6)$.

5.1 Lists of the dim-5 operators

Class $F_{\text{L}}\psi^2$: 2 types

$$\mathcal{O}_{F_{\text{L}}\nu_{\text{L}}\bar{N}_{\text{R}}}(0,0)\Big| iF_{\text{L}}^{\mu\nu}\left(\overline{N}_{\text{R}p}\sigma_{\mu\nu}\nu_{\text{L}r}\right) \tag{5.4}$$

$$\mathcal{O}_{F_{\text{L}}\bar{N}_{\text{R}}^2}(0,-2)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\text{L}}^{\mu\nu}\left(\overline{N}_{\text{R}p}\sigma_{\mu\nu}C\overline{N}_{\text{R}r}\right) \tag{5.5}$$

These operators are listed and discussed in refs. [16, 19, 20]. Here the $(0,0)$ and $(0,-2)$ denote the baryon and lepton numbers of the operators and each of the ψs or $\psi^\dagger$s in the class name means a left-handed two-component spinor or a right-handed two-component spinor in the class respectively. The definition of the Dirac charge conjugation matrix C and its conversions can be found near eq. (4.5), along with the conversion between F, $\tilde{F}$, F_L and F_R eq. (4.13), (4.14), the conversion between two-component spinors and four-component spinors eq. (4.4) and Hermitian conjugation of operators eq. (4.9), (4.10).

5.2 Lists of the dim-6 operators

Class ψ^4: 14 types

$$\mathcal{O}_{\nu_{\text{L}}\bar{N}_{\text{R}}\bar{u}_{\text{R}}u_{\text{L}}}^{(1,2)}(0,0)\left|\begin{array}{l}(u_{\text{L}sa}C\nu_{\text{L}t})\left(\overline{N}_{\text{R}p}C\overline{u}_{\text{R}r}^a\right)\\ \left(\overline{N}_{\text{R}p}u_{\text{L}sa}\right)(\overline{u}_{\text{R}r}^a\nu_{\text{L}t})\end{array}\right. \tag{5.6}$$

$$\mathcal{O}_{\bar{N}_{\text{R}}^2\bar{u}_{\text{R}}u_{\text{L}}}^{(1,2)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_{\text{R}r}u_{\text{L}ta}\right)\left(\overline{N}_{\text{R}p}C\overline{u}_{\text{R}s}^a\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]\left(\overline{N}_{\text{R}p}C\overline{N}_{\text{R}r}\right)(\overline{u}_{\text{R}s}^a u_{\text{L}ta})\end{array}\right. \tag{5.7}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 \bar{N}_\mathrm{R} u_\mathrm{L}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix} p & r \end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix} p \\ r \end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right) \end{array}\right. \tag{5.8}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{L}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}^a_{\mathrm{R}p}e_{\mathrm{L}r}\right) \\ \left(e_{\mathrm{L}r}Cu_{\mathrm{L}ta}\right)\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.9}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L} \bar{e}_\mathrm{R} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(0,-2) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^a_{\mathrm{R}t}\right) \\ \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^a_{\mathrm{R}t}\right) \end{array}\right. \tag{5.10}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}^2 \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix} p & r \end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}^b_{\mathrm{R}r}C\bar{u}^c_{\mathrm{R}t}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix} p \\ r \end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}^a_{\mathrm{R}p}C\bar{d}^b_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^c_{\mathrm{R}t}\right) \end{array}\right. \tag{5.11}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}^a_{\mathrm{R}p}d_{\mathrm{L}ra}\right) \\ \left(d_{\mathrm{L}ra}C\nu_{\mathrm{L}t}\right)\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.12}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{L} \bar{N}_\mathrm{R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}^a_{\mathrm{R}p}d_{\mathrm{L}ra}\right) \end{array}\right. \tag{5.13}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \\ \left(e_{\mathrm{L}r}C\nu_{\mathrm{L}t}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.14}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right) \end{array}\right. \tag{5.15}$$

$$\mathcal{O}_{\nu_\mathrm{L}^3 \bar{N}_\mathrm{R}}(0,2) \left| \mathcal{Y}\,\boxed{\begin{smallmatrix} r & s \\ t \end{smallmatrix}}\,\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \right. \tag{5.16}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2 \bar{N}_\mathrm{R}^2}(0,0) \left| \begin{array}{l} \mathcal{Y}\,\boxed{\begin{smallmatrix} p \\ r \end{smallmatrix}},\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix} p & r \end{smallmatrix}},\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}\,\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \end{array}\right. \tag{5.17}$$

$$\mathcal{O}_{\nu_\mathrm{L} \bar{N}_\mathrm{R}^3}(0,-2) \left| \mathcal{Y}\,\boxed{\begin{smallmatrix} p & r \\ s \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \right. \tag{5.18}$$

$$\mathcal{O}_{\bar{N}_\mathrm{R}^4}(0,-4) \left| \mathcal{Y}\,\boxed{\begin{smallmatrix} p & r \\ s & t \end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right) \right. \tag{5.19}$$

Class $\psi^2\psi^{\dagger 2}$: 33 types

$$\mathcal{O}_{\bar{\nu}_\mathrm{L} N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{L}}(0,0) \left| \left(\bar{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\bar{u}^a_{\mathrm{R}p}u_{\mathrm{L}ra}\right) \right. \tag{5.20}$$

$$\mathcal{O}_{N_\mathrm{R}^2 \bar{u}_\mathrm{R} u_\mathrm{L}}(0,2) \left| \mathcal{Y}\,\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}\,\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)\left(\bar{u}^a_{\mathrm{R}p}u_{\mathrm{L}ra}\right) \right. \tag{5.21}$$

$$\mathcal{O}_{d_\mathrm{R} d_\mathrm{L} N_\mathrm{R} u_\mathrm{L}}(1,1) \left| \epsilon^{abc}\left(d_{\mathrm{R}sc}CN_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}rb}\right) \right. \tag{5.22}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R} e_\mathrm{R} N_\mathrm{R} u_\mathrm{L}}(0,2) \left| \left(e_{\mathrm{R}s}CN_{\mathrm{R}t}\right)\left(\bar{d}^a_{\mathrm{R}p}u_{\mathrm{L}ra}\right) \right. \tag{5.23}$$

$$\mathcal{O}_{\bar{d}_\mathrm{L} e_\mathrm{L} N_\mathrm{R} u_\mathrm{L}}(0,2) \left| \left(e_{\mathrm{L}p}Cu_{\mathrm{L}ra}\right)\left(\bar{d}^a_{\mathrm{L}s}N_{\mathrm{R}t}\right) \right. \tag{5.24}$$

$$\mathcal{O}_{\nu_\mathrm{L} N_\mathrm{R} u_\mathrm{L} \bar{u}_\mathrm{L}}(0,2) \left| \left(u_{\mathrm{L}pa}C\nu_{\mathrm{L}r}\right)\left(\bar{u}^a_{\mathrm{L}t}N_{\mathrm{R}s}\right) \right. \tag{5.25}$$

$$\mathcal{O}_{\bar{N}_\mathrm{R} N_\mathrm{R} u_\mathrm{L} \bar{u}_\mathrm{L}}(0,0) \left| \left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(\bar{u}^a_{\mathrm{L}t}N_{\mathrm{R}s}\right) \right. \tag{5.26}$$

$$\mathcal{O}_{\bar{d}_\mathrm{L} e_\mathrm{R} \bar{N}_\mathrm{R} u_\mathrm{L}}(0,0) \left| \left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(\bar{d}^a_{\mathrm{L}s}e_{\mathrm{R}t}\right) \right. \tag{5.27}$$

$$\mathcal{O}_{d_\mathrm{R}^2 \bar{N}_\mathrm{R} u_\mathrm{L}}(1,-1) \left| \mathcal{Y}\,\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(d_{\mathrm{R}sb}Cd_{\mathrm{R}tc}\right) \right. \tag{5.28}$$

$$\mathcal{O}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\Big|(\bar{e}_{\mathrm{L}s}N_{\mathrm{R}t})\,(\overline{u}^{\,a}_{\mathrm{R}r}d_{\mathrm{L}pa}) \tag{5.29}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,1)\Big|\epsilon_{abc}\left(\overline{d}^{\,c}_{\mathrm{L}s}N_{\mathrm{R}t}\right)\left(\overline{d}^{\,a}_{\mathrm{R}p}C\overline{u}^{\,b}_{\mathrm{R}r}\right) \tag{5.30}$$

$$\mathcal{O}_{d_{\mathrm{R}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\Big|(d_{\mathrm{R}sa}CN_{\mathrm{R}t})\,(\bar{e}_{\mathrm{R}p}C\overline{u}^{\,a}_{\mathrm{R}r}) \tag{5.31}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}}(0,2)\Big|(N_{\mathrm{R}s}Cu_{\mathrm{R}ta})\left(\overline{u}^{\,a}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \tag{5.32}$$

$$\mathcal{O}_{\bar{N}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}}(0,0)\Big|(N_{\mathrm{R}s}Cu_{\mathrm{R}ta})\left(\overline{N}_{\mathrm{R}p}C\overline{u}^{\,a}_{\mathrm{R}r}\right) \tag{5.33}$$

$$\mathcal{O}_{\bar{d}^2_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,-1)\Big|\mathcal{Y}\left[\boxed{\genfrac{}{}{0pt}{}{s}{t}}\right]\epsilon_{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{u}^{\,a}_{\mathrm{R}r}\right)\left(\overline{d}^{\,b}_{\mathrm{L}s}C\overline{d}^{\,c}_{\mathrm{L}t}\right) \tag{5.34}$$

$$\mathcal{O}_{d_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\Big|(\bar{e}_{\mathrm{L}t}d_{\mathrm{R}sa})\left(\overline{N}_{\mathrm{R}p}C\overline{u}^{\,a}_{\mathrm{R}r}\right) \tag{5.35}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,0)\Big|(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s})\left(\overline{d}^{\,a}_{\mathrm{R}p}d_{\mathrm{L}ra}\right) \tag{5.36}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}N^2_{\mathrm{R}}}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right](N_{\mathrm{R}s}CN_{\mathrm{R}t})\left(\overline{d}^{\,a}_{\mathrm{R}p}d_{\mathrm{L}ra}\right) \tag{5.37}$$

$$\mathcal{O}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big|(d_{\mathrm{L}pa}C\nu_{\mathrm{L}r})\left(\overline{d}^{\,a}_{\mathrm{L}s}N_{\mathrm{R}t}\right) \tag{5.38}$$

$$\mathcal{O}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big|\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{d}^{\,a}_{\mathrm{L}s}N_{\mathrm{R}t}\right) \tag{5.39}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big|(d_{\mathrm{R}sa}CN_{\mathrm{R}t})\left(\overline{d}^{\,a}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \tag{5.40}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big|(d_{\mathrm{R}sa}CN_{\mathrm{R}t})\left(\overline{d}^{\,a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \tag{5.41}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,0)\Big|(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}) \tag{5.42}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}N^2_{\mathrm{R}}}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right](N_{\mathrm{R}s}CN_{\mathrm{R}t})\,(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}) \tag{5.43}$$

$$\mathcal{O}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big|(\bar{e}_{\mathrm{L}s}N_{\mathrm{R}t})\,(e_{\mathrm{L}p}C\nu_{\mathrm{L}r}) \tag{5.44}$$

$$\mathcal{O}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big|\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}s}N_{\mathrm{R}t}) \tag{5.45}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big|(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}r})\,(e_{\mathrm{R}s}CN_{\mathrm{R}t}) \tag{5.46}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big|(e_{\mathrm{R}s}CN_{\mathrm{R}t})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \tag{5.47}$$

$$\mathcal{O}_{\nu^2_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big|\mathcal{Y}\left[\boxed{p\,r}\right](\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r})\,(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}) \tag{5.48}$$

$$\mathcal{O}_{\nu^2_{\mathrm{L}}N^2_{\mathrm{R}}}(0,4)\Big|\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](N_{\mathrm{R}s}CN_{\mathrm{R}t})\,(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}) \tag{5.49}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big|\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}) \tag{5.50}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N^2_{\mathrm{R}}}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right](N_{\mathrm{R}s}CN_{\mathrm{R}t})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \tag{5.51}$$

$$\mathcal{O}_{\bar{N}^2_{\mathrm{R}}N^2_{\mathrm{R}}}(0,0)\Big|\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](N_{\mathrm{R}s}CN_{\mathrm{R}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \tag{5.52}$$

5.3 Lists of the dim-7 operators

Class $F_{\mathrm{L}}{}^2\psi^2$: 4 types

$$\mathcal{O}_{G_{\mathrm{L}}{}^2\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\Big|\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)G^A_{\mathrm{L}\,\mu\nu}G^{A\,\mu\nu}_{\mathrm{L}} \tag{5.53}$$

$$\mathcal{O}_{G_{\mathrm{L}}{}^2\bar{N}^2_{\mathrm{R}}}(0,-2)\Big|\mathcal{Y}\left[\boxed{p\,r}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)G^A_{\mathrm{L}\,\mu\nu}G^{A\,\mu\nu}_{\mathrm{L}} \tag{5.54}$$

$$\mathcal{O}_{F_{\mathrm{L}}{}^2\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\Big|F_{\mathrm{L}\mu\nu}F_{\mathrm{L}}{}^{\mu\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \tag{5.55}$$

$$\mathcal{O}_{F_{\mathrm{L}}{}^2\bar{N}^2_{\mathrm{R}}}(0,-2)\Big|\mathcal{Y}\left[\boxed{p\,r}\right]F_{\mathrm{L}\mu\nu}F_{\mathrm{L}}{}^{\mu\nu}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \tag{5.56}$$

Class $F_L{}^2\psi^{\dagger 2}$: 4 types

$$\mathcal{O}_{G_L{}^2\bar{\nu}_L N_R}(0,0)\big|(\overline{\nu}_{Lr}N_{Rp})\,G^A_{L\mu\nu}G^{A\mu\nu}_L \tag{5.57}$$

$$\mathcal{O}_{G_L{}^2 N_R^2}(0,2)\big|\mathcal{Y}\,[\overline{p|r}]\,(N_{Rp}CN_{Rr})\,G^A_{L\mu\nu}G^{A\mu\nu}_L \tag{5.58}$$

$$\mathcal{O}_{F_L{}^2\bar{\nu}_L N_R}(0,0)\big|F_{L\mu\nu}F^{\mu\nu}_L\,(\overline{\nu}_{Lr}N_{Rp}) \tag{5.59}$$

$$\mathcal{O}_{F_L{}^2 N_R^2}(0,2)\big|\mathcal{Y}\,[\overline{p|r}]\,F_{L\mu\nu}\,(N_{Rp}CN_{Rr})\,F^{\mu\nu}_L \tag{5.60}$$

Class $\psi^3\psi^\dagger D$: 42 types

$$\mathcal{O}_{\nu_L N_R \bar{u}_R u_L D}(0,2)\big|i\left(\overline{u}_{Rp}^a\gamma_\mu N_{Rt}\right)(u_{Lra}CD^\mu\nu_{Ls}) \tag{5.61}$$

$$\mathcal{O}_{\bar{\nu}_L \bar{N}_R \bar{u}_R u_L D}(0,-2)\big|i\left(\overline{N}_{Rp}\gamma_\mu C\overline{\nu}_{Lt}\right)(\overline{u}_{Rr}^a D^\mu u_{Lsa}) \tag{5.62}$$

$$\mathcal{O}_{\bar{N}_R N_R \bar{u}_R u_L D}(0,0)\big|i\left(\overline{N}_{Rp}\gamma_\mu N_{Rt}\right)(\overline{u}_{Rr}^a D^\mu u_{Lsa}) \tag{5.63}$$

$$\mathcal{O}_{d_L^2 N_R u_L D}(1,1)\big|\mathcal{Y}\,[\overline{p|r}]\,i\epsilon^{abc}\,(d_{Lpa}C\gamma_\mu N_{Rt})\,(d_{Lrb}CD^\mu u_{Lsc}) \tag{5.64}$$

$$\mathcal{O}_{d_R d_L \bar{N}_R u_L D}(1,-1)\big|i\epsilon^{abc}\left(\overline{N}_{Rr}D^\mu u_{Lsb}\right)(d_{Lpa}C\gamma_\mu d_{Rtc}) \tag{5.65}$$

$$\mathcal{O}_{\bar{d}_R e_L N_R u_L D}(0,2)\big|i\left(\overline{d}_{Rp}^a\gamma_\mu N_{Rt}\right)(e_{Lr}CD^\mu u_{Lsa}) \tag{5.66}$$

$$\mathcal{O}_{\bar{d}_R e_R \bar{N}_R u_L D}(0,0)\big|i\left(\overline{N}_{Rr}D^\mu u_{Lsa}\right)\left(\overline{d}_{Rp}^a\gamma_\mu e_{Rt}\right) \tag{5.67}$$

$$\mathcal{O}_{\bar{d}_L e_L \bar{N}_R u_L D}(0,0)\big|i\left(\overline{N}_{Rr}D^\mu u_{Lsa}\right)\left(\overline{d}_{Lt}^a\gamma_\mu e_{Lp}\right) \tag{5.68}$$

$$\mathcal{O}_{\nu_L \bar{N}_R u_L \bar{u}_L D}(0,0)\big|i\,(u_{Lra}CD^\mu\nu_{Ls})\left(\overline{N}_{Rp}\gamma_\mu C\overline{u}_{Lt}^a\right) \tag{5.69}$$

$$\mathcal{O}_{\bar{N}_R^2 u_L \bar{u}_L D}(0,-2)\big|\mathcal{Y}\,\begin{bmatrix}p\\r\end{bmatrix}\,i\left(\overline{N}_{Rr}D^\mu u_{Lsa}\right)\left(\overline{N}_{Rp}\gamma_\mu C\overline{u}_{Lt}^a\right) \tag{5.70}$$

$$\mathcal{O}_{d_L \bar{e}_R N_R \bar{u}_R D}(0,0)\big|i\,(d_{Lpa}C\gamma_\mu N_{Rt})\,(\overline{e}_{Rr}CD^\mu\overline{u}_{Rs}^a) \tag{5.71}$$

$$\mathcal{O}_{d_L \bar{e}_L \bar{N}_R \bar{u}_R D}(0,-2)\big|i\,(\overline{e}_{Lt}\gamma_\mu d_{Lpa})\left(\overline{N}_{Rr}CD^\mu\overline{u}_{Rs}^a\right) \tag{5.72}$$

$$\mathcal{O}_{\bar{d}_R^2 N_R \bar{u}_R D}(-1,1)\big|\mathcal{Y}\,[\overline{p|r}]\,i\epsilon_{abc}\left(\overline{d}_{Rp}^a\gamma_\mu N_{Rt}\right)\left(\overline{d}_{Rr}^b CD^\mu\overline{u}_{Rs}^c\right) \tag{5.73}$$

$$\mathcal{O}_{\bar{d}_R \bar{d}_L \bar{N}_R \bar{u}_R D}(-1,-1)\big|i\epsilon_{abc}\left(\overline{N}_{Rr}CD^\mu\overline{u}_{Rs}^b\right)\left(\overline{d}_{Rp}^a\gamma_\mu C\overline{d}_{Lt}^c\right) \tag{5.74}$$

$$\mathcal{O}_{d_R \bar{e}_R \bar{N}_R \bar{u}_R D}(0,-2)\big|i\,(\overline{e}_{Rp}\gamma_\mu d_{Rta})\left(\overline{N}_{Rr}CD^\mu\overline{u}_{Rs}^a\right) \tag{5.75}$$

$$\mathcal{O}_{\nu_L \bar{N}_R \bar{u}_R u_R D}(0,0)\big|i\left(\overline{N}_{Rp}\gamma_\mu u_{Rta}\right)(\overline{u}_{Rr}^a D^\mu\nu_{Ls}) \tag{5.76}$$

$$\mathcal{O}_{\bar{N}_R^2 \bar{u}_R u_R D}(0,-2)\big|\mathcal{Y}\,\begin{bmatrix}p\\r\end{bmatrix}\,i\left(\overline{N}_{Rp}\gamma_\mu u_{Rta}\right)\left(\overline{N}_{Rr}CD^\mu\overline{u}_{Rs}^a\right) \tag{5.77}$$

$$\mathcal{O}_{d_L^2 \bar{N}_R u_R D}(1,-1)\big|\mathcal{Y}\,[\overline{p|r}]\,i\epsilon^{abc}\left(D^\mu\overline{N}_{Rs}d_{Lrb}\right)(d_{Lpa}C\gamma_\mu u_{Rtc}) \tag{5.78}$$

$$\mathcal{O}_{\bar{d}_R d_L \nu_L N_R D}(0,2)\big|i\left(\overline{d}_{Rp}^a\gamma_\mu N_{Rt}\right)(d_{Lra}CD^\mu\nu_{Ls}) \tag{5.79}$$

$$\mathcal{O}_{\bar{d}_R d_L \bar{\nu}_L \bar{N}_R D}(0,-2)\big|i\left(D^\mu\overline{N}_{Rs}d_{Lra}\right)\left(\overline{d}_{Rp}^a\gamma_\mu C\overline{\nu}_{Lt}\right) \tag{5.80}$$

$$\mathcal{O}_{\bar{d}_R d_L \bar{N}_R N_R D}(0,0)\big|i\left(D^\mu\overline{N}_{Rs}d_{Lra}\right)\left(\overline{d}_{Rp}^a\gamma_\mu N_{Rt}\right) \tag{5.81}$$

$$\mathcal{O}_{d_L \bar{e}_R \bar{N}_R \bar{u}_L D}(0,-2)\big|i\,(\overline{u}_{Lt}^a\gamma_\mu d_{Lpa})\left(\overline{e}_{Rr}CD^\mu\overline{N}_{Rs}\right) \tag{5.82}$$

$$\mathcal{O}_{d_L \bar{d}_L \nu_L \bar{N}_R D}(0,0)\big|i\left(\overline{d}_{Lt}^a\gamma_\mu d_{Lpa}\right)\left(\overline{N}_{Rr}D^\mu\nu_{Ls}\right) \tag{5.83}$$

$$\mathcal{O}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\bar{d}_{\mathrm{L}t}^{\ a}\gamma_\mu d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right) \tag{5.84}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(-1,-1)\Big|\mathcal{Y}\left[\underline{p\,r}\right]i\epsilon_{abc}\left(\bar{d}_{\mathrm{R}r}^{\ b}CD^\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{\ a}\gamma_\mu C\bar{u}_{\mathrm{L}t}^{\ c}\right) \tag{5.85}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}D}(0,0)\Big|i\left(D^\mu\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^{\ a}\gamma_\mu u_{\mathrm{R}ta}\right) \tag{5.86}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\Big|i\left(\bar{d}_{\mathrm{R}p}^{\ a}\gamma_\mu d_{\mathrm{R}ta}\right)\left(\overline{N}_{\mathrm{R}r}D^\mu\nu_{\mathrm{L}s}\right) \tag{5.87}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\bar{d}_{\mathrm{R}p}^{\ a}\gamma_\mu d_{\mathrm{R}ta}\right)\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right) \tag{5.88}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D}(0,2)\Big|i\left(\bar{e}_{\mathrm{R}p}\gamma_\mu N_{\mathrm{R}t}\right)\left(e_{\mathrm{L}r}CD^\mu\nu_{\mathrm{L}s}\right) \tag{5.89}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,-2)\Big|i\left(\bar{e}_{\mathrm{R}p}\gamma_\mu C\bar{\nu}_{\mathrm{L}t}\right)\left(D^\mu\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right) \tag{5.90}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,0)\Big|i\left(\bar{e}_{\mathrm{R}p}\gamma_\mu N_{\mathrm{R}t}\right)\left(D^\mu\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right) \tag{5.91}$$

$$\mathcal{O}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\Big|i\left(\bar{e}_{\mathrm{L}t}\gamma_\mu e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}D^\mu\nu_{\mathrm{L}s}\right) \tag{5.92}$$

$$\mathcal{O}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\bar{e}_{\mathrm{L}t}\gamma_\mu e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right) \tag{5.93}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\Big|i\left(\bar{e}_{\mathrm{R}p}\gamma_\mu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D^\mu\nu_{\mathrm{L}s}\right) \tag{5.94}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\bar{e}_{\mathrm{R}p}\gamma_\mu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right) \tag{5.95}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^3 N_{\mathrm{R}}D}(0,4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right]i\left(\nu_{\mathrm{L}r}CD^\mu\nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}p}C\gamma_\mu N_{\mathrm{R}t}\right) \tag{5.96}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\nu_{\mathrm{L}r}CD^\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma_\mu C\bar{\nu}_{\mathrm{L}t}\right) \tag{5.97}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,2)\Big|\mathcal{Y}\left[\tfrac{r}{s}\right]i\left(\overline{N}_{\mathrm{R}p}\gamma_\mu N_{\mathrm{R}t}\right)\left(\nu_{\mathrm{L}r}CD^\mu\nu_{\mathrm{L}s}\right) \tag{5.98}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2)\Big|\mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\overline{N}_{\mathrm{R}p}\gamma_\mu C\bar{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}r}D^\mu\nu_{\mathrm{L}s}\right) \tag{5.99}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}D}(0,0)\Big|\mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\overline{N}_{\mathrm{R}p}\gamma_\mu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D^\mu\nu_{\mathrm{L}s}\right) \tag{5.100}$$

$$\mathcal{O}_{\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 D}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right]i\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma_\mu C\bar{\nu}_{\mathrm{L}t}\right) \tag{5.101}$$

$$\mathcal{O}_{\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}}D}(0,-2)\Big|\mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right]i\left(\overline{N}_{\mathrm{R}p}\gamma_\mu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD^\mu\overline{N}_{\mathrm{R}s}\right) \tag{5.102}$$

5.4 Lists of the dim-8 operators

Class $\psi^4 D^2$: 14 types

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}D^2}^{(1\sim 3)}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{\ a}\right)\left(D_\mu u_{\mathrm{L}sa}CD^\mu\nu_{\mathrm{L}t}\right)\\[4pt]\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(D_\mu\bar{u}_{\mathrm{R}r}^{\ a}D^\mu\nu_{\mathrm{L}t}\right)\\[4pt]i\left(D_\mu u_{\mathrm{L}sa}CD_\nu\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}C\bar{u}_{\mathrm{R}r}^{\ a}\right)\end{array}\right. \tag{5.103}$$

$$\mathcal{O}_{\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}u_{\mathrm{L}}D^2}^{(1\sim 3)}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\tfrac{p}{r}\right]\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{\ a}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}D^\mu u_{\mathrm{L}ta}\right)\\[4pt]\mathcal{Y}\left[\underline{p\,r}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(D_\mu\bar{u}_{\mathrm{R}s}^{\ a}D^\mu u_{\mathrm{L}ta}\right)\\[4pt]\mathcal{Y}\left[\underline{p\,r}\right]\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{\ a}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}D^\mu u_{\mathrm{L}ta}\right)\end{array}\right. \tag{5.104}$$

$$\mathcal{O}_{d_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D^2}^{(1\sim 3)}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\underline{p\,r}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_\mu d_{\mathrm{L}rb}CD^\mu u_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\left[\tfrac{p}{r}\right]\epsilon^{abc}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(D_\mu\overline{N}_{\mathrm{R}s}D^\mu u_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\left[\tfrac{p}{r}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_\mu d_{\mathrm{L}rb}CD^\mu u_{\mathrm{L}tc}\right)\end{array}\right. \tag{5.105}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_{\mathrm{R}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}} D^2}(0,0) \left|
\begin{array}{l}
\left(\overline{d}_{\mathrm{R}p}^{\,a} e_{\mathrm{L}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} D^\mu u_{\mathrm{L}ta}\right) \\[4pt]
\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D_\mu e_{\mathrm{L}r} C D^\mu u_{\mathrm{L}ta}\right) \\[4pt]
i\left(D_\mu \overline{N}_{\mathrm{R}s} D_\nu u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{R}p}^{\,a}\sigma^{\mu\nu} e_{\mathrm{L}r}\right)
\end{array}\right. \tag{5.106}$$

$$\mathcal{O}^{(1\sim3)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} D^2}(0,-2) \left|
\begin{array}{l}
\left(\overline{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{u}_{\mathrm{R}t}^{\,a}\right) \\[4pt]
\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(D_\mu \overline{e}_{\mathrm{R}r} C D^\mu \overline{u}_{\mathrm{R}t}^{\,a}\right) \\[4pt]
i\left(\overline{e}_{\mathrm{R}r}\sigma^{\mu\nu} d_{\mathrm{L}pa}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D_\nu \overline{u}_{\mathrm{R}t}^{\,a}\right)
\end{array}\right. \tag{5.107}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_{\mathrm{R}}^2 \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} D^2}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\right]\epsilon_{abc}\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D_\mu \overline{d}_{\mathrm{R}r}^{\,b} C D^\mu \overline{u}_{\mathrm{R}t}^{\,c}\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon_{abc}\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{d}_{\mathrm{R}r}^{\,b}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{u}_{\mathrm{R}t}^{\,c}\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right]\epsilon_{abc}\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D_\mu \overline{d}_{\mathrm{R}r}^{\,b} C D^\mu \overline{u}_{\mathrm{R}t}^{\,c}\right)
\end{array}\right. \tag{5.108}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} D^2}(0,0) \left|
\begin{array}{l}
\left(\overline{d}_{\mathrm{R}p}^{\,a} d_{\mathrm{L}ra}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D_\mu d_{\mathrm{L}ra} C D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
i\left(D_\mu \overline{N}_{\mathrm{R}s} D_\nu \nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{R}p}^{\,a}\sigma^{\mu\nu} d_{\mathrm{L}ra}\right)
\end{array}\right. \tag{5.109}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 D^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}\right]\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{N}_{\mathrm{R}t} D_\mu d_{\mathrm{L}ra}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{d}_{\mathrm{R}p}^{\,a} d_{\mathrm{L}ra}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{N}_{\mathrm{R}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{N}_{\mathrm{R}t} D_\mu d_{\mathrm{L}ra}\right)
\end{array}\right. \tag{5.110}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}_{\mathrm{R}} e_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} D^2}(0,0) \left|
\begin{array}{l}
\left(\overline{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\left(\overline{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right)\left(D_\mu e_{\mathrm{L}r} C D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
i\left(D_\mu \overline{N}_{\mathrm{R}s} D_\nu \nu_{\mathrm{L}t}\right)\left(\overline{e}_{\mathrm{R}p}\sigma^{\mu\nu} e_{\mathrm{L}r}\right)
\end{array}\right. \tag{5.111}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}_{\mathrm{R}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 D^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}\right]\left(\overline{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{N}_{\mathrm{R}t} D_\mu e_{\mathrm{L}r}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{N}_{\mathrm{R}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{N}_{\mathrm{R}t} D_\mu e_{\mathrm{L}r}\right)
\end{array}\right. \tag{5.112}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^3 \bar{N}_{\mathrm{R}} D^2}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\,s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}r}\right)\left(D_\mu \nu_{\mathrm{L}s} C D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\,s\,t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}r}\right)\left(D_\mu \nu_{\mathrm{L}s} C D^\mu \nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.113}$$

$$\mathcal{O}^{(1\sim3)}_{\nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}^2 D^2}(0,0) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix},\begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right)\left(D_\mu \overline{N}_{\mathrm{R}r} D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(D_\mu \nu_{\mathrm{L}s} C D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right)\left(D_\mu \overline{N}_{\mathrm{R}r} D^\mu \nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.114}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}^3 D^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\\boxed{s}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} D^\mu \nu_{\mathrm{L}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\,r\,s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} D^\mu \nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.115}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\mathrm{R}}^4 D^2}(0,-4) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\\boxed{s\,t}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{N}_{\mathrm{R}t}\right) \\[4pt]
\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\,r\,s\,t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(D_\mu \overline{N}_{\mathrm{R}s} C D^\mu \overline{N}_{\mathrm{R}t}\right)
\end{array}\right. \tag{5.116}$$

Class $F_{\mathrm{L}} F_{\mathrm{R}} \psi \psi^\dagger D$: 4 types

$$\mathcal{O}_{G_{\mathrm{L}} G_{\mathrm{R}} \nu_{\mathrm{L}} N_{\mathrm{R}} D}(0,2)\left| i G_{\mathrm{L}\ \nu}^{A\mu} G_{\mathrm{R}\ \lambda}^{A\nu}\left(\nu_{\mathrm{L}p} C \gamma^\lambda D_\mu N_{\mathrm{R}r}\right)\right. \tag{5.117}$$

$$\mathcal{O}_{G_L G_R \bar{N}_R N_R D}(0,0) \Big| i G_L^{A\mu}{}_\nu G_R^{A\nu}{}_\lambda \left(\overline{N}_{Rp} \gamma^\lambda D_\mu N_{Rr} \right) \tag{5.118}$$

$$\mathcal{O}_{F_L F_R \nu_L N_R D}(0,2) \Big| i F_L^\mu{}_\nu F_R^\nu{}_\lambda \left(\nu_{Lp} C \gamma^\lambda D_\mu N_{Rr} \right) \tag{5.119}$$

$$\mathcal{O}_{F_L F_R \bar{N}_R N_R D}(0,0) \Big| i F_L^\mu{}_\nu F_R^\nu{}_\lambda \left(\overline{N}_{Rp} \gamma^\lambda D_\mu N_{Rr} \right) \tag{5.120}$$

Class $\psi^2 \psi^{\dagger 2} D^2$: 33 types

$$\mathcal{O}^{(1,2)}_{\bar{\nu}_L N_R \bar{u}_R u_L D^2}(0,0) \Bigg| \begin{matrix} \left(\overline{u}_R^a{}_p u_{Lra} \right) \left(D^\mu \overline{\nu}_{Lt} D_\mu N_{Rs} \right) \\ i \left(D_\nu \overline{\nu}_{Lt} D_\mu N_{Rs} \right) \left(\overline{u}_R^a{}_p \sigma^{\mu\nu} u_{Lra} \right) \end{matrix} \tag{5.121}$$

$$\mathcal{O}^{(1,2)}_{N_R^2 \bar{u}_R u_L D^2}(0,2) \Bigg| \begin{matrix} \mathcal{Y} \left[\tfrac{s}{t} \right] i \left(D_\mu N_{Rs} C D_\nu N_{Rt} \right) \left(\overline{u}_R^a{}_p \sigma^{\mu\nu} u_{Lra} \right) \\ \mathcal{Y} \left[\overline{s\,t} \right] \left(\overline{u}_R^a{}_p u_{Lra} \right) \left(D_\mu N_{Rs} C D^\mu N_{Rt} \right) \end{matrix} \tag{5.122}$$

$$\mathcal{O}^{(1,2)}_{d_R d_L N_R u_L D^2}(1,1) \Bigg| \begin{matrix} \epsilon^{abc} \left(d_{Lpa} C u_{Lrb} \right) \left(D_\mu d_{Rsc} C D^\mu N_{Rt} \right) \\ i \epsilon^{abc} \left(D_\mu d_{Rsc} C D_\nu N_{Rt} \right) \left(d_{Lpa} C \sigma^{\mu\nu} u_{Lrb} \right) \end{matrix} \tag{5.123}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R e_R N_R u_L D^2}(0,2) \Bigg| \begin{matrix} \left(\overline{d}_R^a{}_p u_{Lra} \right) \left(D_\mu e_{Rs} C D^\mu N_{Rt} \right) \\ i \left(D_\mu e_{Rs} C D_\nu N_{Rt} \right) \left(\overline{d}_R^a{}_p \sigma^{\mu\nu} u_{Lra} \right) \end{matrix} \tag{5.124}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_L e_L N_R u_L D^2}(0,2) \Bigg| \begin{matrix} \left(e_{Lp} C u_{Lra} \right) \left(D_\mu \overline{d}_L^a{}_s D^\mu N_{Rt} \right) \\ i \left(D_\mu \overline{d}_L^a{}_s D_\nu N_{Rt} \right) \left(e_{Lp} C \sigma^{\mu\nu} u_{Lra} \right) \end{matrix} \tag{5.125}$$

$$\mathcal{O}^{(1,2)}_{\nu_L N_R u_L \bar{u}_L D^2}(0,2) \Bigg| \begin{matrix} \left(u_{Lpa} C \nu_{Lr} \right) \left(D^\mu \overline{u}_L^a{}_t D_\mu N_{Rs} \right) \\ i \left(D_\nu \overline{u}_L^a{}_t D_\mu N_{Rs} \right) \left(u_{Lpa} C \sigma^{\mu\nu} \nu_{Lr} \right) \end{matrix} \tag{5.126}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_R N_R u_L \bar{u}_L D^2}(0,0) \Bigg| \begin{matrix} \left(\overline{N}_{Rp} u_{Lra} \right) \left(D^\mu \overline{u}_L^a{}_t D_\mu N_{Rs} \right) \\ i \left(D_\nu \overline{u}_L^a{}_t D_\mu N_{Rs} \right) \left(\overline{N}_{Rp} \sigma^{\mu\nu} u_{Lra} \right) \end{matrix} \tag{5.127}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_L e_R \bar{N}_R u_L D^2}(0,0) \Bigg| \begin{matrix} \left(\overline{N}_{Rp} u_{Lra} \right) \left(D_\mu \overline{d}_L^a{}_s D^\mu e_{Rt} \right) \\ i \left(D_\mu \overline{d}_L^a{}_s D_\nu e_{Rt} \right) \left(\overline{N}_{Rp} \sigma^{\mu\nu} u_{Lra} \right) \end{matrix} \tag{5.128}$$

$$\mathcal{O}^{(1,2)}_{d_R^2 \bar{N}_R u_L D^2}(1,-1) \Bigg| \begin{matrix} \mathcal{Y} \left[\overline{s\,t} \right] i \epsilon^{abc} \left(D_\mu d_{Rsb} C D_\nu d_{Rtc} \right) \left(\overline{N}_{Rp} \sigma^{\mu\nu} u_{Lra} \right) \\ \mathcal{Y} \left[\tfrac{s}{t} \right] \epsilon^{abc} \left(\overline{N}_{Rp} u_{Lra} \right) \left(D_\mu d_{Rsb} C D^\mu d_{Rtc} \right) \end{matrix} \tag{5.129}$$

$$\mathcal{O}^{(1,2)}_{d_L \bar{e}_L N_R \bar{u}_R D^2}(0,0) \Bigg| \begin{matrix} \left(\overline{u}_R^a{}_r d_{Lpa} \right) \left(D_\mu \overline{e}_{Ls} D^\mu N_{Rt} \right) \\ i \left(D_\mu \overline{e}_{Ls} D_\nu N_{Rt} \right) \left(\overline{u}_R^a{}_r \sigma^{\mu\nu} d_{Lpa} \right) \end{matrix} \tag{5.130}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R \bar{d}_L N_R \bar{u}_R D^2}(-1,1) \Bigg| \begin{matrix} \epsilon_{abc} \left(\overline{d}_R^a{}_p C \overline{u}_R^b{}_r \right) \left(D_\mu \overline{d}_L^c{}_s D^\mu N_{Rt} \right) \\ i \epsilon_{abc} \left(D_\mu \overline{d}_L^c{}_s D_\nu N_{Rt} \right) \left(\overline{d}_R^a{}_p \sigma^{\mu\nu} C \overline{u}_R^b{}_r \right) \end{matrix} \tag{5.131}$$

$$\mathcal{O}^{(1,2)}_{d_R \bar{e}_R N_R \bar{u}_R D^2}(0,0) \Bigg| \begin{matrix} \left(\overline{e}_{Rp} C \overline{u}_R^a{}_r \right) \left(D_\mu d_{Rsa} C D^\mu N_{Rt} \right) \\ i \left(D_\mu d_{Rsa} C D_\nu N_{Rt} \right) \left(\overline{e}_{Rp} \sigma^{\mu\nu} C \overline{u}_R^a{}_r \right) \end{matrix} \tag{5.132}$$

$$\mathcal{O}^{(1,2)}_{\nu_L N_R \bar{u}_R u_R D^2}(0,2) \Bigg| \begin{matrix} \left(\overline{u}_R^a{}_p \nu_{Lr} \right) \left(D_\mu N_{Rs} C D^\mu u_{Rta} \right) \\ i \left(D_\mu N_{Rs} C D_\nu u_{Rta} \right) \left(\overline{u}_R^a{}_p \sigma^{\mu\nu} \nu_{Lr} \right) \end{matrix} \tag{5.133}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_\mathrm{R} N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^a\right) \left(D_\mu N_{\mathrm{R}s} C D^\mu u_{\mathrm{R}ta}\right) \\ i\left(D_\mu N_{\mathrm{R}s} C D_\nu u_{\mathrm{R}ta}\right) \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{u}_{\mathrm{R}\,r}^a\right) \end{array} \right. \tag{5.134}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{L}^2 \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} D^2}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}}\, i\epsilon_{abc} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{u}_{\mathrm{R}\,r}^a\right) \left(D_\mu \bar{d}_{\mathrm{L}s}^b C D_\nu \bar{d}_{\mathrm{L}t}^c\right) \\ \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}}\, \epsilon_{abc} \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^a\right) \left(D_\mu \bar{d}_{\mathrm{L}s}^b C D^\mu \bar{d}_{\mathrm{L}t}^c\right) \end{array} \right. \tag{5.135}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} \bar{e}_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} D^2}(0,-2) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^a\right) \left(D^\mu \bar{e}_{\mathrm{L}t} D_\mu d_{\mathrm{R}sa}\right) \\ i\left(D_\nu \bar{e}_{\mathrm{L}t} D_\mu d_{\mathrm{R}sa}\right) \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{u}_{\mathrm{R}\,r}^a\right) \end{array} \right. \tag{5.136}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{L} \bar{\nu}_\mathrm{L} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \left(D^\mu \overline{\nu}_{\mathrm{L}t} D_\mu N_{\mathrm{R}s}\right) \\ i\left(D_\nu \overline{\nu}_{\mathrm{L}t} D_\mu N_{\mathrm{R}s}\right) \left(\bar{d}_{\mathrm{R}p}^a \sigma^{\mu\nu} d_{\mathrm{L}ra}\right) \end{array} \right. \tag{5.137}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{L} N_\mathrm{R}^2 D^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}}\, i\left(D_\mu N_{\mathrm{R}s} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{d}_{\mathrm{R}p}^a \sigma^{\mu\nu} d_{\mathrm{L}ra}\right) \\ \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}}\, \left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \left(D_\mu N_{\mathrm{R}s} C D^\mu N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.138}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L} \bar{d}_\mathrm{L} \nu_\mathrm{L} N_\mathrm{R} D^2}(0,2) \left| \begin{array}{l} \left(d_{\mathrm{L}pa} C \nu_{\mathrm{L}r}\right) \left(D_\mu \bar{d}_{\mathrm{L}s}^a D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu \bar{d}_{\mathrm{L}s}^a D_\nu N_{\mathrm{R}t}\right) \left(d_{\mathrm{L}pa} C \sigma^{\mu\nu} \nu_{\mathrm{L}r}\right) \end{array} \right. \tag{5.139}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L} \bar{d}_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(D_\mu \bar{d}_{\mathrm{L}s}^a D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu \bar{d}_{\mathrm{L}s}^a D_\nu N_{\mathrm{R}t}\right) \left(\overline{N}_{\mathrm{R}r} \sigma^{\mu\nu} d_{\mathrm{L}pa}\right) \end{array} \right. \tag{5.140}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R} \nu_\mathrm{L} N_\mathrm{R} D^2}(0,2) \left| \begin{array}{l} \left(\bar{d}_{\mathrm{R}p}^a \nu_{\mathrm{L}r}\right) \left(D_\mu d_{\mathrm{R}sa} C D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu d_{\mathrm{R}sa} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{d}_{\mathrm{R}p}^a \sigma^{\mu\nu} \nu_{\mathrm{L}r}\right) \end{array} \right. \tag{5.141}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R} \bar{N}_\mathrm{R} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right) \left(D_\mu d_{\mathrm{R}sa} C D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu d_{\mathrm{R}sa} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{d}_{\mathrm{R}p}^a \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.142}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \bar{\nu}_\mathrm{L} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \left(D^\mu \overline{\nu}_{\mathrm{L}t} D_\mu N_{\mathrm{R}s}\right) \\ i\left(D_\nu \overline{\nu}_{\mathrm{L}t} D_\mu N_{\mathrm{R}s}\right) \left(\bar{e}_{\mathrm{R}p} \sigma^{\mu\nu} e_{\mathrm{L}r}\right) \end{array} \right. \tag{5.143}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} N_\mathrm{R}^2 D^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}}}\, i\left(D_\mu N_{\mathrm{R}s} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}p} \sigma^{\mu\nu} e_{\mathrm{L}r}\right) \\ \mathcal{Y}\,{\tiny\boxed{\begin{smallmatrix} s & t \end{smallmatrix}}}\, \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \left(D_\mu N_{\mathrm{R}s} C D^\mu N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.144}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L} \bar{e}_\mathrm{L} \nu_\mathrm{L} N_\mathrm{R} D^2}(0,2) \left| \begin{array}{l} \left(e_{\mathrm{L}p} C \nu_{\mathrm{L}r}\right) \left(D_\mu \bar{e}_{\mathrm{L}s} D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu \bar{e}_{\mathrm{L}s} D_\nu N_{\mathrm{R}t}\right) \left(e_{\mathrm{L}p} C \sigma^{\mu\nu} \nu_{\mathrm{L}r}\right) \end{array} \right. \tag{5.145}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L} \bar{e}_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right) \left(D_\mu \bar{e}_{\mathrm{L}s} D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu \bar{e}_{\mathrm{L}s} D_\nu N_{\mathrm{R}t}\right) \left(\overline{N}_{\mathrm{R}r} \sigma^{\mu\nu} e_{\mathrm{L}p}\right) \end{array} \right. \tag{5.146}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{R} \nu_\mathrm{L} N_\mathrm{R} D^2}(0,2) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}p} \nu_{\mathrm{L}r}\right) \left(D_\mu e_{\mathrm{R}s} C D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu e_{\mathrm{R}s} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}p} \sigma^{\mu\nu} \nu_{\mathrm{L}r}\right) \end{array} \right. \tag{5.147}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{R} \bar{N}_\mathrm{R} N_\mathrm{R} D^2}(0,0) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(D_\mu e_{\mathrm{R}s} C D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu e_{\mathrm{R}s} C D_\nu N_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.148}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}D^2}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(D_\nu\overline{\nu}_{\mathrm{L}t}D_\mu N_{\mathrm{R}s}\right)\left(\nu_{\mathrm{L}p}C\sigma^{\mu\nu}\nu_{\mathrm{L}r}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]\left(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}\right)\left(D^\mu\overline{\nu}_{\mathrm{L}t}D_\mu N_{\mathrm{R}s}\right)\end{array}\right.\tag{5.149}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^2 N_{\mathrm{R}}^2 D^2}(0,4)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\left(D_\mu N_{\mathrm{R}s}CD_\nu N_{\mathrm{R}t}\right)\left(\nu_{\mathrm{L}p}C\sigma^{\mu\nu}\nu_{\mathrm{L}r}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix},\begin{smallmatrix}s|t\end{smallmatrix}\right]\left(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}\right)\left(D_\mu N_{\mathrm{R}s}CD^\mu N_{\mathrm{R}t}\right)\end{array}\right.\tag{5.150}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D^2}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(D^\mu\overline{\nu}_{\mathrm{L}t}D_\mu N_{\mathrm{R}s}\right)\\i\left(D_\nu\overline{\nu}_{\mathrm{L}t}D_\mu N_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}\nu_{\mathrm{L}r}\right)\end{array}\right.\tag{5.151}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^2 D^2}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\left(D_\mu N_{\mathrm{R}s}CD_\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}\nu_{\mathrm{L}r}\right)\\\mathcal{Y}\left[\begin{smallmatrix}s|t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(D_\mu N_{\mathrm{R}s}CD^\mu N_{\mathrm{R}t}\right)\end{array}\right.\tag{5.152}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}^2 D^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right]i\left(D_\mu N_{\mathrm{R}s}CD_\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix},\begin{smallmatrix}s|t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(D_\mu N_{\mathrm{R}s}CD^\mu N_{\mathrm{R}t}\right)\end{array}\right.\tag{5.153}$$

Class $F_{\mathrm{L}}\psi^4$: 22 types

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{u}_{\mathrm{R}}^a\right)\\i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(\overline{u}_{\mathrm{R}r}^a\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}sb}\right)\\i\left(\lambda^A\right)_a^b\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}t}\right)G_{\mathrm{L}\mu\nu}^A\left(\overline{u}_{\mathrm{R}r}^a\sigma^{\mu\nu}u_{\mathrm{L}sb}\right)\end{array}\right.\tag{5.154}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(\overline{u}_{\mathrm{R}s}^a u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{u}_{\mathrm{R}s}^a\right)\end{array}\right.\tag{5.155}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\mathrm{L}}d_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{acd}G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{acd}G_{\mathrm{L}}^{A\mu\nu}\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right)\left(\overline{N}_{\mathrm{R}s}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{bcd}G_{\mathrm{L}}^{A\mu\nu}\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right)\left(\overline{N}_{\mathrm{R}s}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{acd}G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{acd}G_{\mathrm{L}}^{A\mu\nu}\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right)\left(\overline{N}_{\mathrm{R}s}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p|r\end{smallmatrix}\right]i\left(\lambda^A\right)_d^b\epsilon^{bcd}G_{\mathrm{L}}^{A\mu\nu}\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right)\left(\overline{N}_{\mathrm{R}s}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\end{array}\right.\tag{5.156}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}e_{\mathrm{L}r}\right)\\i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu\nu}\left(e_{\mathrm{L}r}Cu_{\mathrm{L}tb}\right)\left(\overline{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}s}\right)\\i\left(\lambda^A\right)_a^b G_{\mathrm{L}\mu\nu}^A\left(\overline{d}_{\mathrm{R}p}^a u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}s}\sigma^{\mu\nu}e_{\mathrm{L}r}\right)\end{array}\right.\tag{5.157}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu\nu}\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^b\right)\left(\overline{e}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu\nu}\left(\overline{e}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}t}^b\right)\left(\overline{N}_{\mathrm{R}s}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\i\left(\lambda^A\right)_b^a G_{\mathrm{L}\mu\nu}^A\left(\overline{u}_{\mathrm{R}t}^b d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r}\sigma^{\mu\nu}C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.158}$$

$$\mathcal{O}^{(1\sim6)}_{G_L \bar{d}_R^2 \bar{N}_R \bar{u}_R}(-1,-1) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_L^{A\mu\nu}\left(\overline{N}_{Rs}C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\bar{d}_{Rr}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_L^{A\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_L^{A\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_L^{A\mu\nu}\left(\overline{N}_{Rs}C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\bar{d}_{Rr}^b\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_L^{A\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_L^{A\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \end{vmatrix} \tag{5.159}$$

$$\mathcal{O}^{(1\sim3)}_{G_L \bar{d}_R d_L \nu_L \bar{N}_R}(0,0) \begin{vmatrix} i\left(\lambda^A\right)^b_a \left(\overline{N}_{Rs}\nu_{Lt}\right) G_L^{A\mu\nu}\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}d_{Lrb}\right) \\ i\left(\lambda^A\right)^b_a G_L^{A\mu\nu}\left(d_{Lrb}C\nu_{Lt}\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ i\left(\lambda^A\right)^b_a G_{L\mu\nu}^A\left(\bar{d}_{Rp}^a\nu_{Lt}\right)\left(\overline{N}_{Rs}\sigma^{\mu\nu}d_{Lrb}\right) \end{vmatrix} \tag{5.160}$$

$$\mathcal{O}^{(1\sim3)}_{G_L \bar{d}_R d_L \bar{N}_R^2}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_L^{A\mu\nu}\left(\overline{N}_{Rt}d_{Lrb}\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_{L\mu\nu}^A\left(\bar{d}_{Rp}^a C\overline{N}_{Rt}\right)\left(\overline{N}_{Rs}\sigma^{\mu\nu}d_{Lrb}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right] i\left(\lambda^A\right)^b_a \left(\overline{N}_{Rs}C\overline{N}_{Rt}\right) G_L^{A\mu\nu}\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}d_{Lrb}\right) \end{vmatrix} \tag{5.161}$$

$$\mathcal{O}^{(1\sim3)}_{F_L \nu_L \bar{N}_R \bar{u}_R u_L}(0,0) \begin{vmatrix} iF_L^{\mu\nu}\left(u_{Lsa}C\nu_{Lt}\right)\left(\overline{N}_{Rp}\sigma_{\mu\nu}C\overline{u}_{Rr}^a\right) \\ iF_L^{\mu\nu}\left(\overline{u}_{Rr}^a\nu_{Lt}\right)\left(\overline{N}_{Rp}\sigma_{\mu\nu}u_{Lsa}\right) \\ iF_{L\mu\nu}\left(\overline{N}_{Rp}\nu_{Lt}\right)\left(\overline{u}_{Rr}^a\sigma^{\mu\nu}u_{Lsa}\right) \end{vmatrix} \tag{5.162}$$

$$\mathcal{O}^{(1\sim3)}_{F_L \bar{N}_R^2 \bar{u}_R u_L}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_L^{\mu\nu}\left(\overline{u}_{Rs}^a u_{Lta}\right)\left(\overline{N}_{Rp}\sigma_{\mu\nu}C\overline{N}_{Rr}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_L^{\mu\nu}\left(\overline{N}_{Rr}u_{Lta}\right)\left(\overline{N}_{Rp}\sigma_{\mu\nu}C\overline{u}_{Rs}^a\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] iF_L^{\mu\nu}\left(\overline{N}_{Rr}u_{Lta}\right)\left(\overline{N}_{Rp}\sigma_{\mu\nu}C\overline{u}_{Rs}^a\right) \end{vmatrix} \tag{5.163}$$

$$\mathcal{O}^{(1\sim3)}_{F_L d_L^2 \bar{N}_R u_L}(1,-1) \begin{vmatrix} \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon^{abc}F_L^{\mu\nu}\left(\overline{N}_{Rs}u_{Ltc}\right)\left(d_{Lpa}C\sigma_{\mu\nu}d_{Lrb}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon^{abc}F_L^{\mu\nu}\left(d_{Lrb}Cu_{Ltc}\right)\left(\overline{N}_{Rs}\sigma_{\mu\nu}d_{Lpa}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon^{abc}F_L^{\mu\nu}\left(d_{Lrb}Cu_{Ltc}\right)\left(\overline{N}_{Rs}\sigma_{\mu\nu}d_{Lpa}\right) \end{vmatrix} \tag{5.164}$$

$$\mathcal{O}^{(1\sim3)}_{F_L \bar{d}_R e_L \bar{N}_R u_L}(0,0) \begin{vmatrix} iF_L^{\mu\nu}\left(\overline{N}_{Rs}u_{Lta}\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}e_{Lr}\right) \\ iF_L^{\mu\nu}\left(e_{Lr}Cu_{Lta}\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ iF_{L\mu\nu}\left(\bar{d}_{Rp}^a u_{Lta}\right)\left(\overline{N}_{Rs}\sigma^{\mu\nu}e_{Lr}\right) \end{vmatrix} \tag{5.165}$$

$$\mathcal{O}^{(1\sim3)}_{F_L d_L \bar{e}_R \bar{N}_R \bar{u}_R}(0,-2) \begin{vmatrix} iF_L^{\mu\nu}\left(\overline{N}_{Rs}C\overline{u}_{Rt}^a\right)\left(\bar{e}_{Rr}\sigma_{\mu\nu}d_{Lpa}\right) \\ iF_L^{\mu\nu}\left(\bar{e}_{Rr}C\overline{u}_{Rt}^a\right)\left(\overline{N}_{Rs}\sigma_{\mu\nu}d_{Lpa}\right) \\ iF_{L\mu\nu}\left(\overline{u}_{Rt}^a d_{Lpa}\right)\left(\bar{e}_{Rr}\sigma^{\mu\nu}C\overline{N}_{Rs}\right) \end{vmatrix} \tag{5.166}$$

$$\mathcal{O}^{(1\sim3)}_{F_L \bar{d}_R^2 \bar{N}_R \bar{u}_R}(-1,-1) \begin{vmatrix} \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{abc}F_L^{\mu\nu}\left(\overline{N}_{Rs}C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\bar{d}_{Rr}^b\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{abc}F_L^{\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}F_L^{\mu\nu}\left(\bar{d}_{Rr}^b C\overline{u}_{Rt}^c\right)\left(\bar{d}_{Rp}^a\sigma_{\mu\nu}C\overline{N}_{Rs}\right) \end{vmatrix} \tag{5.167}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm L}\bar{d}_{\rm R}d_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}}(0,0) \left| \begin{array}{l} iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}\nu_{{\rm L}t}\right)\left(\bar{d}_{{\rm R}p}^{a}\sigma_{\mu\nu}d_{{\rm L}ra}\right) \\ iF_{\rm L}{}^{\mu\nu}\left(d_{{\rm L}ra}C\nu_{{\rm L}t}\right)\left(\bar{d}_{{\rm R}p}^{a}\sigma_{\mu\nu}C\overline{N}_{{\rm R}s}\right) \\ iF_{{\rm L}\mu\nu}\left(\bar{d}_{{\rm R}p}^{a}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}s}\sigma^{\mu\nu}d_{{\rm L}ra}\right) \end{array}\right. \tag{5.168}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm L}\bar{d}_{\rm R}d_{\rm L}\bar{N}_{\rm R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}t}d_{{\rm L}ra}\right)\left(\bar{d}_{{\rm R}p}^{a}\sigma_{\mu\nu}C\overline{N}_{{\rm R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{{\rm L}\mu\nu}\left(\bar{d}_{{\rm R}p}^{a}C\overline{N}_{{\rm R}t}\right)\left(\overline{N}_{{\rm R}s}\sigma^{\mu\nu}d_{{\rm L}ra}\right) \\ \mathcal{Y}\left[\,\overline{s\,t}\,\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}C\overline{N}_{{\rm R}t}\right)\left(\bar{d}_{{\rm R}p}^{a}\sigma_{\mu\nu}d_{{\rm L}ra}\right) \end{array}\right. \tag{5.169}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm L}\bar{e}_{\rm R}e_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}}(0,0) \left| \begin{array}{l} iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}\nu_{{\rm L}t}\right)\left(\bar{e}_{{\rm R}p}\sigma_{\mu\nu}e_{{\rm L}r}\right) \\ iF_{\rm L}{}^{\mu\nu}\left(e_{{\rm L}r}C\nu_{{\rm L}t}\right)\left(\bar{e}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}s}\right) \\ iF_{{\rm L}\mu\nu}\left(\bar{e}_{{\rm R}p}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}s}\sigma^{\mu\nu}e_{{\rm L}r}\right) \end{array}\right. \tag{5.170}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm L}\bar{e}_{\rm R}e_{\rm L}\bar{N}_{\rm R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}t}e_{{\rm L}r}\right)\left(\bar{e}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{{\rm L}\mu\nu}\left(\bar{e}_{{\rm R}p}C\overline{N}_{{\rm R}t}\right)\left(\overline{N}_{{\rm R}s}\sigma^{\mu\nu}e_{{\rm L}r}\right) \\ \mathcal{Y}\left[\,\overline{s\,t}\,\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}C\overline{N}_{{\rm R}t}\right)\left(\bar{e}_{{\rm R}p}\sigma_{\mu\nu}e_{{\rm L}r}\right) \end{array}\right. \tag{5.171}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}\nu_{\rm L}^3\bar{N}_{\rm R}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\s\\t\end{smallmatrix}\right] iF_{{\rm L}\mu\nu}\left(\overline{N}_{{\rm R}p}\nu_{{\rm L}t}\right)\left(\nu_{{\rm L}r}C\sigma^{\mu\nu}\nu_{{\rm L}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right] i\left(\nu_{{\rm L}s}C\nu_{{\rm L}t}\right)F_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}\nu_{{\rm L}r}\right) \end{array}\right. \tag{5.172}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm L}\nu_{\rm L}^2\bar{N}_{\rm R}^2}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}r}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}\nu_{{\rm L}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\overline{s\,t}\right] i\left(\nu_{{\rm L}s}C\nu_{{\rm L}t}\right)F_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}r}\right) \\ \mathcal{Y}\left[\overline{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}r}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}\nu_{{\rm L}s}\right) \end{array}\right. \tag{5.173}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}^3}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\\s\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\,r\\s\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}s}\nu_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}r}\right) \end{array}\right. \tag{5.174}$$

$$\mathcal{O}_{F_{\rm L}\bar{N}_{\rm R}^4}(0,-4) \left| \mathcal{Y}\left[\begin{smallmatrix}p\,r\\s\\t\end{smallmatrix}\right] iF_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}r}C\overline{N}_{{\rm R}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}C\overline{N}_{{\rm R}s}\right) \right. \tag{5.175}$$

Class $F_{\rm L}\psi^2\psi^{\dagger 2}$: 98 types

$$\mathcal{O}_{G_{\rm L}\bar{\nu}_{\rm L}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}}(0,0) \left| i\left(\lambda^A\right)_a^b\left(\bar{\nu}_{{\rm L}t}N_{{\rm R}s}\right)G_{\rm L}^{A\mu\nu}\left(\bar{u}_{{\rm R}p}^{a}\sigma_{\mu\nu}u_{{\rm L}rb}\right) \right. \tag{5.176}$$

$$\mathcal{O}_{G_{\rm L}N_{\rm R}^2\bar{u}_{\rm R}u_{\rm L}}(0,2) \left| \mathcal{Y}\left[\,\overline{s\,t}\,\right] i\left(\lambda^A\right)_a^b\left(N_{{\rm R}s}C N_{{\rm R}t}\right)G_{\rm L}^{A\mu\nu}\left(\bar{u}_{{\rm R}p}^{a}\sigma_{\mu\nu}u_{{\rm L}rb}\right) \right. \tag{5.177}$$

$$\mathcal{O}^{(1,2)}_{G_{\rm L}d_{\rm R}d_{\rm L}N_{\rm R}u_{\rm L}}(1,1) \left| \begin{array}{l} i\left(\lambda^A\right)_d^b\epsilon^{acd}G_{\rm L}^{A\mu\nu}\left(d_{{\rm R}sc}C N_{{\rm R}t}\right)\left(d_{{\rm L}pa}C\sigma_{\mu\nu}u_{{\rm L}rb}\right) \\ i\left(\lambda^A\right)_d^a\epsilon^{bcd}G_{\rm L}^{A\mu\nu}\left(d_{{\rm R}sc}C N_{{\rm R}t}\right)\left(d_{{\rm L}pa}C\sigma_{\mu\nu}u_{{\rm L}rb}\right) \end{array}\right. \tag{5.178}$$

$$\mathcal{O}_{G_{\rm L}\bar{d}_{\rm R}e_{\rm R}N_{\rm R}u_{\rm L}}(0,2) \left| i\left(\lambda^A\right)_a^b G_{\rm L}^{A\mu\nu}\left(e_{{\rm R}s}C N_{{\rm R}t}\right)\left(\bar{d}_{{\rm R}p}^{a}\sigma_{\mu\nu}u_{{\rm L}rb}\right) \right. \tag{5.179}$$

$$\mathcal{O}_{G_{\rm L}\bar{d}_{\rm L}e_{\rm L}N_{\rm R}u_{\rm L}}(0,2) \left| i\left(\lambda^A\right)_b^a G_{\rm L}^{A\mu\nu}\left(\bar{d}_{{\rm L}s}^{b}N_{{\rm R}t}\right)\left(e_{{\rm L}p}C\sigma_{\mu\nu}u_{{\rm L}ra}\right) \right. \tag{5.180}$$

$$\mathcal{O}_{G_{\rm L}\nu_{\rm L}N_{\rm R}u_{\rm L}\bar{u}_{\rm L}}(0,2) \left| i\left(\lambda^A\right)_b^a G_{\rm L}^{A\mu\nu}\left(\bar{u}_{{\rm L}t}^{b}N_{{\rm R}s}\right)\left(u_{{\rm L}pa}C\sigma_{\mu\nu}\nu_{{\rm L}r}\right) \right. \tag{5.181}$$

$$\mathcal{O}_{G_{\rm L}\bar{\nu}_{\rm L}\bar{N}_{\rm R}u_{\rm L}\bar{u}_{\rm L}}(0,-2) \left| i\left(\lambda^A\right)_b^a G_{\rm L}^{A\mu\nu}\left(\bar{u}_{{\rm L}s}^{b}C\bar{\nu}_{{\rm L}t}\right)\left(\overline{N}_{{\rm R}p}\sigma_{\mu\nu}u_{{\rm L}ra}\right) \right. \tag{5.182}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,0)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{u}_{\mathrm{L}t}^b N_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.183}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{L}e_\mathrm{R}\bar{N}_\mathrm{R}u_\mathrm{L}}(0,0)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.184}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}^2\bar{N}_\mathrm{R}u_\mathrm{L}}^{(1,2)}(1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,i\left(\lambda^A\right)_d^b \epsilon^{acd}G_\mathrm{L}^{A\mu\nu}\left(d_{\mathrm{R}sb}Cd_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\\[6pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,i\left(\lambda^A\right)_d^b \epsilon^{acd}G_\mathrm{L}^{A\mu\nu}\left(d_{\mathrm{R}sb}Cd_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\end{array}\right. \tag{5.185}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)_b^a \left(\bar{e}_{\mathrm{L}s}N_{\mathrm{R}t}\right)G_\mathrm{L}^{A\mu\nu}\left(\bar{u}_{\mathrm{R}r}^b\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.186}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}\bar{d}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}}^{(1,2)}(-1,1)\left|\begin{array}{l}i\epsilon_{acd}\left(\lambda^A\right)_b^d G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^c N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^b\right)\\[6pt]i\epsilon_{abd}\left(\lambda^A\right)_c^d G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^c N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^b\right)\end{array}\right. \tag{5.187}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)_a^b G_\mathrm{L}^{A\mu\nu}\left(d_{\mathrm{R}sb}CN_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\right. \tag{5.188}$$

$$\mathcal{O}_{G_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,2)\left| i\left(\lambda^A\right)_a^b G_\mathrm{L}^{A\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tb}\right)\left(\bar{u}_{\mathrm{R}p}^a\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.189}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left| i\left(\lambda^A\right)_a^b G_\mathrm{L}^{A\mu\nu}\left(\bar{\nu}_{\mathrm{L}t}u_{\mathrm{R}sb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\right. \tag{5.190}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)_a^b G_\mathrm{L}^{A\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\right. \tag{5.191}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{L}^2\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}^{(1,2)}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,i\epsilon_{acd}\left(\lambda^A\right)_b^d G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b C\bar{d}_{\mathrm{L}t}^c\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\\[6pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,i\epsilon_{acd}\left(\lambda^A\right)_b^d G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b C\bar{d}_{\mathrm{L}t}^c\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\end{array}\right. \tag{5.192}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left| i\left(\lambda^A\right)_a^b G_\mathrm{L}^{A\mu\nu}\left(\bar{e}_{\mathrm{L}t}d_{\mathrm{R}sb}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}r}^a\right)\right. \tag{5.193}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}^2N_\mathrm{R}u_\mathrm{R}}^{(1,2)}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\lambda^A\right)_d^b \epsilon^{acd}G_\mathrm{L}^{A\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tc}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\\[6pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\,i\left(\lambda^A\right)_d^b \epsilon^{acd}G_\mathrm{L}^{A\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tc}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\end{array}\right. \tag{5.194}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)_a^b \left(\bar{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\right. \tag{5.195}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{L}N_\mathrm{R}^2}(0,2)\left| \mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,i\left(\lambda^A\right)_a^b \left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{R}p}^a\sigma_{\mu\nu}d_{\mathrm{L}rb}\right)\right. \tag{5.196}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{L}}(0,0)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{u}_{\mathrm{L}t}^b N_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.197}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}}(0,2)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.198}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}}(0,-2)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{e}_{\mathrm{L}s}C\bar{u}_{\mathrm{L}t}^b\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.199}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}d_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}}^{(1,2)}(1,-1)\left|\begin{array}{l}i\left(\lambda^A\right)_d^b \epsilon^{acd}G_\mathrm{L}^{A\mu\nu}\left(d_{\mathrm{R}sb}Cu_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\\[6pt]i\left(\lambda^A\right)_d^a \epsilon^{bcd}G_\mathrm{L}^{A\mu\nu}\left(d_{\mathrm{R}sb}Cu_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\end{array}\right. \tag{5.200}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(0,-2)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b C\bar{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.201}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)_b^a G_\mathrm{L}^{A\mu\nu}\left(\bar{d}_{\mathrm{L}s}^b N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.202}$$

$$\mathcal{O}^{(1,2)}_{G_\mathrm{L}\bar{d}^2_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{L}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G^{A\mu\nu}_\mathrm{L}\left(\overline{u}^c_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{d}^b_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\overline{p\,r}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G^{A\mu\nu}_\mathrm{L}\left(\overline{u}^c_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{d}^b_{\mathrm{R}r}\right) \end{array}\right. \tag{5.203}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}e_\mathrm{L}N_\mathrm{R}u_\mathrm{R}}(0,2)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tb}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}e_{\mathrm{L}r}\right)\right. \tag{5.204}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\nu_\mathrm{L}N_\mathrm{R}}(0,2)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(d_{\mathrm{R}sb}CN_{\mathrm{R}t}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.205}$$

$$\mathcal{O}^{(1,2)}_{G_\mathrm{L}\bar{d}_\mathrm{R}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}}(-1,-1) \left| \begin{array}{l} i\epsilon_{acd}\left(\lambda^A\right)^d_b G^{A\mu\nu}_\mathrm{L}\left(\overline{d}^b_{\mathrm{L}s}C\overline{u}^c_{\mathrm{L}t}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \\ i\epsilon_{abd}\left(\lambda^A\right)^d_c G^{A\mu\nu}_\mathrm{L}\left(\overline{d}^b_{\mathrm{L}s}C\overline{u}^c_{\mathrm{L}t}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \end{array}\right. \tag{5.206}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}e_\mathrm{R}\bar{N}_\mathrm{R}u_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(e_{\mathrm{R}s}Cu_{\mathrm{R}tb}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.207}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(0,-2)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(\overline{\nu}_{\mathrm{L}t}d_{\mathrm{R}sb}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.208}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\bar{N}_\mathrm{R}N_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(d_{\mathrm{R}sb}CN_{\mathrm{R}t}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.209}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{d}_\mathrm{L}e_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)^b_a G^{A\mu\nu}_\mathrm{L}\left(\overline{d}^a_{\mathrm{L}s}u_{\mathrm{R}tb}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}e_{\mathrm{L}p}\right)\right. \tag{5.210}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}\bar{e}_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}}(0,-2)\left| i\left(\lambda^A\right)^a_b G^{A\mu\nu}_\mathrm{L}\left(\overline{u}^b_{\mathrm{L}t}d_{\mathrm{R}sa}\right)\left(\overline{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.211}$$

$$\mathcal{O}_{G_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}\bar{u}_\mathrm{L}}(0,0)\left| i\left(\lambda^A\right)^a_b G^{A\mu\nu}_\mathrm{L}\left(\overline{u}^b_{\mathrm{L}t}u_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.212}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}\bar{d}_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R}}(0,0)\left| i\left(\lambda^A\right)^a_b G^{A\mu\nu}_\mathrm{L}\left(\overline{d}^b_{\mathrm{L}t}d_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.213}$$

$$\mathcal{O}_{G_\mathrm{L}\bar{N}^2_\mathrm{R}u_\mathrm{R}\bar{u}_\mathrm{L}}(0,-2)\left| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b G^{A\mu\nu}_\mathrm{L}\left(\overline{u}^b_{\mathrm{L}t}u_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.214}$$

$$\mathcal{O}_{G_\mathrm{L}d_\mathrm{R}\bar{d}_\mathrm{L}\bar{N}^2_\mathrm{R}}(0,-2)\left| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_b G^{A\mu\nu}_\mathrm{L}\left(\overline{d}^b_{\mathrm{L}t}d_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right)\right. \tag{5.215}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,0)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{u}^a_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.216}$$

$$\mathcal{O}_{F_\mathrm{L}N^2_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left| \mathcal{Y}\left[\overline{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F^{\mu\nu}_\mathrm{L}\left(\overline{u}^a_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.217}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{R}d_\mathrm{L}N_\mathrm{R}u_\mathrm{L}}(1,1)\left| i\epsilon^{abc}F^{\mu\nu}_\mathrm{L}\left(d_{\mathrm{R}sc}CN_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}u_{\mathrm{L}rb}\right)\right. \tag{5.218}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}e_\mathrm{R}N_\mathrm{R}u_\mathrm{L}}(0,2)\left| iF^{\mu\nu}_\mathrm{L}\left(e_{\mathrm{R}s}CN_{\mathrm{R}t}\right)\left(\overline{d}^a_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.219}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{L}e_\mathrm{L}N_\mathrm{R}u_\mathrm{L}}(0,2)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{d}^a_{\mathrm{L}s}N_{\mathrm{R}t}\right)\left(e_{\mathrm{L}p}C\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.220}$$

$$\mathcal{O}_{F_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,2)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{u}^a_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(u_{\mathrm{L}pa}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right)\right. \tag{5.221}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,-2)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{u}^a_{\mathrm{L}s}C\overline{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.222}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,0)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{u}^a_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.223}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{L}e_\mathrm{R}\bar{N}_\mathrm{R}u_\mathrm{L}}(0,0)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{d}^a_{\mathrm{L}s}e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.224}$$

$$\mathcal{O}_{F_\mathrm{L}d^2_\mathrm{R}\bar{N}_\mathrm{R}u_\mathrm{L}}(1,-1)\left| \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right] i\epsilon^{abc}F^{\mu\nu}_\mathrm{L}\left(d_{\mathrm{R}sb}Cd_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}u_{\mathrm{L}ra}\right)\right. \tag{5.225}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,0)\left| iF^{\mu\nu}_\mathrm{L}\left(\overline{e}_{\mathrm{L}s}N_{\mathrm{R}t}\right)\left(\overline{u}^a_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right)\right. \tag{5.226}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}\bar{d}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}}(-1,1)\Big| i\epsilon_{abc}F_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,c}N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,b}\right) \tag{5.227}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{R}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(d_{\mathrm{R}sa}CN_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,a}\right) \tag{5.228}$$

$$\mathcal{O}_{F_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}ta}\right)\left(\bar{u}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.229}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{\nu}_{\mathrm{L}t}u_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,a}\right) \tag{5.230}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}ta}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,a}\right) \tag{5.231}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{L}^2\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(-1,-1)\Big|\mathcal{Y}\left[\genfrac{}{}{0pt}{}{s}{t}\right] i\epsilon_{abc}F_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,b}C\bar{d}_{\mathrm{L}t}^{\,c}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,a}\right) \tag{5.232}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{R}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{e}_{\mathrm{L}t}d_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\bar{u}_{\mathrm{R}\,r}^{\,a}\right) \tag{5.233}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}^2N_\mathrm{R}u_\mathrm{R}}(1,1)\Big|\mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon^{abc}F_\mathrm{L}{}^{\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}tc}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}d_{\mathrm{L}rb}\right) \tag{5.234}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}d_{\mathrm{L}ra}\right) \tag{5.235}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{L}N_\mathrm{R}^2}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}d_{\mathrm{L}ra}\right) \tag{5.236}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{L}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{u}_{\mathrm{L}t}^{\,a}N_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right) \tag{5.237}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}}(0,2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,a}N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.238}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}}(0,-2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{e}_{\mathrm{L}s}C\bar{u}_{\mathrm{L}t}^{\,a}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right) \tag{5.239}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{R}d_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}}(1,-1)\Big| i\epsilon^{abc}F_\mathrm{L}{}^{\mu\nu}\left(d_{\mathrm{R}sb}Cu_{\mathrm{R}tc}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right) \tag{5.240}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(0,-2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,a}C\bar{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right) \tag{5.241}$$

$$\mathcal{O}_{F_\mathrm{L}d_\mathrm{L}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,a}N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}d_{\mathrm{L}pa}\right) \tag{5.242}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}^2N_\mathrm{R}\bar{u}_\mathrm{L}}(-1,1)\Big|\mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{abc}F_\mathrm{L}{}^{\mu\nu}\left(\bar{u}_{\mathrm{L}t}^{\,c}N_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\bar{d}_{\mathrm{R}\,r}^{\,b}\right) \tag{5.243}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}e_\mathrm{L}N_\mathrm{R}u_\mathrm{R}}(0,2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(N_{\mathrm{R}s}Cu_{\mathrm{R}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}e_{\mathrm{L}r}\right) \tag{5.244}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\nu_\mathrm{L}N_\mathrm{R}}(0,2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(d_{\mathrm{R}sa}CN_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.245}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}}(-1,-1)\Big| i\epsilon_{abc}F_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,b}C\bar{u}_{\mathrm{L}t}^{\,c}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.246}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}e_\mathrm{R}\bar{N}_\mathrm{R}u_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(e_{\mathrm{R}s}Cu_{\mathrm{R}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.247}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(0,-2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{\nu}_{\mathrm{L}t}d_{\mathrm{R}sa}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.248}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{R}d_\mathrm{R}\bar{N}_\mathrm{R}N_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(d_{\mathrm{R}sa}CN_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.249}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{e}_\mathrm{R}e_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}p}\sigma_{\mu\nu}e_{\mathrm{L}r}\right) \tag{5.250}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{e}_\mathrm{R}e_\mathrm{L}N_\mathrm{R}^2}(0,2)\Big|\mathcal{Y}\left[\boxed{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F_\mathrm{L}{}^{\mu\nu}\left(\bar{e}_{\mathrm{R}p}\sigma_{\mu\nu}e_{\mathrm{L}r}\right) \tag{5.251}$$

$$\mathcal{O}_{F_\mathrm{L}e_\mathrm{L}\bar{e}_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}}(0,2)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{e}_{\mathrm{L}s}N_{\mathrm{R}t}\right)\left(e_{\mathrm{L}p}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.252}$$

$$\mathcal{O}_{F_\mathrm{L}\bar{d}_\mathrm{L}e_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}}(0,0)\Big| iF_\mathrm{L}{}^{\mu\nu}\left(\bar{d}_{\mathrm{L}s}^{\,a}u_{\mathrm{R}ta}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}e_{\mathrm{L}p}\right) \tag{5.253}$$

$$\mathcal{O}_{F_{\mathrm{L}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,-2)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{e}_{\mathrm{L}s}C\overline{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}e_{\mathrm{L}p}\right) \tag{5.254}$$

$$\mathcal{O}_{F_{\mathrm{L}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{e}_{\mathrm{L}s}N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}\sigma_{\mu\nu}e_{\mathrm{L}p}\right) \tag{5.255}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(e_{\mathrm{R}s}CN_{\mathrm{R}t}\right)\left(\overline{e}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.256}$$

$$\mathcal{O}_{F_{\mathrm{L}}d_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{u}_{\mathrm{L}t}^{a}d_{\mathrm{R}sa}\right)\left(\overline{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.257}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,-2)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}t}e_{\mathrm{R}s}\right)\left(\overline{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.258}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(e_{\mathrm{R}s}CN_{\mathrm{R}t}\right)\left(\overline{e}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.259}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}^{2}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,2)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\nu_{\mathrm{L}p}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.260}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}^{2}N_{\mathrm{R}}^{2}}(0,4)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F_{\mathrm{L}}{}^{\mu\nu}\left(\nu_{\mathrm{L}p}C\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.261}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{u}_{\mathrm{L}t}^{a}u_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.262}$$

$$\mathcal{O}_{F_{\mathrm{L}}d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{d}_{\mathrm{L}t}^{a}d_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.263}$$

$$\mathcal{O}_{F_{\mathrm{L}}e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{e}_{\mathrm{L}t}e_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.264}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}^{2}\bar{N}_{\mathrm{R}}}(0,-2)\Big| \mathcal{Y}\left[\boxed{s\,t}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}s}C\overline{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.265}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\Big| iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.266}$$

$$\mathcal{O}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^{2}}(0,2)\Big| \mathcal{Y}\left[\boxed{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F_{\mathrm{L}}{}^{\mu\nu}\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}\nu_{\mathrm{L}r}\right) \tag{5.267}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{u}_{\mathrm{L}t}^{a}u_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.268}$$

$$\mathcal{O}_{F_{\mathrm{L}}d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{d}_{\mathrm{L}t}^{a}d_{\mathrm{R}sa}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.269}$$

$$\mathcal{O}_{F_{\mathrm{L}}e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{e}_{\mathrm{L}t}e_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.270}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}^{2}\bar{N}_{\mathrm{R}}^{2}}(0,-4)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}s}C\overline{\nu}_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.271}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}N_{\mathrm{R}}}(0,-2)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu\nu}\left(\overline{\nu}_{\mathrm{L}t}N_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.272}$$

$$\mathcal{O}_{F_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}N_{\mathrm{R}}^{2}}(0,0)\Big| \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right] i\left(N_{\mathrm{R}s}CN_{\mathrm{R}t}\right)F_{\mathrm{L}}{}^{\mu\nu}\left(\overline{N}_{\mathrm{R}p}\sigma_{\mu\nu}C\overline{N}_{\mathrm{R}r}\right) \tag{5.273}$$

5.5 Lists of the dim-9 operators

5.5.1 Classes involving two-fermions

Class $F_{\mathrm{L}}{}^{2}\psi^{2}D^{2}$: 4 types

$$\mathcal{O}^{(1,2)}_{G_{\mathrm{L}}{}^{2}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D^{2}}(0,0)\left|\begin{array}{l} G_{\mathrm{L}\,\nu\lambda}^{A}G_{\mathrm{L}}^{A\nu\lambda}\left(D_{\mu}\overline{N}_{\mathrm{R}p}D^{\mu}\nu_{\mathrm{L}r}\right)\\ iG_{\mathrm{L}}^{A\lambda\rho}G_{\mathrm{L}\,\mu\nu}^{A}\left(D_{\lambda}\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}D_{\rho}\nu_{\mathrm{L}r}\right) \end{array}\right. \tag{5.274}$$

$$\mathcal{O}^{(1,2)}_{G_{\mathrm{L}}{}^{2}\bar{N}_{\mathrm{R}}^{2}D^{2}}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{p\,r}\right]G_{\mathrm{L}\,\nu\lambda}^{A}G_{\mathrm{L}}^{A\nu\lambda}\left(D_{\mu}\overline{N}_{\mathrm{R}p}CD^{\mu}\overline{N}_{\mathrm{R}r}\right)\\ \mathcal{Y}\left[\boxed{p\,r}\right]iG_{\mathrm{L}}^{A\lambda\rho}G_{\mathrm{L}\,\mu\nu}^{A}\left(D_{\lambda}\overline{N}_{\mathrm{R}p}\sigma^{\mu\nu}CD_{\rho}\overline{N}_{\mathrm{R}r}\right) \end{array}\right. \tag{5.275}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}{}^2\nu_{\rm L}\bar{N}_{\rm R}D^2}(0,0)\left|\begin{array}{l}F_{{\rm L}\nu\lambda}F_{\rm L}{}^{\nu\lambda}\left(D_\mu\overline{N}_{{\rm R}p}D^\mu\nu_{{\rm L}r}\right)\\iF_{{\rm L}\mu\nu}F_{\rm L}{}^{\lambda\rho}\left(D_\lambda\overline{N}_{{\rm R}p}\sigma^{\mu\nu}D_\rho\nu_{{\rm L}r}\right)\end{array}\right.\tag{5.276}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}{}^2\bar{N}_{\rm R}^2D^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{p\,r}\right]F_{{\rm L}\nu\lambda}F_{\rm L}{}^{\nu\lambda}\left(D_\mu\overline{N}_{{\rm R}p}CD^\mu\overline{N}_{{\rm R}r}\right)\\\mathcal{Y}\left[\boxed{p\,r}\right]iF_{{\rm L}\mu\nu}F_{\rm L}{}^{\lambda\rho}\left(D_\lambda\overline{N}_{{\rm R}p}\sigma^{\mu\nu}CD_\rho\overline{N}_{{\rm R}r}\right)\end{array}\right.\tag{5.277}$$

Class $F_{\rm L}F_{\rm R}\psi^2D^2$: 4 types

$$\mathcal{O}_{G_{\rm L}G_{\rm R}\nu_{\rm L}\bar{N}_{\rm R}D^2}(0,0)\left|G_{\rm L}^{A\mu}{}_\lambda G_{\rm R}^{A\nu\lambda}\left(\overline{N}_{{\rm R}p}D_\mu D_\nu\nu_{{\rm L}r}\right)\right.\tag{5.278}$$

$$\mathcal{O}_{G_{\rm L}G_{\rm R}\bar{N}_{\rm R}^2D^2}(0,-2)\left|\mathcal{Y}\left[\boxed{p\,r}\right]G_{\rm L}^{A\mu}{}_\lambda G_{\rm R}^{A\nu\lambda}\left(\overline{N}_{{\rm R}p}CD_\mu D_\nu\overline{N}_{{\rm R}r}\right)\right.\tag{5.279}$$

$$\mathcal{O}_{F_{\rm L}F_{\rm R}\nu_{\rm L}\bar{N}_{\rm R}D^2}(0,0)\left|F_{\rm L}^{\mu}{}_\lambda F_{\rm R}^{\nu\lambda}\left(\overline{N}_{{\rm R}p}D_\mu D_\nu\nu_{{\rm L}r}\right)\right.\tag{5.280}$$

$$\mathcal{O}_{F_{\rm L}F_{\rm R}\bar{N}_{\rm R}^2D^2}(0,-2)\left|\mathcal{Y}\left[\boxed{p\,r}\right]F_{\rm L}^{\mu}{}_\lambda F_{\rm R}^{\nu\lambda}\left(\overline{N}_{{\rm R}p}CD_\mu D_\nu\overline{N}_{{\rm R}r}\right)\right.\tag{5.281}$$

Class $F_{\rm L}{}^2\psi^{\dagger2}D^2$: 4 types

$$\mathcal{O}_{G_{\rm L}{}^2\bar{\nu}_{\rm L}N_{\rm R}D^2}(0,0)\left|G_{{\rm L}\nu\lambda}^A G_{\rm L}^{A\nu\lambda}\left(D^\mu\overline{\nu}_{{\rm L}r}D_\mu N_{{\rm R}p}\right)\right.\tag{5.282}$$

$$\mathcal{O}_{G_{\rm L}{}^2N_{\rm R}^2D^2}(0,2)\left|\mathcal{Y}\left[\boxed{p\,r}\right]G_{{\rm L}\nu\lambda}^A G_{\rm L}^{A\nu\lambda}\left(D_\mu N_{{\rm R}p}CD^\mu N_{{\rm R}r}\right)\right.\tag{5.283}$$

$$\mathcal{O}_{F_{\rm L}{}^2\bar{\nu}_{\rm L}N_{\rm R}D^2}(0,0)\left|F_{{\rm L}\nu\lambda}F_{\rm L}{}^{\nu\lambda}\left(D^\mu\overline{\nu}_{{\rm L}r}D_\mu N_{{\rm R}p}\right)\right.\tag{5.284}$$

$$\mathcal{O}_{F_{\rm L}{}^2N_{\rm R}^2D^2}(0,2)\left|\mathcal{Y}\left[\boxed{p\,r}\right]F_{{\rm L}\nu\lambda}F_{\rm L}{}^{\nu\lambda}\left(D_\mu N_{{\rm R}p}CD^\mu N_{{\rm R}r}\right)\right.\tag{5.285}$$

Class $F_{\rm L}{}^3\psi^2$: 6 types

$$\mathcal{O}^{(1,2)}_{G_{\rm L}{}^3\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}id^{ABC}G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu\nu}G_{{\rm L}\lambda\rho}^C\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}\nu_{{\rm L}r}\right)\\f^{ABC}\left(\overline{N}_{{\rm R}p}\nu_{{\rm L}r}\right)G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu}{}_\lambda G_{\rm L}^{C\nu\lambda}\end{array}\right.\tag{5.286}$$

$$\mathcal{O}^{(1,2)}_{G_{\rm L}{}^3\bar{N}_{\rm R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{array}{c}p\\r\end{array}}\right]id^{ABC}G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu\nu}G_{{\rm L}\lambda\rho}^C\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}C\overline{N}_{{\rm R}r}\right)\\\mathcal{Y}\left[\boxed{p\,r}\right]f^{ABC}\left(\overline{N}_{{\rm R}p}C\overline{N}_{{\rm R}r}\right)G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu}{}_\lambda G_{\rm L}^{C\nu\lambda}\end{array}\right.\tag{5.287}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}G_{\rm L}{}^2\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}iF_{{\rm L}\mu\nu}G_{{\rm L}\lambda\rho}^A G_{\rm L}^{A\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}\nu_{{\rm L}r}\right)\\iF_{{\rm L}\mu\nu}G_{\rm L}^{A\mu}{}_\lambda G_{\rm L}^{A\lambda}{}_\rho\left(\overline{N}_{{\rm R}p}\sigma^{\nu\rho}\nu_{{\rm L}r}\right)\end{array}\right.\tag{5.288}$$

$$\mathcal{O}^{(1,2)}_{F_{\rm L}G_{\rm L}{}^2\bar{N}_{\rm R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{array}{c}p\\r\end{array}}\right]iF_{{\rm L}\mu\nu}G_{{\rm L}\lambda\rho}^A G_{\rm L}^{A\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}C\overline{N}_{{\rm R}r}\right)\\\mathcal{Y}\left[\boxed{\begin{array}{c}p\\r\end{array}}\right]iF_{{\rm L}\mu\nu}G_{\rm L}^{A\mu}{}_\lambda G_{\rm L}^{A\lambda}{}_\rho\left(\overline{N}_{{\rm R}p}\sigma^{\nu\rho}C\overline{N}_{{\rm R}r}\right)\end{array}\right.\tag{5.289}$$

$$\mathcal{O}_{F_{\rm L}{}^3\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|iF_{{\rm L}\lambda\rho}F_{{\rm L}\mu\nu}F_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}\nu_{{\rm L}r}\right)\right.\tag{5.290}$$

$$\mathcal{O}_{F_{\rm L}{}^3\bar{N}_{\rm R}^2}(0,-2)\left|\mathcal{Y}\left[\boxed{\begin{array}{c}p\\r\end{array}}\right]iF_{{\rm L}\lambda\rho}F_{{\rm L}\mu\nu}F_{\rm L}{}^{\mu\nu}\left(\overline{N}_{{\rm R}p}\sigma^{\lambda\rho}C\overline{N}_{{\rm R}r}\right)\right.\tag{5.291}$$

Class $F_{\rm L}{}^3\psi^{\dagger2}$: 2 types

$$\mathcal{O}_{G_{\rm L}{}^3\bar{\nu}_{\rm L}N_{\rm R}}(0,0)\left|f^{ABC}\left(\overline{\nu}_{{\rm L}r}N_{{\rm R}p}\right)G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu}{}_\lambda G_{\rm L}^{C\nu\lambda}\right.\tag{5.292}$$

$$\mathcal{O}_{G_{\rm L}{}^3N_{\rm R}^2}(0,2)\left|\mathcal{Y}\left[\boxed{p\,r}\right]f^{ABC}\left(N_{{\rm R}p}CN_{{\rm R}r}\right)G_{{\rm L}\mu\nu}^A G_{\rm L}^{B\mu}{}_\lambda G_{\rm L}^{C\nu\lambda}\right.\tag{5.293}$$

Class $F_\mathrm{L} F_\mathrm{R}{}^2 \psi^2$: 8 types

$$\mathcal{O}_{G_\mathrm{L} G_\mathrm{R}{}^2 \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \Big| i d^{ABC} G^A_{\mathrm{L}\,\mu\nu} G^B_{\mathrm{R}\,\lambda\rho} G^{C\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} \nu_{\mathrm{L}r} \right) \tag{5.294}$$

$$\mathcal{O}_{F_\mathrm{R} G_\mathrm{L} G_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \Big| i F_{\mathrm{R}\,\lambda\rho} G^A_{\mathrm{L}\,\mu\nu} G^{A\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} \nu_{\mathrm{L}r} \right) \tag{5.295}$$

$$\mathcal{O}_{G_\mathrm{L} G_\mathrm{R}{}^2 \bar{N}_\mathrm{R}^2}(0,-2) \Big| \mathcal{Y} \left[\tfrac{p}{r} \right] i d^{ABC} G^A_{\mathrm{L}\,\mu\nu} G^B_{\mathrm{R}\,\lambda\rho} G^{C\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r} \right) \tag{5.296}$$

$$\mathcal{O}_{F_\mathrm{R} G_\mathrm{L} G_\mathrm{R} \bar{N}_\mathrm{R}^2}(0,-2) \Big| \mathcal{Y} \left[\tfrac{p}{r} \right] i F_{\mathrm{R}\,\lambda\rho} G^A_{\mathrm{L}\,\mu\nu} G^{A\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r} \right) \tag{5.297}$$

$$\mathcal{O}_{F_\mathrm{L} G_\mathrm{R}{}^2 \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \Big| i F_{\mathrm{L}\,\mu\nu} G^A_{\mathrm{R}\,\lambda\rho} G^{A\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} \nu_{\mathrm{L}r} \right) \tag{5.298}$$

$$\mathcal{O}_{F_\mathrm{L} F_\mathrm{R}{}^2 \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \Big| i F_{\mathrm{L}\,\mu\nu} F_{\mathrm{R}\,\lambda\rho} F^{\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} \nu_{\mathrm{L}r} \right) \tag{5.299}$$

$$\mathcal{O}_{F_\mathrm{L} G_\mathrm{R}{}^2 \bar{N}_\mathrm{R}^2}(0,-2) \Big| \mathcal{Y} \left[\tfrac{p}{r} \right] i F_{\mathrm{L}\,\mu\nu} G^A_{\mathrm{R}\,\lambda\rho} G^{A\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r} \right) \tag{5.300}$$

$$\mathcal{O}_{F_\mathrm{L} F_\mathrm{R}{}^2 \bar{N}_\mathrm{R}^2}(0,-2) \Big| \mathcal{Y} \left[\tfrac{p}{r} \right] i F_{\mathrm{L}\,\mu\nu} F_{\mathrm{R}\,\lambda\rho} F^{\,\lambda\rho}_\mathrm{R} \left(\overline{N}_{\mathrm{R}p} \sigma^{\mu\nu} C \overline{N}_{\mathrm{R}r} \right) \tag{5.301}$$

5.5.2 Classes involving four-fermions

Class $\psi^3 \psi^\dagger D^3$: 42 types

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L} N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{L} D^3}(0,2) \left| \begin{array}{l} i \left(\overline{u}^a_{\mathrm{R}p} D_\mu D_\nu \nu_{\mathrm{L}s} \right) \left(u_{\mathrm{L}ra} C \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \\ i \left(D_\mu u_{\mathrm{L}ra} C D_\nu \nu_{\mathrm{L}s} \right) \left(\overline{u}^a_{\mathrm{R}p} \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \end{array} \right. \tag{5.302}$$

$$\mathcal{O}^{(1,2)}_{\bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{L} D^3}(0,-2) \left| \begin{array}{l} i \left(\overline{N}_{\mathrm{R}p} D_\mu D_\nu u_{\mathrm{L}sa} \right) \left(\overline{u}^a_{\mathrm{R}r} \gamma^\nu C D^\mu \overline{\nu}_{\mathrm{L}t} \right) \\ i \left(D_\mu \overline{u}^a_{\mathrm{R}r} D_\nu u_{\mathrm{L}sa} \right) \left(\overline{N}_{\mathrm{R}p} \gamma^\nu C D^\mu \overline{\nu}_{\mathrm{L}t} \right) \end{array} \right. \tag{5.303}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_\mathrm{R} N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{L} D^3}(0,0) \left| \begin{array}{l} i \left(\overline{N}_{\mathrm{R}p} D_\mu D_\nu u_{\mathrm{L}sa} \right) \left(\overline{u}^a_{\mathrm{R}r} \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \\ i \left(\overline{N}_{\mathrm{R}p} \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \left(D_\mu \overline{u}^a_{\mathrm{R}r} D_\nu u_{\mathrm{L}sa} \right) \end{array} \right. \tag{5.304}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 N_\mathrm{R} u_\mathrm{L} D^3}(1,1) \left| \begin{array}{l} \mathcal{Y} \left[\boxed{p\,r} \right] i \epsilon^{abc} \left(d_{\mathrm{L}pa} C D_\mu D_\nu u_{\mathrm{L}sc} \right) \left(d_{\mathrm{L}rb} C \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \\ \mathcal{Y} \left[\tfrac{p}{r} \right] i \epsilon^{abc} \left(D_\mu d_{\mathrm{L}rb} C D_\nu u_{\mathrm{L}sc} \right) \left(d_{\mathrm{L}pa} C \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \end{array} \right. \tag{5.305}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} d_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{L} D^3}(1,-1) \left| \begin{array}{l} i \epsilon^{abc} \left(d_{\mathrm{L}pa} C D_\mu D_\nu u_{\mathrm{L}sb} \right) \left(\overline{N}_{\mathrm{R}r} \gamma^\nu D^\mu d_{\mathrm{R}tc} \right) \\ i \epsilon^{abc} \left(D_\mu \overline{N}_{\mathrm{R}r} D_\nu u_{\mathrm{L}sb} \right) \left(d_{\mathrm{L}pa} C \gamma^\nu D^\mu d_{\mathrm{R}tc} \right) \end{array} \right. \tag{5.306}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{L} N_\mathrm{R} u_\mathrm{L} D^3}(0,2) \left| \begin{array}{l} i \left(\overline{d}^a_{\mathrm{R}p} D_\mu D_\nu u_{\mathrm{L}sa} \right) \left(e_{\mathrm{L}r} C \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \\ i \left(D_\mu e_{\mathrm{L}r} C D_\nu u_{\mathrm{L}sa} \right) \left(\overline{d}^a_{\mathrm{R}p} \gamma^\nu D^\mu N_{\mathrm{R}t} \right) \end{array} \right. \tag{5.307}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{R} \bar{N}_\mathrm{R} u_\mathrm{L} D^3}(0,0) \left| \begin{array}{l} i \left(\overline{d}^a_{\mathrm{R}p} D_\mu D_\nu u_{\mathrm{L}sa} \right) \left(\overline{N}_{\mathrm{R}r} \gamma^\nu D^\mu e_{\mathrm{R}t} \right) \\ i \left(D_\mu \overline{N}_{\mathrm{R}r} D_\nu u_{\mathrm{L}sa} \right) \left(\overline{d}^a_{\mathrm{R}p} \gamma^\nu D^\mu e_{\mathrm{R}t} \right) \end{array} \right. \tag{5.308}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{L} e_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{L} D^3}(0,0) \left| \begin{array}{l} i \left(e_{\mathrm{L}p} C D_\mu D_\nu u_{\mathrm{L}sa} \right) \left(\overline{N}_{\mathrm{R}r} \gamma^\nu C D^\mu \overline{d}^{\,a}_{\mathrm{L}t} \right) \\ i \left(D_\mu \overline{N}_{\mathrm{R}r} D_\nu u_{\mathrm{L}sa} \right) \left(D^\mu \overline{d}^{\,a}_{\mathrm{L}t} \gamma^\nu e_{\mathrm{L}p} \right) \end{array} \right. \tag{5.309}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}D^3}(0,0) \left| \begin{array}{l} i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(D^\mu \overline{u}_{\mathrm{L}t}{}^a \gamma^\nu u_{\mathrm{L}ra}\right) \\ i\left(D_\mu u_{\mathrm{L}ra}CD_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu CD^\mu \overline{u}_{\mathrm{L}t}{}^a\right) \end{array} \right. \tag{5.310}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\mathrm{R}}^2 u_{\mathrm{L}}\bar{u}_{\mathrm{L}}D^3}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r}\right] i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \overline{u}_{\mathrm{L}t}{}^a\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\left(D_\mu \overline{N}_{\mathrm{R}r}D_\nu u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu CD^\mu \overline{u}_{\mathrm{L}t}{}^a\right) \end{array} \right. \tag{5.311}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}D^3}(0,0) \left| \begin{array}{l} i\left(D_\mu D_\nu \overline{u}_{\mathrm{R}s}{}^a d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r}\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu \overline{e}_{\mathrm{R}r}CD_\nu \overline{u}_{\mathrm{R}s}{}^a\right)\left(d_{\mathrm{L}pa}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.312}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}D^3}(0,-2) \left| \begin{array}{l} i\left(D_\mu D_\nu \overline{u}_{\mathrm{R}s}{}^a d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \overline{e}_{\mathrm{L}t}\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}CD_\nu \overline{u}_{\mathrm{R}s}{}^a\right)\left(D^\mu \overline{e}_{\mathrm{L}t}\gamma^\nu d_{\mathrm{L}pa}\right) \end{array} \right. \tag{5.313}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 N_{\mathrm{R}}\bar{u}_{\mathrm{R}}D^3}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon_{abc}\left(\overline{d}_{\mathrm{R}r}^b \gamma^\nu D^\mu N_{\mathrm{R}t}\right)\left(\overline{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{u}_{\mathrm{R}s}^c\right) \\ \mathcal{Y}\left[\frac{p}{r}\right] i\epsilon_{abc}\left(\overline{d}_{\mathrm{R}p}^a \gamma^\nu D^\mu N_{\mathrm{R}t}\right)\left(D_\mu \overline{d}_{\mathrm{R}r}^b CD_\nu \overline{u}_{\mathrm{R}s}^c\right) \end{array} \right. \tag{5.314}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}D^3}(-1,-1) \left| \begin{array}{l} i\epsilon_{abc}\left(\overline{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{u}_{\mathrm{R}s}^b\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \overline{d}_{\mathrm{L}t}^c\right) \\ i\epsilon_{abc}\left(D_\mu \overline{N}_{\mathrm{R}r}CD_\nu \overline{u}_{\mathrm{R}s}^b\right)\left(\overline{d}_{\mathrm{R}p}^a \gamma^\nu CD^\mu \overline{d}_{\mathrm{L}t}^c\right) \end{array} \right. \tag{5.315}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}D^3}(0,-2) \left| \begin{array}{l} i\left(\overline{e}_{\mathrm{R}p}CD_\mu D_\nu \overline{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}CD_\nu \overline{u}_{\mathrm{R}s}^a\right)\left(\overline{e}_{\mathrm{R}p}\gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \end{array} \right. \tag{5.316}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}D^3}(0,0) \left| \begin{array}{l} i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{u}_{\mathrm{R}r}^a \gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \\ i\left(D_\mu \overline{u}_{\mathrm{R}r}^a D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \end{array} \right. \tag{5.317}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\mathrm{R}}^2 \bar{u}_{\mathrm{R}}u_{\mathrm{R}}D^3}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r}\right] i\left(\overline{N}_{\mathrm{R}p}CD_\mu D_\nu \overline{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] i\left(D_\mu \overline{N}_{\mathrm{R}r}CD_\nu \overline{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \end{array} \right. \tag{5.318}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}u_{\mathrm{R}}D^3}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{p\,r}\right] i\epsilon^{abc}\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}C\gamma^\nu D^\mu u_{\mathrm{R}tc}\right) \\ \mathcal{Y}\left[\frac{p}{r}\right] i\epsilon^{abc}\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu d_{\mathrm{L}rb}\right)\left(d_{\mathrm{L}pa}C\gamma^\nu D^\mu u_{\mathrm{R}tc}\right) \end{array} \right. \tag{5.319}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D^3}(0,2) \left| \begin{array}{l} i\left(\overline{d}_{\mathrm{R}p}^a D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(d_{\mathrm{L}ra}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu d_{\mathrm{L}ra}CD_\nu \nu_{\mathrm{L}s}\right)\left(\overline{d}_{\mathrm{R}p}^a \gamma^\nu D^\mu N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.320}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D^3}(0,-2) \left| \begin{array}{l} i\left(\overline{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{\nu}_{\mathrm{L}t}\gamma^\nu d_{\mathrm{L}ra}\right) \\ i\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu d_{\mathrm{L}ra}\right)\left(\overline{d}_{\mathrm{R}p}^a \gamma^\nu CD^\mu \overline{\nu}_{\mathrm{L}t}\right) \end{array} \right. \tag{5.321}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D^3}(0,0) \left| \begin{array}{l} i\left(\overline{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(d_{\mathrm{L}ra}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu d_{\mathrm{L}ra}\right)\left(\overline{d}_{\mathrm{R}p}^a \gamma^\nu D^\mu N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.322}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}\bar{e}_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{L}D^3}(0,-2)\left|\begin{matrix} i\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{u}_{\mathrm{L}t}^a\right) \\ i\left(D_\mu \bar{e}_{\mathrm{R}r}CD_\nu \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \bar{u}_{\mathrm{L}t}^a \gamma^\nu d_{\mathrm{L}pa}\right) \end{matrix}\right.\tag{5.323}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}\bar{d}_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(d_{\mathrm{L}pa}CD_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{d}_{\mathrm{L}t}^a\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(D^\mu \bar{d}_{\mathrm{L}t}^a \gamma^\nu d_{\mathrm{L}pa}\right) \end{matrix}\right.\tag{5.324}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}^2 D^3}(0,-2)\left|\begin{matrix} \mathcal{Y}\left[\frac{r}{s}\right] i\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{d}_{\mathrm{L}t}^a\right) \\ \mathcal{Y}\left[\boxed{r|s}\right] i\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{d}_{\mathrm{L}t}^a\right) \end{matrix}\right.\tag{5.325}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}^2 \bar{N}_\mathrm{R}\bar{u}_\mathrm{L}D^3}(-1,-1)\left|\begin{matrix} \mathcal{Y}\left[\boxed{p|r}\right] i\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^b \gamma^\nu CD^\mu \bar{u}_{\mathrm{L}t}^c\right) \\ \mathcal{Y}\left[\boxed{p\atop r}\right] i\epsilon_{abc}\left(D_\mu \bar{d}_{\mathrm{R}r}^b CD_\nu \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^a \gamma^\nu CD^\mu \bar{u}_{\mathrm{L}t}^c\right) \end{matrix}\right.\tag{5.326}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}e_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(\bar{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}C\gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \\ i\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^a \gamma^\nu D^\mu u_{\mathrm{R}ta}\right) \end{matrix}\right.\tag{5.327}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}d_\mathrm{R}\nu_\mathrm{L}\bar{N}_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(\bar{d}_{\mathrm{R}p}^a D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^a \gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \end{matrix}\right.\tag{5.328}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}d_\mathrm{R}\bar{N}_\mathrm{R}^2 D^3}(0,-2)\left|\begin{matrix} \mathcal{Y}\left[\frac{r}{s}\right] i\left(\bar{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\left[\boxed{r|s}\right] i\left(\bar{d}_{\mathrm{R}p}^a CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu d_{\mathrm{R}ta}\right) \end{matrix}\right.\tag{5.329}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}D^3}(0,2)\left|\begin{matrix} i\left(\bar{e}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(e_{\mathrm{L}r}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\mu e_{\mathrm{L}r}CD_\nu \nu_{\mathrm{L}s}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \end{matrix}\right.\tag{5.330}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}D^3}(0,-2)\left|\begin{matrix} i\left(\bar{e}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(D^\mu \overline{\nu}_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}r}\right) \\ i\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu CD^\mu \overline{\nu}_{\mathrm{L}t}\right) \end{matrix}\right.\tag{5.331}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(\bar{e}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \\ i\left(D_\nu \overline{N}_{\mathrm{R}s}D_\mu e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu D^\mu N_{\mathrm{R}t}\right) \end{matrix}\right.\tag{5.332}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L}\bar{e}_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(e_{\mathrm{L}p}CD_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{e}_{\mathrm{L}t}\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(D^\mu \bar{e}_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}p}\right) \end{matrix}\right.\tag{5.333}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}^2 D^3}(0,-2)\left|\begin{matrix} \mathcal{Y}\left[\frac{r}{s}\right] i\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{e}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{r|s}\right] i\left(D_\mu D_\nu \overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \bar{e}_{\mathrm{L}t}\right) \end{matrix}\right.\tag{5.334}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{R}\nu_\mathrm{L}\bar{N}_\mathrm{R}D^3}(0,0)\left|\begin{matrix} i\left(\bar{e}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu e_{\mathrm{R}t}\right) \\ i\left(D_\mu \overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu D^\mu e_{\mathrm{R}t}\right) \end{matrix}\right.\tag{5.335}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}^2_{\mathrm{R}}D^3}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\bar{e}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu e_{\mathrm{R}t}\right)\\\mathcal{Y}\,\boxed{r\,|\,s}\,i\left(\bar{e}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu e_{\mathrm{R}t}\right)\end{array}\right.$$
(5.336)

$$\mathcal{O}_{\nu^3_{\mathrm{L}}N_{\mathrm{R}}D^3}(0,4)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}}\,i\left(\nu_{\mathrm{L}p}CD_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}r}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\right.$$
(5.337)

$$\mathcal{O}^{(1,2)}_{\nu^2_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D^3}(0,0)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(D^\mu\overline{\nu}_{\mathrm{L}t}\gamma^\nu \nu_{\mathrm{L}r}\right)\\\mathcal{Y}\,\boxed{r\,|\,s}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(D^\mu\overline{\nu}_{\mathrm{L}t}\gamma^\nu \nu_{\mathrm{L}r}\right)\end{array}\right.$$
(5.338)

$$\mathcal{O}^{(1,2)}_{\nu^2_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D^3}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}r}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\\\mathcal{Y}\,\boxed{r\,|\,s}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}r}C\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\end{array}\right.$$
(5.339)

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}^2_{\mathrm{R}}D^3}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \overline{\nu}_{\mathrm{L}t}\right)\\\mathcal{Y}\,\boxed{p\,|\,r}\,i\left(D_\mu\overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu CD^\mu \overline{\nu}_{\mathrm{L}t}\right)\end{array}\right.$$
(5.340)

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}\bar{N}^2_{\mathrm{R}}N_{\mathrm{R}}D^3}(0,0)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}D_\mu D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\\\mathcal{Y}\,\boxed{p\,|\,r}\,i\left(D_\mu\overline{N}_{\mathrm{R}r}D_\nu \nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\end{array}\right.$$
(5.341)

$$\mathcal{O}_{\bar{\nu}_{\mathrm{L}}\bar{N}^3_{\mathrm{R}}D^3}(0,-4)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD^\mu \overline{\nu}_{\mathrm{L}t}\right)\right.$$
(5.342)

$$\mathcal{O}_{\bar{N}^3_{\mathrm{R}}N_{\mathrm{R}}D^3}(0,-2)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}}\,i\left(\overline{N}_{\mathrm{R}p}CD_\mu D_\nu \overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D^\mu N_{\mathrm{R}t}\right)\right.$$
(5.343)

Class $F_{\mathrm{L}}\psi^3\psi^\dagger D$: 70 types

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}D}(0,2)\left|\begin{array}{l}i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(u_{\mathrm{L}rb}CD_\mu \nu_{\mathrm{L}s}\right)\left(\bar{u}^a_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(D_\mu u_{\mathrm{L}rb}C\nu_{\mathrm{L}s}\right)\left(\bar{u}^a_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\bar{u}^a_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(D_\mu u_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(u_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right)\left(\bar{u}^a_{\mathrm{R}p}D_\mu \nu_{\mathrm{L}s}\right)\end{array}\right.$$
(5.344)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}D}(0,-2)\left|\begin{array}{l}i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)\left(\bar{u}^a_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)\left(D_\mu\bar{u}^a_{\mathrm{R}r}u_{\mathrm{L}sb}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(D_\mu\bar{u}^a_{\mathrm{R}r}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}D_\mu u_{\mathrm{L}sb}\right)\left(\bar{u}^a_{\mathrm{R}r}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)\end{array}\right.$$
(5.345)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0)\left|\begin{array}{l}i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\bar{u}^a_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu\bar{u}^a_{\mathrm{R}r}u_{\mathrm{L}sb}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(D_\mu\bar{u}^a_{\mathrm{R}r}\gamma^\nu N_{\mathrm{R}t}\right)\\i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{L}\nu}\left(\overline{N}_{\mathrm{R}p}D_\mu u_{\mathrm{L}sb}\right)\left(\bar{u}^a_{\mathrm{R}r}\gamma^\nu N_{\mathrm{R}t}\right)\end{array}\right.$$
(5.346)

$$\mathcal{O}^{(1\sim8)}_{G_{\mathrm{L}}d_{\mathrm{L}}^2 N_{\mathrm{R}}u_{\mathrm{L}}D}(1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}rb}CD_\mu u_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}rb}CD_\mu u_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu d_{\mathrm{L}rb}Cu_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu d_{\mathrm{L}rb}Cu_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\boxed{p\,r}\right] i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}rb}CD_\mu u_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\boxed{p\,r}\right] i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(d_{\mathrm{L}rb}CD_\mu u_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\boxed{p\,r}\right] i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu d_{\mathrm{L}rb}Cu_{\mathrm{L}sc}\right)\\
\mathcal{Y}\left[\boxed{p\,r}\right] i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}C\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu d_{\mathrm{L}rb}Cu_{\mathrm{L}sc}\right)
\end{array}\right.$$

(5.347)

$$\mathcal{O}^{(1\sim8)}_{G_{\mathrm{L}}d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(1,-1) \left|
\begin{array}{l}
i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\left(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\left(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_{\mathrm{R}r} u_{\mathrm{L}sb}\right)\left(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_{\mathrm{R}r} u_{\mathrm{L}sb}\right)\left(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu d_{\mathrm{R}tc}\right)\\
i\left(\lambda^A\right)_d^b \epsilon^{acd} G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}\gamma^\nu d_{\mathrm{R}tc}\right)\left(d_{\mathrm{L}pa}CD_\mu u_{\mathrm{L}sb}\right)\\
i\left(\lambda^A\right)_d^d \epsilon^{bcd} G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}\gamma^\nu d_{\mathrm{R}tc}\right)\left(d_{\mathrm{L}pa}CD_\mu u_{\mathrm{L}sb}\right)
\end{array}\right.$$

(5.348)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}D}(0,2) \left|
\begin{array}{l}
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(e_{\mathrm{L}r}CD_\mu u_{\mathrm{L}sb}\right)\left(\bar{d}_{\mathrm{R}p}^a\gamma^\nu N_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(D_\mu e_{\mathrm{L}r}Cu_{\mathrm{L}sb}\right)\left(\bar{d}_{\mathrm{R}p}^a\gamma^\nu N_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(\bar{d}_{\mathrm{R}p}^a u_{\mathrm{L}sb}\right)\left(D_\mu e_{\mathrm{L}r}C\gamma^\nu N_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(e_{\mathrm{L}r}C\gamma^\nu N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a D_\mu u_{\mathrm{L}sb}\right)
\end{array}\right.$$

(5.349)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0) \left|
\begin{array}{l}
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\left(\bar{d}_{\mathrm{R}p}^a\gamma^\nu e_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_{\mathrm{R}r} u_{\mathrm{L}sb}\right)\left(\bar{d}_{\mathrm{R}p}^a\gamma^\nu e_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(\bar{d}_{\mathrm{R}p}^a u_{\mathrm{L}sb}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu e_{\mathrm{R}t}\right)\\
i\left(\lambda^A\right)_a^b G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}\gamma^\nu e_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a D_\mu u_{\mathrm{L}sb}\right)
\end{array}\right.$$

(5.350)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0) \left|
\begin{array}{l}
i\left(\lambda^A\right)_b^a G^{A\mu}_{\mathrm{L}\ \nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu e_{\mathrm{L}p}\right)\\
i\left(\lambda^A\right)_b^a G^{A\mu}_{\mathrm{L}\ \nu}\left(D_\mu\overline{N}_{\mathrm{R}r} u_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu e_{\mathrm{L}p}\right)\\
i\left(\lambda^A\right)_b^a G^{A\mu}_{\mathrm{L}\ \nu}\left(e_{\mathrm{L}p}Cu_{\mathrm{L}sa}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right)\\
i\left(\lambda^A\right)_b^a G^{A\mu}_{\mathrm{L}\ \nu}\left(e_{\mathrm{L}p}CD_\mu u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right)
\end{array}\right.$$

(5.351)

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}D}(0,0)\left|\begin{array}{l}
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(u_{\mathrm{L}ra}CD_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(D_{\mu}u_{\mathrm{L}ra}C\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{u}_{\mathrm{L}t}^{b}\gamma^{\nu}D_{\mu}u_{\mathrm{L}ra}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{u}_{\mathrm{L}t}^{b}\gamma^{\nu}u_{\mathrm{L}ra}\right)
\end{array}\right. \tag{5.352}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}D}(0,-2)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}r}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}r}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{u}_{\mathrm{L}t}^{b}\right)
\end{array}\right. \tag{5.353}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}D}(0,0)\left|\begin{array}{l}
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(d_{\mathrm{L}pa}C\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{e}_{\mathrm{R}r}CD_{\mu}\overline{u}_{\mathrm{R}s}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(d_{\mathrm{L}pa}C\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{e}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}s}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{u}_{\mathrm{R}s}^{b}d_{\mathrm{L}pa}\right)\left(D_{\mu}\overline{e}_{\mathrm{R}r}\gamma^{\nu}N_{\mathrm{R}t}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{e}_{\mathrm{R}r}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{u}_{\mathrm{R}s}^{b}d_{\mathrm{L}pa}\right)
\end{array}\right. \tag{5.354}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}D}(0,-2)\left|\begin{array}{l}
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{e}_{\mathrm{L}t}\gamma^{\nu}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{u}_{\mathrm{R}s}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{e}_{\mathrm{L}t}\gamma^{\nu}d_{\mathrm{L}pa}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}s}^{b}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{u}_{\mathrm{R}s}^{b}d_{\mathrm{L}pa}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\overline{e}_{\mathrm{L}t}\right)\\[4pt]
i\left(\lambda^{A}\right)^{a}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\overline{e}_{\mathrm{L}t}\right)\left(D_{\mu}\overline{u}_{\mathrm{R}s}^{b}d_{\mathrm{L}pa}\right)
\end{array}\right. \tag{5.355}
$$

$$
\mathcal{O}^{(1\sim8)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}^{2}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}D}(-1,1)\left|\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{abd}\left(\lambda^{A}\right)^{d}_{\ c}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{d}_{\mathrm{R}r}^{b}C\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{abd}\left(\lambda^{A}\right)^{d}_{\ c}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{d}_{\mathrm{R}r}^{b}C\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon_{abd}\left(\lambda^{A}\right)^{d}_{\ c}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{\ b}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{d}_{\mathrm{R}r}^{b}C\overline{u}_{\mathrm{R}s}^{c}\right)\\[4pt]
\mathcal{Y}\left[\boxed{p\,r}\right]i\epsilon_{abd}\left(\lambda^{A}\right)^{d}_{\ c}G_{\mathrm{L}}^{A\mu}{}_{\nu}\left(\overline{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}\overline{d}_{\mathrm{R}r}^{b}C\overline{u}_{\mathrm{R}s}^{c}\right)
\end{array}\right. \tag{5.356}
$$

$$\mathcal{O}^{(1\sim8)}_{G_L \bar{d}_R \bar{d}_L \bar{N}_R \bar{u}_R D}(-1,-1) \begin{vmatrix} i\epsilon_{acd} \left(\lambda^A\right)^d_b G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rr} C D_\mu \overline{u}_{Rs}^b\right) \left(\bar{d}^a_{Rp}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{abd} \left(\lambda^A\right)^d_c G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rr} C D_\mu \overline{u}_{Rs}^b\right) \left(\bar{d}^a_{Rp}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{acd} \left(\lambda^A\right)^d_b G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rr} C \overline{u}_{Rs}^b\right) \left(\bar{d}^a_{Rp}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{abd} \left(\lambda^A\right)^d_c G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rr} C \overline{u}_{Rs}^b\right) \left(\bar{d}^a_{Rp}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{acd} \left(\lambda^A\right)^d_b G^{A\mu}_{L\ \nu} \left(\bar{d}^a_{Rp} C \overline{u}_{Rs}^b\right) \left(D_\mu \overline{N}_{Rr}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{abd} \left(\lambda^A\right)^d_c G^{A\mu}_{L\ \nu} \left(\bar{d}^a_{Rp} C \overline{u}_{Rs}^b\right) \left(D_\mu \overline{N}_{Rr}\gamma^\nu C \bar{d}^c_{Lt}\right) \\ i\epsilon_{acd} \left(\lambda^A\right)^d_b G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rr}\gamma^\nu C \bar{d}^c_{Lt}\right) \left(\bar{d}^a_{Rp} C D_\mu \overline{u}_{Rs}^b\right) \\ i\epsilon_{abd} \left(\lambda^A\right)^d_c G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rr}\gamma^\nu C \bar{d}^c_{Lt}\right) \left(\bar{d}^a_{Rp} C D_\mu \overline{u}_{Rs}^b\right) \end{vmatrix}$$

(5.357)

$$\mathcal{O}^{(1\sim4)}_{G_L d_R \bar{e}_R \bar{N}_R \bar{u}_R D}(0,-2) \begin{vmatrix} i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\bar{e}_{Rp}\gamma^\nu d_{Rtb}\right) \left(\overline{N}_{Rr} C D_\mu \overline{u}_{Rs}^a\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\bar{e}_{Rp}\gamma^\nu d_{Rtb}\right) \left(D_\mu \overline{N}_{Rr} C \overline{u}_{Rs}^a\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\bar{e}_{Rp} C \overline{u}_{Rs}^a\right) \left(D_\mu \overline{N}_{Rr}\gamma^\nu d_{Rtb}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rr}\gamma^\nu d_{Rtb}\right) \left(\bar{e}_{Rp} C D_\mu \overline{u}_{Rs}^a\right) \end{vmatrix}$$

(5.358)

$$\mathcal{O}^{(1\sim4)}_{G_L \nu_L \bar{N}_R \bar{u}_R u_R D}(0,0) \begin{vmatrix} i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(\overline{u}_{Rr}^a D_\mu \nu_{Ls}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(D_\mu \overline{u}_{Rr}^a \nu_{Ls}\right) \\ i\left(\lambda^A\right)^b_a \left(\overline{N}_{Rp}\nu_{Ls}\right) G^{A\mu}_{L\ \nu} \left(D_\mu \overline{u}_{Rr}^a \gamma^\nu u_{Rtb}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp} D_\mu \nu_{Ls}\right) \left(\overline{u}_{Rr}^a \gamma^\nu u_{Rtb}\right) \end{vmatrix}$$

(5.359)

$$\mathcal{O}^{(1\sim4)}_{G_L \bar{N}_R^2 \bar{u}_R u_R D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(\overline{N}_{Rr} C D_\mu \overline{u}_{Rs}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(D_\mu \overline{N}_{Rr} C \overline{u}_{Rs}^a\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(\overline{N}_{Rr} C D_\mu \overline{u}_{Rs}^a\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^b_a G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rp}\gamma^\nu u_{Rtb}\right) \left(D_\mu \overline{N}_{Rr} C \overline{u}_{Rs}^a\right) \end{vmatrix}$$

(5.360)

$$\mathcal{O}^{(1\sim8)}_{G_L d_L^2 \bar{N}_R u_R D}(1,-1) \begin{vmatrix} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^b_d \epsilon^{acd} G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rs} d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rs} d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^b_d \epsilon^{acd} G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rs} D_\mu d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rs} D_\mu d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^b_d \epsilon^{acd} G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rs} d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{L\ \nu} \left(D_\mu \overline{N}_{Rs} d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^b_d \epsilon^{acd} G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rs} D_\mu d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \\ \mathcal{Y}\left[\,\overline{p\ r}\,\right] i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{L\ \nu} \left(\overline{N}_{Rs} D_\mu d_{Lrb}\right) \left(d_{Lpa} C\gamma^\nu u_{Rtc}\right) \end{vmatrix}$$

(5.361)

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D}(0,2) \left|\begin{array}{l} i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(d_{\mathrm{L}rb}CD_\mu\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu d_{\mathrm{L}rb}C\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}_p}^a\nu_{\mathrm{L}s}\right)\left(D_\mu d_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(d_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}_p}^a D_\mu\nu_{\mathrm{L}s}\right) \end{array}\right. \tag{5.362}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,-2) \left|\begin{array}{l} i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}s}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu C\bar{\nu}_{\mathrm{L}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}s}D_\mu d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu C\bar{\nu}_{\mathrm{L}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}_p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{\nu}_{\mathrm{L}t}\gamma^\nu D_\mu d_{\mathrm{L}rb}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\bar{\nu}_{\mathrm{L}t}\gamma^\nu d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}_p}^a CD_\mu\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.363}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,0) \left|\begin{array}{l} i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}s}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}s}D_\mu d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}_p}^a\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}_p}^a C\overline{N}_{\mathrm{R}s}\right)\left(D_\mu d_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right) \\[4pt] i\left(\lambda^A\right)_a^b G_{\mathrm{L}}^{A\mu}{}_\nu \left(d_{\mathrm{L}rb}C\gamma^\nu N_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}_p}^a CD_\mu\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.364}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(0,-2) \left|\begin{array}{l} i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\bar{e}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_\mu\bar{e}_{\mathrm{R}r}\gamma^\nu C\bar{u}_{\mathrm{L}t}^b\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}\gamma^\nu C\bar{u}_{\mathrm{L}t}^b\right) \end{array}\right. \tag{5.365}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \left|\begin{array}{l} i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right) \\[4pt] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(d_{\mathrm{L}pa}CD_\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right) \end{array}\right. \tag{5.366}$$

$$\mathcal{O}^{(1\sim4)}_{G_{\mathrm{L}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s}\right] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^b\gamma^\nu d_{\mathrm{L}pa}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s}\right] i\left(\lambda^A\right)_b^a G_{\mathrm{L}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu C\bar{d}_{\mathrm{L}t}^b\right) \end{array}\right. \tag{5.367}$$

$$
\mathcal{O}^{(1\sim8)}_{G_{\mathrm L}\bar{d}_{\mathrm R}^2 \bar{N}_{\mathrm R}\bar{u}_{\mathrm L}D}(-1,-1)
\begin{vmatrix}
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rr}^b CD_\mu \overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rr}^b CD_\mu \overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\bar{d}_{\mathrm Rr}^b C\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\bar{d}_{\mathrm Rr}^b C\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rr}^b CD_\mu \overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rr}^b CD_\mu \overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right] i\epsilon_{acd}\left(\lambda^A\right)^d_b G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\bar{d}_{\mathrm Rr}^b C\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right] i\epsilon_{abd}\left(\lambda^A\right)^d_c G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\bar{d}_{\mathrm Rr}^b C\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu C\overline{u}_{\mathrm Lt}^c\right)
\end{vmatrix}
\tag{5.368}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm L}\bar{d}_{\mathrm R}e_{\mathrm L}\bar{N}_{\mathrm R}u_{\mathrm R}D}(0,0)
\begin{vmatrix}
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm Rs}e_{\mathrm Lr}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu u_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm Rs}D_\mu e_{\mathrm Lr}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu u_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rp}^a C\overline{N}_{\mathrm Rs}\right)\left(D_\mu e_{\mathrm Lr}C\gamma^\nu u_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(e_{\mathrm Lr}C\gamma^\nu u_{\mathrm Rtb}\right)\left(\bar{d}_{\mathrm Rp}^a CD_\mu\overline{N}_{\mathrm Rs}\right)
\end{vmatrix}
\tag{5.369}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm L}\bar{d}_{\mathrm R}d_{\mathrm R}\nu_{\mathrm L}\bar{N}_{\mathrm R}D}(0,0)
\begin{vmatrix}
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm Rr}D_\mu\nu_{\mathrm Ls}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm Rr}\nu_{\mathrm Ls}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rp}^a \nu_{\mathrm Ls}\right)\left(D_\mu\overline{N}_{\mathrm Rr}\gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm Rr}\gamma^\nu d_{\mathrm Rtb}\right)\left(\bar{d}_{\mathrm Rp}^a D_\mu\nu_{\mathrm Ls}\right)
\end{vmatrix}
\tag{5.370}
$$

$$
\mathcal{O}^{(1\sim4)}_{G_{\mathrm L}\bar{d}_{\mathrm R}d_{\mathrm R}\bar{N}_{\mathrm R}^2 D}(0,-2)
\begin{vmatrix}
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm Rr}CD_\mu\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rp}^a C\overline{N}_{\mathrm Rs}\right)\left(D_\mu\overline{N}_{\mathrm Rr}\gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{r\,s}\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm Rr}CD_\mu\overline{N}_{\mathrm Rs}\right)\left(\bar{d}_{\mathrm Rp}^a \gamma^\nu d_{\mathrm Rtb}\right) \\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{r\,s}\end{smallmatrix}\right] i\left(\lambda^A\right)^b_a G_{\mathrm L}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm Rp}^a C\overline{N}_{\mathrm Rs}\right)\left(D_\mu\overline{N}_{\mathrm Rr}\gamma^\nu d_{\mathrm Rtb}\right)
\end{vmatrix}
\tag{5.371}
$$

$$
\mathcal{O}^{(1\sim4)}_{F_{\mathrm L}\nu_{\mathrm L}N_{\mathrm R}\bar{u}_{\mathrm R}u_{\mathrm L}D}(0,2)
\begin{vmatrix}
iF_{\mathrm L}^{\mu}{}_\nu \left(u_{\mathrm Lra}CD_\mu\nu_{\mathrm Ls}\right)\left(\overline{u}_{\mathrm Rp}^a \gamma^\nu N_{\mathrm Rt}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(D_\mu u_{\mathrm Lra}C\nu_{\mathrm Ls}\right)\left(\overline{u}_{\mathrm Rp}^a \gamma^\nu N_{\mathrm Rt}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(\overline{u}_{\mathrm Rp}^a \nu_{\mathrm Ls}\right)\left(D_\mu u_{\mathrm Lra}C\gamma^\nu N_{\mathrm Rt}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(u_{\mathrm Lra}C\gamma^\nu N_{\mathrm Rt}\right)\left(\overline{u}_{\mathrm Rp}^a D_\mu\nu_{\mathrm Ls}\right)
\end{vmatrix}
\tag{5.372}
$$

$$
\mathcal{O}^{(1\sim4)}_{F_{\mathrm L}\bar{\nu}_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}u_{\mathrm L}D}(0,-2)
\begin{vmatrix}
iF_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_{\mathrm Rp}\gamma^\nu C\overline{\nu}_{\mathrm Lt}\right)\left(\overline{u}_{\mathrm Rr}^a D_\mu u_{\mathrm Lsa}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_{\mathrm Rp}\gamma^\nu C\overline{\nu}_{\mathrm Lt}\right)\left(D_\mu\overline{u}_{\mathrm Rr}^a u_{\mathrm Lsa}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_{\mathrm Rp}u_{\mathrm Lsa}\right)\left(D_\mu\overline{u}_{\mathrm Rr}^a \gamma^\nu C\overline{\nu}_{\mathrm Lt}\right) \\[4pt]
iF_{\mathrm L}^{\mu}{}_\nu \left(\overline{N}_{\mathrm Rp}D_\mu u_{\mathrm Lsa}\right)\left(\overline{u}_{\mathrm Rr}^a \gamma^\nu C\overline{\nu}_{\mathrm Lt}\right)
\end{vmatrix}
\tag{5.373}
$$

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\bar{N}_{\rm R}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,0)\left|\begin{array}{l} iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}\gamma^{\nu}N_{{\rm R}t}\right)(\overline{u}_{{\rm R}r}^{a}D_{\mu}u_{{\rm L}sa}) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}\gamma^{\nu}N_{{\rm R}t}\right)(D_{\mu}\overline{u}_{{\rm R}r}^{a}u_{{\rm L}sa}) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}u_{{\rm L}sa}\right)(D_{\mu}\overline{u}_{{\rm R}r}^{a}\gamma^{\nu}N_{{\rm R}t}) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}D_{\mu}u_{{\rm L}sa}\right)(\overline{u}_{{\rm R}r}^{a}\gamma^{\nu}N_{{\rm R}t}) \end{array}\right.$$ (5.374)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}d_{\rm L}^{2}N_{\rm R}u_{\rm L}D}(1,1)\left|\begin{array}{l} \mathcal{Y}\,\boxed{p\,|\,r}\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(d_{{\rm L}pa}C\gamma^{\nu}N_{{\rm R}t}\right)(d_{{\rm L}rb}CD_{\mu}u_{{\rm L}sc}) \\ \mathcal{Y}\,\boxed{p\,|\,r}\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(d_{{\rm L}pa}C\gamma^{\nu}N_{{\rm R}t}\right)(D_{\mu}d_{{\rm L}rb}Cu_{{\rm L}sc}) \\ \mathcal{Y}\,\boxed{\begin{array}{c}p\\r\end{array}}\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(d_{{\rm L}pa}C\gamma^{\nu}N_{{\rm R}t}\right)(d_{{\rm L}rb}CD_{\mu}u_{{\rm L}sc}) \\ \mathcal{Y}\,\boxed{\begin{array}{c}p\\r\end{array}}\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(d_{{\rm L}pa}C\gamma^{\nu}N_{{\rm R}t}\right)(D_{\mu}d_{{\rm L}rb}Cu_{{\rm L}sc}) \end{array}\right.$$ (5.375)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}d_{\rm R}d_{\rm L}\bar{N}_{\rm R}u_{\rm L}D}(1,-1)\left|\begin{array}{l} i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}D_{\mu}u_{{\rm L}sb}\right)(d_{{\rm L}pa}C\gamma^{\nu}d_{{\rm R}tc}) \\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{{\rm R}r}u_{{\rm L}sb}\right)(d_{{\rm L}pa}C\gamma^{\nu}d_{{\rm R}tc}) \\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(d_{{\rm L}pa}Cu_{{\rm L}sb}\right)\left(D_{\mu}\overline{N}_{{\rm R}r}\gamma^{\nu}d_{{\rm R}tc}\right) \\ i\epsilon^{abc}F_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}\gamma^{\nu}d_{{\rm R}tc}\right)(d_{{\rm L}pa}CD_{\mu}u_{{\rm L}sb}) \end{array}\right.$$ (5.376)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\bar{d}_{\rm R}e_{\rm L}N_{\rm R}u_{\rm L}D}(0,2)\left|\begin{array}{l} iF_{\rm L}{}^{\mu}{}_{\nu}\left(e_{{\rm L}r}CD_{\mu}u_{{\rm L}sa}\right)\left(\bar{d}_{{\rm R}p}^{a}\gamma^{\nu}N_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}e_{{\rm L}r}Cu_{{\rm L}sa}\right)\left(\bar{d}_{{\rm R}p}^{a}\gamma^{\nu}N_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\bar{d}_{{\rm R}p}^{a}u_{{\rm L}sa}\right)\left(D_{\mu}e_{{\rm L}r}C\gamma^{\nu}N_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(e_{{\rm L}r}C\gamma^{\nu}N_{{\rm R}t}\right)\left(\bar{d}_{{\rm R}p}^{a}D_{\mu}u_{{\rm L}sa}\right) \end{array}\right.$$ (5.377)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\bar{d}_{\rm R}e_{\rm R}\bar{N}_{\rm R}u_{\rm L}D}(0,0)\left|\begin{array}{l} iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}D_{\mu}u_{{\rm L}sa}\right)\left(\bar{d}_{{\rm R}p}^{a}\gamma^{\nu}e_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{{\rm R}r}u_{{\rm L}sa}\right)\left(\bar{d}_{{\rm R}p}^{a}\gamma^{\nu}e_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\bar{d}_{{\rm R}p}^{a}u_{{\rm L}sa}\right)\left(D_{\mu}\overline{N}_{{\rm R}r}\gamma^{\nu}e_{{\rm R}t}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}\gamma^{\nu}e_{{\rm R}t}\right)\left(\bar{d}_{{\rm R}p}^{a}D_{\mu}u_{{\rm L}sa}\right) \end{array}\right.$$ (5.378)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\bar{d}_{\rm L}e_{\rm L}\bar{N}_{\rm R}u_{\rm L}D}(0,0)\left|\begin{array}{l} iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}D_{\mu}u_{{\rm L}sa}\right)\left(\bar{d}_{{\rm L}t}^{a}\gamma^{\nu}e_{{\rm L}p}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{{\rm R}r}u_{{\rm L}sa}\right)\left(\bar{d}_{{\rm L}t}^{a}\gamma^{\nu}e_{{\rm L}p}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(e_{{\rm L}p}Cu_{{\rm L}sa}\right)\left(D_{\mu}\overline{N}_{{\rm R}r}\gamma^{\nu}C\bar{d}_{{\rm L}t}^{a}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(e_{{\rm L}p}CD_{\mu}u_{{\rm L}sa}\right)\left(\overline{N}_{{\rm R}r}\gamma^{\nu}C\bar{d}_{{\rm L}t}^{a}\right) \end{array}\right.$$ (5.379)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}u_{\rm L}\bar{u}_{\rm L}D}(0,0)\left|\begin{array}{l} iF_{\rm L}{}^{\mu}{}_{\nu}\left(u_{{\rm L}ra}CD_{\mu}\nu_{{\rm L}s}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}u_{{\rm L}ra}C\nu_{{\rm L}s}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}\nu_{{\rm L}s}\right)(\overline{u}_{{\rm L}t}^{a}\gamma^{\nu}D_{\mu}u_{{\rm L}ra}) \\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}p}D_{\mu}\nu_{{\rm L}s}\right)(\overline{u}_{{\rm L}t}^{a}\gamma^{\nu}u_{{\rm L}ra}) \end{array}\right.$$ (5.380)

$$\mathcal{O}^{(1\sim4)}_{F_{\rm L}\bar{N}_{\rm R}^{2}u_{\rm L}\bar{u}_{\rm L}D}(0,-2)\left|\begin{array}{l} \mathcal{Y}\,\boxed{\begin{array}{c}p\\r\end{array}}\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}D_{\mu}u_{{\rm L}sa}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \\ \mathcal{Y}\,\boxed{\begin{array}{c}p\\r\end{array}}\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{{\rm R}r}u_{{\rm L}sa}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \\ \mathcal{Y}\,\boxed{p\,|\,r}\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(\overline{N}_{{\rm R}r}D_{\mu}u_{{\rm L}sa}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \\ \mathcal{Y}\,\boxed{p\,|\,r}\ iF_{\rm L}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{{\rm R}r}u_{{\rm L}sa}\right)\left(\overline{N}_{{\rm R}p}\gamma^{\nu}C\overline{u}_{{\rm L}t}^{a}\right) \end{array}\right.$$ (5.381)

$$\mathcal{O}^{(1\sim4)}_{F_L d_L \bar{e}_R N_R \bar{u}_R D}(0,0) \begin{vmatrix} iF_L{}^{\mu}{}_{\nu}\left(d_{Lpa}C\gamma^{\nu}N_{Rt}\right)\left(\bar{e}_{Rr}CD_{\mu}\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(d_{Lpa}C\gamma^{\nu}N_{Rt}\right)\left(D_{\mu}\bar{e}_{Rr}C\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{u}_{Rs}^{a}d_{Lpa}\right)\left(D_{\mu}\bar{e}_{Rr}\gamma^{\nu}N_{Rt}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Rr}\gamma^{\nu}N_{Rt}\right)\left(D_{\mu}\bar{u}_{Rs}^{a}d_{Lpa}\right) \end{vmatrix}$$

(5.382)

$$\mathcal{O}^{(1\sim4)}_{F_L d_L \bar{e}_L \bar{N}_R \bar{u}_R D}(0,-2) \begin{vmatrix} iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Lt}\gamma^{\nu}d_{Lpa}\right)\left(\overline{N}_{Rr}CD_{\mu}\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Lt}\gamma^{\nu}d_{Lpa}\right)\left(D_{\mu}\overline{N}_{Rr}C\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{u}_{Rs}^{a}d_{Lpa}\right)\left(D_{\mu}\overline{N}_{Rr}\gamma^{\nu}C\bar{e}_{Lt}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rr}\gamma^{\nu}C\bar{e}_{Lt}\right)\left(D_{\mu}\bar{u}_{Rs}^{a}d_{Lpa}\right) \end{vmatrix}$$

(5.383)

$$\mathcal{O}^{(1\sim4)}_{F_L \bar{d}_R^2 N_R \bar{u}_R D}(-1,1) \begin{vmatrix} \mathcal{Y}\left[\boxed{p|r}\right] i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\bar{d}_{Rp}^{a}\gamma^{\nu}N_{Rt}\right)\left(\bar{d}_{Rr}^{b}CD_{\mu}\bar{u}_{Rs}^{c}\right) \\ \mathcal{Y}\left[\boxed{p|r}\right] i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\bar{d}_{Rp}^{a}\gamma^{\nu}N_{Rt}\right)\left(D_{\mu}\bar{d}_{Rr}^{b}C\bar{u}_{Rs}^{c}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\bar{d}_{Rp}^{a}\gamma^{\nu}N_{Rt}\right)\left(\bar{d}_{Rr}^{b}CD_{\mu}\bar{u}_{Rs}^{c}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\bar{d}_{Rp}^{a}\gamma^{\nu}N_{Rt}\right)\left(D_{\mu}\bar{d}_{Rr}^{b}C\bar{u}_{Rs}^{c}\right) \end{vmatrix}$$

(5.384)

$$\mathcal{O}^{(1\sim4)}_{F_L \bar{d}_R \bar{d}_L \bar{N}_R \bar{u}_R D}(-1,-1) \begin{vmatrix} i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rr}CD_{\mu}\bar{u}_{Rs}^{b}\right)\left(\bar{d}_{Rp}^{a}\gamma^{\nu}C\bar{d}_{Lt}^{c}\right) \\ i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{Rr}C\bar{u}_{Rs}^{b}\right)\left(\bar{d}_{Rp}^{a}\gamma^{\nu}C\bar{d}_{Lt}^{c}\right) \\ i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\bar{d}_{Rp}^{a}C\bar{u}_{Rs}^{b}\right)\left(D_{\mu}\overline{N}_{Rr}\gamma^{\nu}C\bar{d}_{Lt}^{c}\right) \\ i\epsilon_{abc}F_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rr}\gamma^{\nu}C\bar{d}_{Lt}^{c}\right)\left(\bar{d}_{Rp}^{a}CD_{\mu}\bar{u}_{Rs}^{b}\right) \end{vmatrix}$$

(5.385)

$$\mathcal{O}^{(1\sim4)}_{F_L d_R \bar{e}_R \bar{N}_R \bar{u}_R D}(0,-2) \begin{vmatrix} iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Rp}\gamma^{\nu}d_{Rta}\right)\left(\overline{N}_{Rr}CD_{\mu}\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Rp}\gamma^{\nu}d_{Rta}\right)\left(D_{\mu}\overline{N}_{Rr}C\bar{u}_{Rs}^{a}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\bar{e}_{Rp}C\bar{u}_{Rs}^{a}\right)\left(D_{\mu}\overline{N}_{Rr}\gamma^{\nu}d_{Rta}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rr}\gamma^{\nu}d_{Rta}\right)\left(\bar{e}_{Rp}CD_{\mu}\bar{u}_{Rs}^{a}\right) \end{vmatrix}$$

(5.386)

$$\mathcal{O}^{(1\sim4)}_{F_L \nu_L \bar{N}_R \bar{u}_R u_R D}(0,0) \begin{vmatrix} iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(\bar{u}_{Rr}^{a}D_{\mu}\nu_{Ls}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(D_{\mu}\bar{u}_{Rr}^{a}\nu_{Ls}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\nu_{Ls}\right)\left(D_{\mu}\bar{u}_{Rr}^{a}\gamma^{\nu}u_{Rta}\right) \\ iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}D_{\mu}\nu_{Ls}\right)\left(\bar{u}_{Rr}^{a}\gamma^{\nu}u_{Rta}\right) \end{vmatrix}$$

(5.387)

$$\mathcal{O}^{(1\sim4)}_{F_L \bar{N}_R^2 \bar{u}_R u_R D}(0,-2) \begin{vmatrix} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(\overline{N}_{Rr}CD_{\mu}\bar{u}_{Rs}^{a}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(D_{\mu}\overline{N}_{Rr}C\bar{u}_{Rs}^{a}\right) \\ \mathcal{Y}\left[\boxed{p|r}\right] iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(\overline{N}_{Rr}CD_{\mu}\bar{u}_{Rs}^{a}\right) \\ \mathcal{Y}\left[\boxed{p|r}\right] iF_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rp}\gamma^{\nu}u_{Rta}\right)\left(D_{\mu}\overline{N}_{Rr}C\bar{u}_{Rs}^{a}\right) \end{vmatrix}$$

(5.388)

$$\mathcal{O}^{(1\sim4)}_{F_L d_L^2 \bar{N}_R u_R D}(1,-1) \begin{vmatrix} \mathcal{Y}\left[\boxed{p|r}\right] i\epsilon^{abc}F_L{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{Rs}d_{Lrb}\right)\left(d_{Lpa}C\gamma^{\nu}u_{Rtc}\right) \\ \mathcal{Y}\left[\boxed{p|r}\right] i\epsilon^{abc}F_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rs}D_{\mu}d_{Lrb}\right)\left(d_{Lpa}C\gamma^{\nu}u_{Rtc}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] i\epsilon^{abc}F_L{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{Rs}d_{Lrb}\right)\left(d_{Lpa}C\gamma^{\nu}u_{Rtc}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right] i\epsilon^{abc}F_L{}^{\mu}{}_{\nu}\left(\overline{N}_{Rs}D_{\mu}d_{Lrb}\right)\left(d_{Lpa}C\gamma^{\nu}u_{Rtc}\right) \end{vmatrix}$$

(5.389)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D}(0,2) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(d_{\mathrm{L}ra}CD_{\mu}\nu_{\mathrm{L}s})\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(D_{\mu}d_{\mathrm{L}ra}C\nu_{\mathrm{L}s})\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}\nu_{\mathrm{L}s}\right)(D_{\mu}d_{\mathrm{L}ra}C\gamma^{\nu}N_{\mathrm{R}t}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(d_{\mathrm{L}ra}C\gamma^{\nu}N_{\mathrm{R}t})\left(\bar{d}_{\mathrm{R}p}^{a}D_{\mu}\nu_{\mathrm{L}s}\right) \end{array}\right.$$

(5.390)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,-2) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{\nu}_{\mathrm{L}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}D_{\mu}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{\nu}_{\mathrm{L}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)(\bar{\nu}_{\mathrm{L}t}\gamma^{\nu}D_{\mu}d_{\mathrm{L}ra}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(\bar{\nu}_{\mathrm{L}t}\gamma^{\nu}d_{\mathrm{L}ra})\left(\bar{d}_{\mathrm{R}p}^{a}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.391)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,0) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}D_{\mu}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)(D_{\mu}d_{\mathrm{L}ra}C\gamma^{\nu}N_{\mathrm{R}t}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(d_{\mathrm{L}ra}C\gamma^{\nu}N_{\mathrm{R}t})\left(\bar{d}_{\mathrm{R}p}^{a}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.392)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(0,-2) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)(\bar{u}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}s}\right)(\bar{u}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(D_{\mu}\bar{e}_{\mathrm{R}r}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{a}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(\bar{e}_{\mathrm{R}r}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{a}) \end{array}\right.$$

(5.393)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s})\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{d}_{\mathrm{L}t}^{a}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(d_{\mathrm{L}pa}CD_{\mu}\nu_{\mathrm{L}s})\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{d}_{\mathrm{L}t}^{a}\right) \end{array}\right.$$

(5.394)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}D}(0,-2) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{d}_{\mathrm{L}t}^{a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{d}_{\mathrm{L}t}^{a}\right) \end{array}\right.$$

(5.395)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}^{2}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(-1,-1) \left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right] i\epsilon_{abc}F_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right] i\epsilon_{abc}F_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\bar{d}_{\mathrm{R}r}^{b}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}F_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right] i\epsilon_{abc}F_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\bar{d}_{\mathrm{R}r}^{b}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right) \end{array}\right.$$

(5.396)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}D}(0,0) \left|\begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}u_{\mathrm{R}ta}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}D_{\mu}e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}u_{\mathrm{R}ta}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)(D_{\mu}e_{\mathrm{L}r}C\gamma^{\nu}u_{\mathrm{R}ta}) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\,(e_{\mathrm{L}r}C\gamma^{\nu}u_{\mathrm{R}ta})\left(\bar{d}_{\mathrm{R}p}^{a}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.397)

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}\nu_{\mathrm{L}s}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}d_{\mathrm{R}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{a}D_{\mu}\nu_{\mathrm{L}s}\right) \end{array}\right. \tag{5.398}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}d_{\mathrm{R}ta}\right) \end{array}\right. \tag{5.399}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D}(0,2) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(e_{\mathrm{L}r}CD_{\mu}\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(D_{\mu}e_{\mathrm{L}r}C\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(D_{\mu}e_{\mathrm{L}r}C\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}D_{\mu}\nu_{\mathrm{L}s}\right)\left(e_{\mathrm{L}r}C\gamma^{\nu}N_{\mathrm{R}t}\right) \end{array}\right. \tag{5.400}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,-2) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}C\bar{\nu}_{\mathrm{L}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}D_{\mu}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}C\bar{\nu}_{\mathrm{L}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{\nu}_{\mathrm{L}t}\gamma^{\nu}D_{\mu}e_{\mathrm{L}r}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{\nu}_{\mathrm{L}t}\gamma^{\nu}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.401}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,0) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}D_{\mu}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(D_{\mu}e_{\mathrm{L}r}C\gamma^{\nu}N_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(e_{\mathrm{L}r}C\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{R}p}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.402}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{L}t}\gamma^{\nu}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{L}t}\gamma^{\nu}e_{\mathrm{L}p}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(e_{\mathrm{L}p}C\nu_{\mathrm{L}s}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{e}_{\mathrm{L}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(e_{\mathrm{L}p}CD_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{e}_{\mathrm{L}t}\right) \end{array}\right. \tag{5.403}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{L}t}\gamma^{\nu}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{e}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{L}t}\gamma^{\nu}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}C\bar{e}_{\mathrm{L}t}\right) \end{array}\right. \tag{5.404}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \left| \begin{array}{l} iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\gamma^{\nu}e_{\mathrm{R}t}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(D_{\mu}\overline{N}_{\mathrm{R}r}\gamma^{\nu}e_{\mathrm{R}t}\right) \\ iF_{\mathrm{L}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}p}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}e_{\mathrm{R}t}\right) \end{array}\right. \tag{5.405}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\bar{e}_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu e_{\mathrm{R}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\bar{e}_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\gamma^\nu e_{\mathrm{R}t}\right)
\end{array}\right.
\tag{5.406}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{L}}\nu_{\mathrm{L}}^3 N_{\mathrm{R}} D}(0,4) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}p}C\gamma^\nu N_{\mathrm{R}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(D_\mu\nu_{\mathrm{L}r}C\nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}p}C\gamma^\nu N_{\mathrm{R}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}p}C\gamma^\nu N_{\mathrm{R}t}\right)
\end{array}\right.
\tag{5.407}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\nu_{\mathrm{L}}^2 \bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}} D}(0,0) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{\nu}_{\mathrm{L}t}\gamma^\nu D_\mu\nu_{\mathrm{L}r}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{\nu}_{\mathrm{L}t}\gamma^\nu D_\mu\nu_{\mathrm{L}r}\right)
\end{array}\right.
\tag{5.408}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} N_{\mathrm{R}} D}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(D_\mu\nu_{\mathrm{L}r}C\gamma^\nu N_{\mathrm{R}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\nu_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(D_\mu\nu_{\mathrm{L}r}C\gamma^\nu N_{\mathrm{R}t}\right)
\end{array}\right.
\tag{5.409}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)
\end{array}\right.
\tag{5.410}$$

$$\mathcal{O}^{(1\sim4)}_{F_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} D}(0,0) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}s}\right)
\end{array}\right.
\tag{5.411}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 D}(0,-4) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right)
\end{array}\right.
\tag{5.412}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}} D}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(D_\mu\overline{N}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] iF_{\mathrm{L}}{}^\mu{}_\nu \left(\overline{N}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)
\end{array}\right.
\tag{5.413}$$

Class $F_{\rm R}\psi^3\psi^\dagger D$: 70 types

$$\mathcal{O}^{(1\sim3)}_{G_{\rm R}\nu_{\rm L}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,2)\begin{vmatrix}i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{u}^a_{{\rm R}p}u_{{\rm L}rb}\right)(\nu_{{\rm L}s}C\gamma^\nu D_\mu N_{{\rm R}t})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{u}^a_{{\rm R}p}\nu_{{\rm L}s}\right)(u_{{\rm L}rb}C\gamma^\nu D_\mu N_{{\rm R}t})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu(u_{{\rm L}rb}CD_\mu\nu_{{\rm L}s})\left(\overline{u}^a_{{\rm R}p}\gamma^\nu N_{{\rm R}t}\right)\end{vmatrix} \tag{5.414}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm R}\nu_{\rm L}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,2)\begin{vmatrix}iF_{\rm R}^{\mu}{}_\nu\left(\overline{u}^a_{{\rm R}p}u_{{\rm L}ra}\right)(\nu_{{\rm L}s}C\gamma^\nu D_\mu N_{{\rm R}t})\\ iF_{\rm R}^{\mu}{}_\nu\left(\overline{u}^a_{{\rm R}p}\nu_{{\rm L}s}\right)(u_{{\rm L}ra}C\gamma^\nu D_\mu N_{{\rm R}t})\\ iF_{\rm R}^{\mu}{}_\nu(u_{{\rm L}ra}CD_\mu\nu_{{\rm L}s})\left(\overline{u}^a_{{\rm R}p}\gamma^\nu N_{{\rm R}t}\right)\end{vmatrix} \tag{5.415}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm R}\bar{\nu}_{\rm L}\bar{N}_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,-2)\begin{vmatrix}i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}C\overline{u}^a_{{\rm R}r}\right)(D_\mu\overline{\nu}_{{\rm L}t}\gamma^\nu u_{{\rm L}sb})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}u_{{\rm L}sb}\right)(\overline{u}^a_{{\rm R}r}\gamma^\nu CD_\mu\overline{\nu}_{{\rm L}t})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}\gamma^\nu C\overline{\nu}_{{\rm L}t}\right)(\overline{u}^a_{{\rm R}r}D_\mu u_{{\rm L}sb})\end{vmatrix} \tag{5.416}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm R}\bar{\nu}_{\rm L}\bar{N}_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,-2)\begin{vmatrix}iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}C\overline{u}^a_{{\rm R}r}\right)(D_\mu\overline{\nu}_{{\rm L}t}\gamma^\nu u_{{\rm L}sa})\\ iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}u_{{\rm L}sa}\right)(\overline{u}^a_{{\rm R}r}\gamma^\nu CD_\mu\overline{\nu}_{{\rm L}t})\\ iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}\gamma^\nu C\overline{\nu}_{{\rm L}t}\right)(\overline{u}^a_{{\rm R}r}D_\mu u_{{\rm L}sa})\end{vmatrix} \tag{5.417}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\rm R}\bar{N}_{\rm R}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,0)\begin{vmatrix}i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}C\overline{u}^a_{{\rm R}r}\right)(u_{{\rm L}sb}C\gamma^\nu D_\mu N_{{\rm R}t})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}u_{{\rm L}sb}\right)(\overline{u}^a_{{\rm R}r}\gamma^\nu D_\mu N_{{\rm R}t})\\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\rm R}{}_\nu\left(\overline{N}_{{\rm R}p}\gamma^\nu N_{{\rm R}t}\right)(\overline{u}^a_{{\rm R}r}D_\mu u_{{\rm L}sb})\end{vmatrix} \tag{5.418}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm R}\bar{N}_{\rm R}N_{\rm R}\bar{u}_{\rm R}u_{\rm L}D}(0,0)\begin{vmatrix}iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}C\overline{u}^a_{{\rm R}r}\right)(u_{{\rm L}sa}C\gamma^\nu D_\mu N_{{\rm R}t})\\ iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}u_{{\rm L}sa}\right)(\overline{u}^a_{{\rm R}r}\gamma^\nu D_\mu N_{{\rm R}t})\\ iF_{\rm R}^{\mu}{}_\nu\left(\overline{N}_{{\rm R}p}\gamma^\nu N_{{\rm R}t}\right)(\overline{u}^a_{{\rm R}r}D_\mu u_{{\rm L}sa})\end{vmatrix} \tag{5.419}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\rm R}d^2_{\rm L}N_{\rm R}u_{\rm L}D}(1,1)\begin{vmatrix}\mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}Cd_{{\rm L}rb})(u_{{\rm L}sc}C\gamma^\nu D_\mu N_{{\rm R}t})\\ \mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}Cu_{{\rm L}sc})(d_{{\rm L}rb}C\gamma^\nu D_\mu N_{{\rm R}t})\\ \mathcal{Y}\left[\tfrac{p}{r}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}C\gamma^\nu N_{{\rm R}t})(d_{{\rm L}rb}CD_\mu u_{{\rm L}sc})\\ \mathcal{Y}\left[\overline{pr}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}Cd_{{\rm L}rb})(u_{{\rm L}sc}C\gamma^\nu D_\mu N_{{\rm R}t})\\ \mathcal{Y}\left[\overline{pr}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}Cu_{{\rm L}sc})(d_{{\rm L}rb}C\gamma^\nu D_\mu N_{{\rm R}t})\\ \mathcal{Y}\left[\overline{pr}\right]i\left(\lambda^A\right)^a_d\epsilon^{bcd}G^{A\mu}_{\rm R}{}_\nu(d_{{\rm L}pa}C\gamma^\nu N_{{\rm R}t})(d_{{\rm L}rb}CD_\mu u_{{\rm L}sc})\end{vmatrix} \tag{5.420}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\rm R}d^2_{\rm L}N_{\rm R}u_{\rm L}D}(1,1)\begin{vmatrix}\mathcal{Y}\left[\overline{pr}\right]i\epsilon^{abc}F_{\rm R}^{\mu}{}_\nu(d_{{\rm L}pa}Cu_{{\rm L}sc})(d_{{\rm L}rb}C\gamma^\nu D_\mu N_{{\rm R}t})\\ \mathcal{Y}\left[\overline{pr}\right]i\epsilon^{abc}F_{\rm R}^{\mu}{}_\nu(d_{{\rm L}pa}C\gamma^\nu N_{{\rm R}t})(d_{{\rm L}rb}CD_\mu u_{{\rm L}sc})\\ \mathcal{Y}\left[\tfrac{p}{r}\right]i\epsilon^{abc}F_{\rm R}^{\mu}{}_\nu(d_{{\rm L}pa}Cd_{{\rm L}rb})(u_{{\rm L}sc}C\gamma^\nu D_\mu N_{{\rm R}t})\end{vmatrix} \tag{5.421}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\mathrm{R}}d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(1,-1)\left|\begin{array}{l} i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(u_{\mathrm{L}sb}C\gamma^\nu D_\mu d_{\mathrm{R}tc}) \\ i\left(\lambda^A\right)^a_d \epsilon^{abd} G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(u_{\mathrm{L}sb}C\gamma^\nu D_\mu d_{\mathrm{R}tc}) \\ i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{\mathrm{R}\,\nu}(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb})\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu d_{\mathrm{R}tc}\right) \\ i\left(\lambda^A\right)^a_d \epsilon^{abd} G^{A\mu}_{\mathrm{R}\,\nu}(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb})\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu d_{\mathrm{R}tc}\right) \\ i\left(\lambda^A\right)^a_d \epsilon^{bcd} G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}) \\ i\left(\lambda^A\right)^a_d \epsilon^{abd} G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}) \end{array}\right. \tag{5.422}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(1,-1)\left|\begin{array}{l} i\epsilon^{abc}F^{\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(u_{\mathrm{L}sb}C\gamma^\nu D_\mu d_{\mathrm{R}tc}) \\ i\epsilon^{abc}F^{\mu}_{\mathrm{R}\,\nu}(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb})\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu d_{\mathrm{R}tc}\right) \\ i\epsilon^{abc}F^{\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)(d_{\mathrm{L}pa}C\gamma^\nu d_{\mathrm{R}tc}) \end{array}\right. \tag{5.423}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}D}(0,2)\left|\begin{array}{l} i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}e_{\mathrm{L}r}\right)(u_{\mathrm{L}sb}C\gamma^\nu D_\mu N_{\mathrm{R}t}) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}u_{\mathrm{L}sb}\right)(e_{\mathrm{L}r}C\gamma^\nu D_\mu N_{\mathrm{R}t}) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}(e_{\mathrm{L}r}CD_\mu u_{\mathrm{L}sb})\left(\bar{d}^a_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right) \end{array}\right. \tag{5.424}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}D}(0,2)\left|\begin{array}{l} iF^{\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}e_{\mathrm{L}r}\right)(u_{\mathrm{L}sa}C\gamma^\nu D_\mu N_{\mathrm{R}t}) \\ iF^{\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}u_{\mathrm{L}sa}\right)(e_{\mathrm{L}r}C\gamma^\nu D_\mu N_{\mathrm{R}t}) \\ iF^{\mu}_{\mathrm{R}\,\nu}(e_{\mathrm{L}r}CD_\mu u_{\mathrm{L}sa})\left(\bar{d}^a_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right) \end{array}\right. \tag{5.425}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(u_{\mathrm{L}sb}C\gamma^\nu D_\mu e_{\mathrm{R}t}) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \\ i\left(\lambda^A\right)^b_a G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sb}\right)\left(\bar{d}^a_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right) \end{array}\right. \tag{5.426}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0)\left|\begin{array}{l} iF^{\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(u_{\mathrm{L}sa}C\gamma^\nu D_\mu e_{\mathrm{R}t}) \\ iF^{\mu}_{\mathrm{R}\,\nu}\left(\bar{d}^a_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \\ iF^{\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sa}\right)\left(\bar{d}^a_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right) \end{array}\right. \tag{5.427}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^a_b \left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)G^{A\mu}_{\mathrm{R}\,\nu}\left(D_\mu\bar{d}^b_{\mathrm{L}t}\gamma^\nu u_{\mathrm{L}sa}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{\mathrm{R}\,\nu}(e_{\mathrm{L}p}Cu_{\mathrm{L}sa})\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD_\mu\bar{d}^b_{\mathrm{L}t}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sa}\right)\left(\bar{d}^b_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}p}\right) \end{array}\right. \tag{5.428}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}D}(0,0)\left|\begin{array}{l} iF^{\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(D_\mu\bar{d}^a_{\mathrm{L}t}\gamma^\nu u_{\mathrm{L}sa}\right) \\ iF^{\mu}_{\mathrm{R}\,\nu}(e_{\mathrm{L}p}Cu_{\mathrm{L}sa})\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD_\mu\bar{d}^a_{\mathrm{L}t}\right) \\ iF^{\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}r}D_\mu u_{\mathrm{L}sa}\right)\left(\bar{d}^a_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}p}\right) \end{array}\right. \tag{5.429}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^a_b G^{A\mu}_{\mathrm{R}\,\nu}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(D_\mu\bar{u}^b_{\mathrm{L}t}\gamma^\nu\nu_{\mathrm{L}s}\right) \\ i\left(\lambda^A\right)^a_b \left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)G^{A\mu}_{\mathrm{R}\,\nu}\left(D_\mu\bar{u}^b_{\mathrm{L}t}\gamma^\nu u_{\mathrm{L}ra}\right) \\ i\left(\lambda^A\right)^a_b G^{A\mu}_{\mathrm{R}\,\nu}(u_{\mathrm{L}ra}CD_\mu\nu_{\mathrm{L}s})\left(\overline{N}_{\mathrm{R}p}\gamma^\nu C\bar{u}^b_{\mathrm{L}t}\right) \end{array}\right. \tag{5.430}$$

$$\mathcal{O}^{(1\sim3)}_{F_R\nu_L\bar{N}_R u_L\bar{u}_L D}(0,0)\left|\begin{array}{l} iF_R{}^\mu{}_\nu\left(\overline{N}_{Rp}u_{Lra}\right)\left(D_\mu\overline{u}_L{}^a_t\gamma^\nu\nu_{Ls}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(\overline{N}_{Rp}\nu_{Ls}\right)\left(D_\mu\overline{u}_L{}^a_t\gamma^\nu u_{Lra}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(u_{Lra}CD_\mu\nu_{Ls}\right)\left(\overline{N}_{Rp}\gamma^\nu C\overline{u}_L{}^a_t\right)\end{array}\right.\tag{5.431}$$

$$\mathcal{O}^{(1\sim3)}_{G_R\bar{N}^2_R u_L\bar{u}_L D}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\left(\lambda^A\right)^a_b G_R^{A\mu}{}_\nu\left(\overline{N}_{Rp}u_{Lsa}\right)\left(\overline{N}_{Rr}\gamma^\nu CD_\mu\overline{u}_L{}^b_t\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{N}_{Rr}D_\mu u_{Lsa}\right)\left(\overline{N}_{Rp}\gamma^\nu C\overline{u}_L{}^b_t\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\left(\lambda^A\right)^a_b\left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)G_R^{A\mu}{}_\nu\left(D_\mu\overline{u}_L{}^b_t\gamma^\nu u_{Lsa}\right)\end{array}\right.\tag{5.432}$$

$$\mathcal{O}^{(1\sim3)}_{F_R\bar{N}^2_R u_L\bar{u}_L D}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]iF_R{}^\mu{}_\nu\left(\overline{N}_{Rp}u_{Lsa}\right)\left(\overline{N}_{Rr}\gamma^\nu CD_\mu\overline{u}_L{}^a_t\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]iF_R{}^\mu{}_\nu\left(\overline{N}_{Rr}D_\mu u_{Lsa}\right)\left(\overline{N}_{Rp}\gamma^\nu C\overline{u}_L{}^a_t\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]iF_R{}^\mu{}_\nu\left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(D_\mu\overline{u}_L{}^a_t\gamma^\nu u_{Lsa}\right)\end{array}\right.\tag{5.433}$$

$$\mathcal{O}^{(1\sim3)}_{G_R d_L\bar{e}_R N_R\bar{u}_R D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^a_b G_R^{A\mu}{}_\nu\left(\bar{e}_{Rr}d_{Lpa}\right)\left(\overline{u}_R{}^b_s\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{u}_R{}^b_s d_{Lpa}\right)\left(\bar{e}_{Rr}\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] i\left(\lambda^A\right)^a_b G_R^{A\mu}{}_\nu\left(d_{Lpa}C\gamma^\nu N_{Rt}\right)\left(\bar{e}_{Rr}CD_\mu\overline{u}_R{}^b_s\right)\end{array}\right.\tag{5.434}$$

$$\mathcal{O}^{(1\sim3)}_{F_R d_L\bar{e}_R N_R\bar{u}_R D}(0,0)\left|\begin{array}{l} iF_R{}^\mu{}_\nu\left(\bar{e}_{Rr}d_{Lpa}\right)\left(\overline{u}_R{}^a_s\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(\overline{u}_R{}^a_s d_{Lpa}\right)\left(\bar{e}_{Rr}\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(d_{Lpa}C\gamma^\nu N_{Rt}\right)\left(\bar{e}_{Rr}CD_\mu\overline{u}_R{}^a_s\right)\end{array}\right.\tag{5.435}$$

$$\mathcal{O}^{(1\sim3)}_{G_R d_L\bar{e}_L\bar{N}_R\bar{u}_R D}(0,-2)\left|\begin{array}{l} i\left(\lambda^A\right)^a_b G_R^{A\mu}{}_\nu\left(\overline{N}_{Rr}d_{Lpa}\right)\left(\overline{u}_R{}^b_s\gamma^\nu CD_\mu\bar{e}_{Lt}\right)\\[4pt] i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{u}_R{}^b_s d_{Lpa}\right)\left(\overline{N}_{Rr}\gamma^\nu CD_\mu\bar{e}_{Lt}\right)\\[4pt] i\left(\lambda^A\right)^a_b G_R^{A\mu}{}_\nu\left(\bar{e}_{Lt}\gamma^\nu d_{Lpa}\right)\left(\overline{N}_{Rr}CD_\mu\overline{u}_R{}^b_s\right)\end{array}\right.\tag{5.436}$$

$$\mathcal{O}^{(1\sim3)}_{F_R d_L\bar{e}_L\bar{N}_R\bar{u}_R D}(0,-2)\left|\begin{array}{l} iF_R{}^\mu{}_\nu\left(\overline{N}_{Rr}d_{Lpa}\right)\left(\overline{u}_R{}^a_s\gamma^\nu CD_\mu\bar{e}_{Lt}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(\overline{u}_R{}^a_s d_{Lpa}\right)\left(\overline{N}_{Rr}\gamma^\nu CD_\mu\bar{e}_{Lt}\right)\\[4pt] iF_R{}^\mu{}_\nu\left(\bar{e}_{Lt}\gamma^\nu d_{Lpa}\right)\left(\overline{N}_{Rr}CD_\mu\overline{u}_R{}^a_s\right)\end{array}\right.\tag{5.437}$$

$$\mathcal{O}^{(1\sim6)}_{G_R\bar{d}^2_R N_R\bar{u}_R D}(-1,1)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p C\bar{d}_R{}^b_r\right)\left(\overline{u}_R{}^c_s\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p C\overline{u}_R{}^c_s\right)\left(\bar{d}_R{}^b_r\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p\gamma^\nu N_{Rt}\right)\left(\bar{d}_R{}^b_r CD_\mu\overline{u}_R{}^c_s\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p C\bar{d}_R{}^b_r\right)\left(\overline{u}_R{}^c_s\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p C\overline{u}_R{}^c_s\right)\left(\bar{d}_R{}^b_r\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\epsilon_{acd}\left(\lambda^A\right)^d_b G_R^{A\mu}{}_\nu\left(\bar{d}_R{}^a_p\gamma^\nu N_{Rt}\right)\left(\bar{d}_R{}^b_r CD_\mu\overline{u}_R{}^c_s\right)\end{array}\right.\tag{5.438}$$

$$\mathcal{O}^{(1\sim3)}_{F_R\bar{d}^2_R N_R\bar{u}_R D}(-1,1)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\epsilon_{abc}F_R{}^\mu{}_\nu\left(\bar{d}_R{}^a_p C\overline{u}_R{}^c_s\right)\left(\bar{d}_R{}^b_r\gamma^\nu D_\mu N_{Rt}\right)\\[4pt] \mathcal{Y}\left[\boxed{p\,|\,r}\right]i\epsilon_{abc}F_R{}^\mu{}_\nu\left(\bar{d}_R{}^a_p\gamma^\nu N_{Rt}\right)\left(\bar{d}_R{}^b_r CD_\mu\overline{u}_R{}^c_s\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\ r\end{smallmatrix}\right]i\epsilon_{abc}F_R{}^\mu{}_\nu\left(\bar{d}_R{}^a_p C\bar{d}_R{}^b_r\right)\left(\overline{u}_R{}^c_s\gamma^\nu D_\mu N_{Rt}\right)\end{array}\right.\tag{5.439}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\mathrm R}\bar d_{\mathrm R}\bar d_{\mathrm L}\bar N_{\mathrm R}\bar u_{\mathrm R}D}(-1,-1)\left|\begin{array}{l} i\epsilon_{acd}\left(\lambda^A\right)^d_{\ b}G^{A\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^b\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{bcd}\left(\lambda^A\right)^d_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^b\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{acd}\left(\lambda^A\right)^d_{\ b}G^{A\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\bar u_{\mathrm R s}{}^b\right)\left(\overline N_{\mathrm R r}\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{bcd}\left(\lambda^A\right)^d_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\bar u_{\mathrm R s}{}^b\right)\left(\overline N_{\mathrm R r}\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{acd}\left(\lambda^A\right)^d_{\ b}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R r} C D_\mu\bar u_{\mathrm R s}{}^b\right)\left(\bar d_{\mathrm R p}{}^a\gamma^\nu C \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{bcd}\left(\lambda^A\right)^d_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R r} C D_\mu\bar u_{\mathrm R s}{}^b\right)\left(\bar d_{\mathrm R p}{}^a\gamma^\nu C \bar d_{\mathrm L t}{}^c\right) \end{array}\right. \tag{5.440}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm R}\bar d_{\mathrm R}\bar d_{\mathrm L}\bar N_{\mathrm R}\bar u_{\mathrm R}D}(-1,-1)\left|\begin{array}{l} i\epsilon_{abc}F^{\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^b\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{abc}F^{\mu}_{\mathrm R\ \nu}\left(\bar d_{\mathrm R p}{}^a C\bar u_{\mathrm R s}{}^b\right)\left(\overline N_{\mathrm R r}\gamma^\nu C D_\mu \bar d_{\mathrm L t}{}^c\right)\\[4pt] i\epsilon_{abc}F^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R r} C D_\mu\bar u_{\mathrm R s}{}^b\right)\left(\bar d_{\mathrm R p}{}^a\gamma^\nu C \bar d_{\mathrm L t}{}^c\right) \end{array}\right. \tag{5.441}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm R}d_{\mathrm R}\bar e_{\mathrm R}\bar N_{\mathrm R}\bar u_{\mathrm R}D}(0,-2)\left|\begin{array}{l} i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^a\gamma^\nu D_\mu d_{\mathrm R t b}\right)\\[4pt] i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}C\bar u_{\mathrm R s}{}^a\right)\left(\overline N_{\mathrm R r}\gamma^\nu D_\mu d_{\mathrm R t b}\right)\\[4pt] i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}\gamma^\nu d_{\mathrm R t b}\right)\left(\overline N_{\mathrm R r}C D_\mu\bar u_{\mathrm R s}{}^a\right) \end{array}\right. \tag{5.442}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm R}d_{\mathrm R}\bar e_{\mathrm R}\bar N_{\mathrm R}\bar u_{\mathrm R}D}(0,-2)\left|\begin{array}{l} iF^{\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^a\gamma^\nu D_\mu d_{\mathrm R t a}\right)\\[4pt] iF^{\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}C\bar u_{\mathrm R s}{}^a\right)\left(\overline N_{\mathrm R r}\gamma^\nu D_\mu d_{\mathrm R t a}\right)\\[4pt] iF^{\mu}_{\mathrm R\ \nu}\left(\bar e_{\mathrm R p}\gamma^\nu d_{\mathrm R t a}\right)\left(\overline N_{\mathrm R r}C D_\mu\bar u_{\mathrm R s}{}^a\right) \end{array}\right. \tag{5.443}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm R}\nu_{\mathrm L}\bar N_{\mathrm R}\bar u_{\mathrm R}u_{\mathrm R}D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}C\bar u_{\mathrm R r}{}^a\right)\left(\nu_{\mathrm L s}C\gamma^\nu D_\mu u_{\mathrm R t b}\right)\\[4pt] i\left(\lambda^A\right)^b_{\ a}\left(\overline N_{\mathrm R p}\nu_{\mathrm L s}\right)G^{A\mu}_{\mathrm R\ \nu}\left(\bar u_{\mathrm R r}{}^a\gamma^\nu D_\mu u_{\mathrm R t b}\right)\\[4pt] i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}\gamma^\nu u_{\mathrm R t b}\right)\left(\bar u_{\mathrm R r}{}^a D_\mu \nu_{\mathrm L s}\right) \end{array}\right. \tag{5.444}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm R}\nu_{\mathrm L}\bar N_{\mathrm R}\bar u_{\mathrm R}u_{\mathrm R}D}(0,0)\left|\begin{array}{l} iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}C\bar u_{\mathrm R r}{}^a\right)\left(\nu_{\mathrm L s}C\gamma^\nu D_\mu u_{\mathrm R t a}\right)\\[4pt] iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}\nu_{\mathrm L s}\right)\left(\bar u_{\mathrm R r}{}^a\gamma^\nu D_\mu u_{\mathrm R t a}\right)\\[4pt] iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}\gamma^\nu u_{\mathrm R t a}\right)\left(\bar u_{\mathrm R r}{}^a D_\mu \nu_{\mathrm L s}\right) \end{array}\right. \tag{5.445}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm R}\bar N_{\mathrm R}^2\bar u_{\mathrm R}u_{\mathrm R}D}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}C\bar u_{\mathrm R s}{}^a\right)\left(\overline N_{\mathrm R r}\gamma^\nu D_\mu u_{\mathrm R t b}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\left(\lambda^A\right)^b_{\ a}G^{A\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}\gamma^\nu u_{\mathrm R t b}\right)\left(\overline N_{\mathrm R r}C D_\mu\bar u_{\mathrm R s}{}^a\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right]i\left(\lambda^A\right)^b_{\ a}\left(\overline N_{\mathrm R p}C\overline N_{\mathrm R r}\right)G^{A\mu}_{\mathrm R\ \nu}\left(\bar u_{\mathrm R s}{}^a\gamma^\nu D_\mu u_{\mathrm R t b}\right) \end{array}\right. \tag{5.446}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm R}\bar N_{\mathrm R}^2\bar u_{\mathrm R}u_{\mathrm R}D}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}C\bar u_{\mathrm R s}{}^a\right)\left(\overline N_{\mathrm R r}\gamma^\nu D_\mu u_{\mathrm R t a}\right)\\[4pt] \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}\gamma^\nu u_{\mathrm R t a}\right)\left(\overline N_{\mathrm R r}C D_\mu\bar u_{\mathrm R s}{}^a\right)\\[4pt] \mathcal{Y}\left[\overline{p\,r}\right]iF^{\mu}_{\mathrm R\ \nu}\left(\overline N_{\mathrm R p}C\overline N_{\mathrm R r}\right)\left(\bar u_{\mathrm R s}{}^a\gamma^\nu D_\mu u_{\mathrm R t a}\right) \end{array}\right. \tag{5.447}$$

$$\mathcal{O}^{(1\sim6)}_{G_R d_L^2 \bar{N}_R u_R D}(1,-1)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(d_{Lpa}Cd_{Lrb}\right)\left(\overline{N}_{Rs}\gamma^\nu D_\mu u_{Rtc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(\overline{N}_{Rs}d_{Lpa}\right)\left(d_{Lrb}C\gamma^\nu D_\mu u_{Rtc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lrb}\right)\left(d_{Lpa}C\gamma^\nu u_{Rtc}\right)\\ \mathcal{Y}\left[\boxed{p\,|\,r}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(d_{Lpa}Cd_{Lrb}\right)\left(\overline{N}_{Rs}\gamma^\nu D_\mu u_{Rtc}\right)\\ \mathcal{Y}\left[\boxed{p\,|\,r}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(\overline{N}_{Rs}d_{Lpa}\right)\left(d_{Lrb}C\gamma^\nu D_\mu u_{Rtc}\right)\\ \mathcal{Y}\left[\boxed{p\,|\,r}\right] i\left(\lambda^A\right)^a_{d}\epsilon^{bcd}G_R^{A\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lrb}\right)\left(d_{Lpa}C\gamma^\nu u_{Rtc}\right)\end{array}\right.$$

$$(5.448)$$

$$\mathcal{O}^{(1\sim3)}_{F_R d_L^2 \bar{N}_R u_R D}(1,-1)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{p\,|\,r}\right] i\epsilon^{abc}F_R^{\mu}{}_\nu\left(\overline{N}_{Rs}d_{Lpa}\right)\left(d_{Lrb}C\gamma^\nu D_\mu u_{Rtc}\right)\\ \mathcal{Y}\left[\boxed{p\,|\,r}\right] i\epsilon^{abc}F_R^{\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lrb}\right)\left(d_{Lpa}C\gamma^\nu u_{Rtc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}\right] i\epsilon^{abc}F_R^{\mu}{}_\nu\left(d_{Lpa}Cd_{Lrb}\right)\left(\overline{N}_{Rs}\gamma^\nu D_\mu u_{Rtc}\right)\end{array}\right.$$

$$(5.449)$$

$$\mathcal{O}^{(1\sim3)}_{G_R \bar{d}_R d_L \nu_L N_R D}(0,2)\left|\begin{array}{l} i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lrb}\right)\left(\nu_{Ls}C\gamma^\nu D_\mu N_{Rt}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a \nu_{Ls}\right)\left(d_{Lrb}C\gamma^\nu D_\mu N_{Rt}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(d_{Lrb}CD_\mu \nu_{Ls}\right)\left(\overline{d}_{Rp}^a\gamma^\nu N_{Rt}\right)\end{array}\right.$$

$$(5.450)$$

$$\mathcal{O}^{(1\sim3)}_{F_R \bar{d}_R d_L \nu_L N_R D}(0,2)\left|\begin{array}{l} iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lra}\right)\left(\nu_{Ls}C\gamma^\nu D_\mu N_{Rt}\right)\\ iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a \nu_{Ls}\right)\left(d_{Lra}C\gamma^\nu D_\mu N_{Rt}\right)\\ iF_R^{\mu}{}_\nu\left(d_{Lra}CD_\mu \nu_{Ls}\right)\left(\overline{d}_{Rp}^a\gamma^\nu N_{Rt}\right)\end{array}\right.$$

$$(5.451)$$

$$\mathcal{O}^{(1\sim3)}_{G_R \bar{d}_R d_L \bar{\nu}_L \bar{N}_R D}(0,-2)\left|\begin{array}{l} i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lrb}\right)\left(\overline{N}_{Rs}\gamma^\nu C D_\mu\overline{\nu}_{Lt}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a C\overline{N}_{Rs}\right)\left(D_\mu\overline{\nu}_{Lt}\gamma^\nu d_{Lrb}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lrb}\right)\left(\overline{d}_{Rp}^a\gamma^\nu C\overline{\nu}_{Lt}\right)\end{array}\right.$$

$$(5.452)$$

$$\mathcal{O}^{(1\sim3)}_{F_R \bar{d}_R d_L \bar{\nu}_L \bar{N}_R D}(0,-2)\left|\begin{array}{l} iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lra}\right)\left(\overline{N}_{Rs}\gamma^\nu C D_\mu\overline{\nu}_{Lt}\right)\\ iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a C\overline{N}_{Rs}\right)\left(D_\mu\overline{\nu}_{Lt}\gamma^\nu d_{Lra}\right)\\ iF_R^{\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lra}\right)\left(\overline{d}_{Rp}^a\gamma^\nu C\overline{\nu}_{Lt}\right)\end{array}\right.$$

$$(5.453)$$

$$\mathcal{O}^{(1\sim3)}_{G_R \bar{d}_R d_L \bar{N}_R N_R D}(0,0)\left|\begin{array}{l} i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lrb}\right)\left(\overline{N}_{Rs}\gamma^\nu D_\mu N_{Rt}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(\overline{d}_{Rp}^a C\overline{N}_{Rs}\right)\left(d_{Lrb}C\gamma^\nu D_\mu N_{Rt}\right)\\ i\left(\lambda^A\right)^b_{a}G_R^{A\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lrb}\right)\left(\overline{d}_{Rp}^a\gamma^\nu N_{Rt}\right)\end{array}\right.$$

$$(5.454)$$

$$\mathcal{O}^{(1\sim3)}_{F_R \bar{d}_R d_L \bar{N}_R N_R D}(0,0)\left|\begin{array}{l} iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a d_{Lra}\right)\left(\overline{N}_{Rs}\gamma^\nu D_\mu N_{Rt}\right)\\ iF_R^{\mu}{}_\nu\left(\overline{d}_{Rp}^a C\overline{N}_{Rs}\right)\left(d_{Lra}C\gamma^\nu D_\mu N_{Rt}\right)\\ iF_R^{\mu}{}_\nu\left(D_\mu\overline{N}_{Rs}d_{Lra}\right)\left(\overline{d}_{Rp}^a\gamma^\nu N_{Rt}\right)\end{array}\right.$$

$$(5.455)$$

$$\mathcal{O}^{(1\sim3)}_{G_R d_L \bar{e}_R \bar{N}_R \bar{u}_L D}(0,-2)\left|\begin{array}{l} i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{e}_{Rr}d_{Lpa}\right)\left(\overline{N}_{Rs}\gamma^\nu C D_\mu\overline{u}_{Lt}^b\right)\\ i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{N}_{Rs}d_{Lpa}\right)\left(\overline{e}_{Rr}\gamma^\nu C D_\mu\overline{u}_{Lt}^b\right)\\ i\left(\lambda^A\right)^a_{b}G_R^{A\mu}{}_\nu\left(\overline{e}_{Rr}C D_\mu\overline{N}_{Rs}\right)\left(\overline{u}_{Lt}^b\gamma^\nu d_{Lpa}\right)\end{array}\right.$$

$$(5.456)$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(0,-2)\left|\begin{array}{l}iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{a}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{a}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{e}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right)\end{array}\right.\tag{5.457}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\left|\begin{array}{l}i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(D_{\mu}\bar{d}_{\mathrm{L}t}^{b}\gamma^{\nu}\nu_{\mathrm{L}s}\right)\\i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{b}\right)\\i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^{b}\gamma^{\nu}d_{\mathrm{L}pa}\right)\end{array}\right.\tag{5.458}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0)\left|\begin{array}{l}iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(D_{\mu}\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}\nu_{\mathrm{L}s}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{a}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right)\end{array}\right.\tag{5.459}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{b}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^{b}\gamma^{\nu}d_{\mathrm{L}pa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]i\left(\lambda^{A}\right)^{a}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{b}\right)\end{array}\right.\tag{5.460}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}D}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{a}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}t}^{a}\gamma^{\nu}d_{\mathrm{L}pa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{d}_{\mathrm{L}t}^{a}\right)\end{array}\right.\tag{5.461}$$

$$\mathcal{O}^{(1\sim6)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}^{2}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{d}_{\mathrm{R}r}^{b}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{d}_{\mathrm{R}r}^{b}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]i\epsilon_{acd}\left(\lambda^{A}\right)^{d}_{b}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right)\end{array}\right.\tag{5.462}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}^{2}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}D}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]i\epsilon_{abc}F_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]i\epsilon_{abc}F_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}r}^{b}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}C\bar{u}_{\mathrm{L}t}^{c}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]i\epsilon_{abc}F_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{d}_{\mathrm{R}r}^{b}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\bar{u}_{\mathrm{L}t}^{c}\right)\end{array}\right.\tag{5.463}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}D}(0,0)\left|\begin{array}{l}i\left(\lambda^{A}\right)^{b}_{a}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}D_{\mu}u_{\mathrm{R}tb}\right)\\i\left(\lambda^{A}\right)^{b}_{a}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}C\gamma^{\nu}D_{\mu}u_{\mathrm{R}tb}\right)\\i\left(\lambda^{A}\right)^{b}_{a}G_{\mathrm{R}}^{A\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}u_{\mathrm{R}tb}\right)\end{array}\right.\tag{5.464}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}D}(0,0)\left|\begin{array}{l}iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}D_{\mu}u_{\mathrm{R}ta}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}C\gamma^{\nu}D_{\mu}u_{\mathrm{R}ta}\right)\\iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(D_{\mu}\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^{\nu}u_{\mathrm{R}ta}\right)\end{array}\right.\tag{5.465}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \begin{vmatrix} i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^\nu D_\mu d_{\mathrm{R}tb}\right) \\ i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu d_{\mathrm{R}tb}\right) \\ i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^\nu d_{\mathrm{R}tb}\right) \end{vmatrix} \tag{5.466}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^\nu D_\mu d_{\mathrm{R}ta}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu d_{\mathrm{R}ta}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^\nu d_{\mathrm{R}ta}\right) \end{vmatrix} \tag{5.467}$$

$$\mathcal{O}^{(1\sim3)}_{G_{\mathrm{R}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \begin{vmatrix} \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu d_{\mathrm{R}tb}\right) \\ \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^\nu d_{\mathrm{R}tb}\right) \\ \mathcal{Y}\begin{bmatrix}r|s\end{bmatrix} i\left(\lambda^A\right)^b_a G_{\mathrm{R}}^{A\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu d_{\mathrm{R}tb}\right) \end{vmatrix} \tag{5.468}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \begin{vmatrix} \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a}\gamma^\nu d_{\mathrm{R}ta}\right) \\ \mathcal{Y}\begin{bmatrix}r|s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu d_{\mathrm{R}ta}\right) \end{vmatrix} \tag{5.469}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}D}(0,2) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^\nu D_\mu N_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(e_{\mathrm{L}r}C\gamma^\nu D_\mu N_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right)\left(e_{\mathrm{L}r}CD_\mu\nu_{\mathrm{L}s}\right) \end{vmatrix} \tag{5.470}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,-2) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu CD_\mu\overline{\nu}_{\mathrm{L}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(D_\mu\overline{\nu}_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}r}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu C\overline{\nu}_{\mathrm{L}t}\right) \end{vmatrix} \tag{5.471}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}D}(0,0) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu N_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}C\gamma^\nu D_\mu N_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(D_\mu\overline{N}_{\mathrm{R}s}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}\gamma^\nu N_{\mathrm{R}t}\right) \end{vmatrix} \tag{5.472}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(D_\mu\bar{e}_{\mathrm{L}t}\gamma^\nu\nu_{\mathrm{L}s}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(e_{\mathrm{L}p}C\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu CD_\mu\bar{e}_{\mathrm{L}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right) \end{vmatrix} \tag{5.473}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \begin{vmatrix} \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu CD_\mu\bar{e}_{\mathrm{L}t}\right) \\ \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{L}t}\gamma^\nu e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\begin{bmatrix}r|s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu CD_\mu\bar{e}_{\mathrm{L}t}\right) \end{vmatrix} \tag{5.474}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}D}(0,0) \begin{vmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \\ iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D_\mu\nu_{\mathrm{L}s}\right) \end{vmatrix} \tag{5.475}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 D}(0,-2) \begin{vmatrix} \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \\ \mathcal{Y}\begin{bmatrix}r\\s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}\gamma^\nu e_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_\mu\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\begin{bmatrix}r|s\end{bmatrix} iF_{\mathrm{R}}^{\mu}{}_\nu \left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^\nu D_\mu e_{\mathrm{R}t}\right) \end{vmatrix} \tag{5.476}$$

$$\mathcal{O}^{(1,2)}_{F_{\mathrm{R}}\nu_{\mathrm{L}}^3 N_{\mathrm{R}} D}(0,4) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\nu_{\mathrm{L}r}CD_{\mu}\nu_{\mathrm{L}s}\right)\left(\nu_{\mathrm{L}p}C\gamma^{\nu}N_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\\boxed{s}\end{smallmatrix}\right] i\left(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}\right)F_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\nu_{\mathrm{L}s}C\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.477}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\nu_{\mathrm{L}}^2 \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} D}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(D_{\mu}\overline{\nu}_{\mathrm{L}t}\gamma^{\nu}\nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\nu_{\mathrm{L}r}CD_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{\nu}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(D_{\mu}\overline{\nu}_{\mathrm{L}t}\gamma^{\nu}\nu_{\mathrm{L}s}\right) \end{array} \right. \tag{5.478}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} N_{\mathrm{R}} D}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\nu_{\mathrm{L}r}CD_{\mu}\nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.479}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}CD_{\mu}\overline{\nu}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{\nu}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(D_{\mu}\overline{\nu}_{\mathrm{L}t}\gamma^{\nu}\nu_{\mathrm{L}s}\right) \end{array} \right. \tag{5.480}$$

$$\mathcal{O}^{(1\sim3)}_{F_{\mathrm{R}}\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} D}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}D_{\mu}\nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\nu_{\mathrm{L}s}C\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.481}$$

$$\mathcal{O}^{(1,2)}_{F_{\mathrm{R}}\bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^3 D}(0,-4) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right)\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}C\overline{\nu}_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}CD_{\mu}\overline{\nu}_{\mathrm{L}t}\right) \end{array} \right. \tag{5.482}$$

$$\mathcal{O}^{(1,2)}_{F_{\mathrm{R}}\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}} D}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}\gamma^{\nu}N_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}CD_{\mu}\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\\\boxed{s}\end{smallmatrix}\right] iF_{\mathrm{R}}{}^{\mu}{}_{\nu}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\gamma^{\nu}D_{\mu}N_{\mathrm{R}t}\right) \end{array} \right. \tag{5.483}$$

5.5.3 Classes involving six-fermions: ψ^6

Class ψ^6: 64 types

$$\mathcal{O}^{(1\sim3)}_{e_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} u_{\mathrm{L}}^3}(1,1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix},\boxed{t\,u\,v}\right] \epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vc}\right)\left(e_{\mathrm{L}p}Cu_{\mathrm{L}ta}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ub}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix},\begin{smallmatrix}\boxed{t\,u}\\\boxed{v}\end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ta}\right)\left(u_{\mathrm{L}ub}Cu_{\mathrm{L}vc}\right) \\ \mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}\boxed{t\,u}\\\boxed{v}\end{smallmatrix}\right] \epsilon^{abc}\left(e_{\mathrm{L}p}Ce_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(u_{\mathrm{L}ub}Cu_{\mathrm{L}vc}\right) \end{array} \right. \tag{5.484}$$

$$\mathcal{O}^{(1\sim10)}_{\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 u_{\mathrm{L}}^2}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix},\begin{smallmatrix}\boxed{t}\\\boxed{u}\end{smallmatrix}\right] \left(u_{\mathrm{L}ub}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix},\begin{smallmatrix}\boxed{t}\\\boxed{u}\end{smallmatrix}\right] \left(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix},\begin{smallmatrix}\boxed{t}\\\boxed{u}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{R}s}^{b}\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}r}^{a}u_{\mathrm{L}ub}\right) \\ \mathcal{Y}\left[\boxed{r\,s},\boxed{t\,u}\right] \left(u_{\mathrm{L}ub}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\boxed{r\,s},\boxed{t\,u}\right] \left(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\boxed{r\,s},\boxed{t\,u}\right] \left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{R}s}^{b}\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}r}^{a}u_{\mathrm{L}ub}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix},\boxed{t\,u}\right] \left(u_{\mathrm{L}ub}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix},\boxed{t\,u}\right] \left(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\boxed{r\,s},\begin{smallmatrix}\boxed{t}\\\boxed{u}\end{smallmatrix}\right] \left(u_{\mathrm{L}ub}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \\ \mathcal{Y}\left[\boxed{r\,s},\begin{smallmatrix}\boxed{t}\\\boxed{u}\end{smallmatrix}\right] \left(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v}\right)\left(\overline{u}_{\mathrm{R}s}^{b}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{a}\right) \end{array} \right. \tag{5.485}$$

$$
\mathcal{O}^{(1\sim10)}_{\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}^2 u_{\mathrm{L}}^2}(0,-2)\left|
\begin{aligned}
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{s}{t},\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{s\,t},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{s}{t},\boxed{u\,v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{s}{t},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{s\,t},\tfrac{u}{v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{s\,t},\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{s}{t},\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{u}_{\mathrm{R}s}^a C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{s}{t},\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{u}_{\mathrm{R}s}^a u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{u}_{\mathrm{R}s}^a C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{u}_{\mathrm{R}s}^a u_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)
\end{aligned}
\right.
\tag{5.486}
$$

$$
\mathcal{O}^{(1\sim15)}_{d_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}} u_{\mathrm{L}}^2}(1,-1)\left|
\begin{aligned}
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{u\,v}\right]\epsilon^{abe}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}uc}Cu_{\mathrm{L}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^c\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ud}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{R}t}^a u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ud}\right)\left(\overline{u}_{\mathrm{R}t}^a u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ve}\right)\left(\overline{u}_{\mathrm{R}t}^a d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ud}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{u}{v}\right]\epsilon^{bde}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}ud}Cu_{\mathrm{L}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^a\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{u}{v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}ud}Cu_{\mathrm{L}ve}\right)\left(\overline{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{u}{v}\right]\epsilon^{abe}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}uc}\right)\left(\overline{u}_{\mathrm{R}t}^c u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\tfrac{u}{v}\right]\epsilon^{abe}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ve}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}uc}\right)\left(\overline{u}_{\mathrm{R}t}^c d_{\mathrm{L}pa}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ud}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{R}t}^a u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right]\epsilon^{abe}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}uc}Cu_{\mathrm{L}ve}\right)\left(\overline{u}_{\mathrm{R}t}^c d_{\mathrm{L}rb}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ud}\right)\left(\overline{u}_{\mathrm{R}t}^a u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ve}\right)\left(\overline{u}_{\mathrm{R}t}^a d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ud}\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{u}{v}\right]\epsilon^{bde}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}ud}Cu_{\mathrm{L}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^a\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{u}{v}\right]\epsilon^{abe}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}uc}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{R}t}^c u_{\mathrm{L}ve}\right)\\
&\mathcal{Y}\left[\tfrac{p}{r},\tfrac{u}{v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}ud}Cu_{\mathrm{L}ve}\right)\left(\overline{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)
\end{aligned}
\right.
\tag{5.487}
$$

$$
\mathcal{O}^{(1\sim10)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}} u_{\mathrm{L}}^2}(0,0)\left|
\begin{aligned}
&\mathcal{Y}\left[\tfrac{u}{v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ua}\right)\left(\overline{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\\
&\mathcal{Y}\left[\tfrac{u}{v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{u}_{\mathrm{R}t}^b e_{\mathrm{L}r}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\
&\mathcal{Y}\left[\tfrac{u}{v}\right]\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\
&\mathcal{Y}\left[\tfrac{u}{v}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vb}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ua}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\boxed{u\,v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^b\right)\\
&\mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ua}\right)\left(\overline{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\\
&\mathcal{Y}\left[\boxed{u\,v}\right]\left(u_{\mathrm{L}ua}Cu_{\mathrm{L}vb}\right)\left(\overline{u}_{\mathrm{R}t}^b e_{\mathrm{L}r}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\
&\mathcal{Y}\left[\boxed{u\,v}\right]\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ua}\right)\left(\overline{u}_{\mathrm{R}t}^b u_{\mathrm{L}vb}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\
&\mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vb}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ua}\right)\left(\overline{d}_{\mathrm{R}p}^a C\overline{u}_{\mathrm{R}t}^b\right)
\end{aligned}
\right.
\tag{5.488}
$$

$$\mathcal{O}^{(1\sim5)}_{d_{\mathrm{L}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^{2}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{L}pa}Ce_{\mathrm{L}r}\right)\left(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}tb}\right)\left(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}v}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}uc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}tb}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{L}pa}Ce_{\mathrm{L}r}\right)\left(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}tb}\right)\left(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}\right)\end{array}\right.\tag{5.489}$$

$$\mathcal{O}^{(1\sim5)}_{d_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}^{2}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ub}\right)\left(\overline{N}_{\mathrm{R}t}u_{\mathrm{L}vc}\right)\left(d_{\mathrm{L}pa}Ce_{\mathrm{L}r}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}u_{\mathrm{L}vc}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ub}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}ub}Cu_{\mathrm{L}vc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}u_{\mathrm{L}vc}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ub}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}Ce_{\mathrm{L}r}\right)\left(u_{\mathrm{L}ub}Cu_{\mathrm{L}vc}\right)\end{array}\right.\tag{5.490}$$

$$\mathcal{O}^{(1\sim10)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^{2}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{a}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{b}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{c}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{a}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}^{a}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{b}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}^{c}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{a}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t\\u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vb}\right)\left(\bar{u}^{b}_{\mathrm{R}t}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{a}_{\mathrm{R}u}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{a}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{b}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\left(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{c}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{a}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}^{a}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{b}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}^{c}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{a}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}t&u\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vb}\right)\left(\bar{u}^{b}_{\mathrm{R}t}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}^{a}_{\mathrm{R}u}\right)\end{array}\right.\tag{5.491}$$

$$\mathcal{O}^{(1\sim15)}_{\bar{d}_{\mathrm{R}}^{2}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^{2}u_{\mathrm{L}}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{abd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}va}\right)\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{u}^{c}_{\mathrm{R}t}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{d}_{\mathrm{R}u}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{abd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{abd}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}vc}\right)\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{u}^{c}_{\mathrm{R}t}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{d}_{\mathrm{R}u}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{abd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t&u\end{smallmatrix}}\,\epsilon_{bcd}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}va}\right)\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{u}^{c}_{\mathrm{R}t}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{d}_{\mathrm{R}u}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{abd}\left(\bar{d}^{a}_{\mathrm{R}p}C\bar{d}^{b}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}^{c}_{\mathrm{R}t}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t\\u\end{smallmatrix}}\,\epsilon_{bcd}\left(\bar{d}^{a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}^{d}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}^{b}_{\mathrm{R}r}C\bar{u}^{c}_{\mathrm{R}t}\right)\end{array}\right.\tag{5.492}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_R d_L \nu_L \bar{N}_R \bar{u}_R u_L}(0,0)\left|\begin{array}{l}(u_{Lua}C\nu_{Lv})\left(\bar{d}_{R_p}^a d_{Lrb}\right)\left(\overline{N}_{Rs}C\bar{u}_{Rt}^b\right)\\[4pt](u_{Luc}C\nu_{Lv})\left(\bar{d}_{R_p}^a d_{Lra}\right)\left(\overline{N}_{Rs}C\bar{u}_{Rt}^c\right)\\[4pt]\left(\overline{N}_{Rs}u_{Lua}\right)\left(\bar{u}_{Rt}^b\nu_{Lv}\right)\left(\bar{d}_{R_p}^a d_{Lrb}\right)\\[4pt]\left(\overline{N}_{Rs}u_{Luc}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right)\left(\bar{u}_{Rt}^c\nu_{Lv}\right)\\[4pt](u_{Lua}C\nu_{Lv})\left(\bar{u}_{Rt}^b d_{Lrb}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt](u_{Luc}C\nu_{Lv})\left(\bar{u}_{Rt}^c d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\left(\bar{u}_{Rt}^b\nu_{Lv}\right)(d_{Lrb}Cu_{Lua})\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\left(\bar{u}_{Rt}^c\nu_{Lv}\right)(d_{Lra}Cu_{Luc})\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\left(\overline{N}_{Rs}\nu_{Lv}\right)(d_{Lrb}Cu_{Lua})\left(\bar{d}_{R_p}^a C\bar{u}_{Rt}^b\right)\\[4pt]\left(\overline{N}_{Rs}\nu_{Lv}\right)(d_{Lra}Cu_{Luc})\left(\bar{d}_{R_p}^a C\bar{u}_{Rt}^c\right)\end{array}\right.\qquad(5.493)$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_R d_L \bar{N}_R^2 \bar{u}_R u_L}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}u_{Lva}\right)\left(\bar{d}_{R_p}^a d_{Lrb}\right)\left(\overline{N}_{Rs}C\bar{u}_{Ru}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}u_{Lvc}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right)\left(\overline{N}_{Rs}C\bar{u}_{Ru}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}d_{Lrb}\right)\left(\bar{u}_{Ru}^b u_{Lva}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}d_{Lra}\right)\left(\bar{u}_{Ru}^c u_{Lvc}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}u_{Lva}\right)\left(\bar{u}_{Ru}^b d_{Lrb}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}u_{Lvc}\right)\left(\bar{u}_{Ru}^c d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right)\left(\bar{d}_{R_p}^a d_{Lrb}\right)\left(\bar{u}_{Ru}^b u_{Lva}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right)\left(\bar{u}_{Ru}^c u_{Lvc}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rt}u_{Lva}\right)\left(\bar{u}_{Ru}^b d_{Lrb}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rt}u_{Lvc}\right)\left(\bar{u}_{Ru}^c d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)\end{array}\right.\qquad(5.494)$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}_R e_L \nu_L \bar{N}_R \bar{u}_R u_L}(0,0)\left|\begin{array}{l}(\bar{e}_{Rp}e_{Lr})(u_{Lua}C\nu_{Lv})\left(\overline{N}_{Rs}C\bar{u}_{Rt}^a\right)\\[4pt](\bar{e}_{Rp}e_{Lr})\left(\overline{N}_{Rs}u_{Lua}\right)\left(\bar{u}_{Rt}^a\nu_{Lv}\right)\\[4pt]\left(\bar{e}_{Rp}C\overline{N}_{Rs}\right)(u_{Lua}C\nu_{Lv})\left(\bar{u}_{Rt}^a e_{Lr}\right)\\[4pt]\left(\bar{e}_{Rp}C\overline{N}_{Rs}\right)(e_{Lr}Cu_{Lua})\left(\bar{u}_{Rt}^a\nu_{Lv}\right)\\[4pt]\left(\overline{N}_{Rs}\nu_{Lv}\right)(e_{Lr}Cu_{Lua})\left(\bar{e}_{Rp}C\bar{u}_{Rt}^a\right)\end{array}\right.\qquad(5.495)$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}_R e_L \bar{N}_R^2 \bar{u}_R u_L}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right](\bar{e}_{Rp}e_{Lr})\left(\overline{N}_{Rt}u_{Lva}\right)\left(\overline{N}_{Rs}C\bar{u}_{Ru}^a\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}e_{Lr}\right)\left(\bar{e}_{Rp}C\overline{N}_{Rs}\right)\left(\bar{u}_{Ru}^a u_{Lva}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{Rt}u_{Lva}\right)\left(\bar{e}_{Rp}C\overline{N}_{Rs}\right)\left(\bar{u}_{Ru}^a e_{Lr}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right)(\bar{e}_{Rp}e_{Lr})\left(\bar{u}_{Ru}^a u_{Lva}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{Rt}u_{Lva}\right)\left(\bar{e}_{Rp}C\overline{N}_{Rs}\right)\left(\bar{u}_{Ru}^a e_{Lr}\right)\end{array}\right.\qquad(5.496)$$

$$\mathcal{O}^{(1\sim3)}_{\nu_L^3 \bar{N}_R \bar{u}_R u_L}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}t\\u\\v\end{smallmatrix}\right]\left(\overline{N}_{Rp}\nu_{Lt}\right)(u_{Lsa}C\nu_{Lv})\left(\bar{u}_{Rr}^a\nu_{Lu}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t&u\\v\end{smallmatrix}\right](\nu_{Lu}C\nu_{Lv})(u_{Lsa}C\nu_{Lt})\left(\overline{N}_{Rp}C\bar{u}_{Rr}^a\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t&u\\v\end{smallmatrix}\right](\nu_{Lu}C\nu_{Lv})\left(\overline{N}_{Rp}u_{Lsa}\right)\left(\bar{u}_{Rr}^a\nu_{Lt}\right)\end{array}\right.\qquad(5.497)$$

$$\mathcal{O}^{(1\sim5)}_{\nu_{\rm L}^2 \bar{N}_{\rm R}^2 \bar{u}_{\rm R} u_{\rm L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\rm R r}\nu_{\rm L u}\right)\left(u_{\rm L t a}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R p}C\overline{u}_{\rm R s}{}^a\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\rm R r}\nu_{\rm L u}\right)\left(\overline{N}_{\rm R p}u_{\rm L t a}\right)\left(\overline{u}_{\rm R s}{}^a\nu_{\rm L v}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{u\,v}\right] \left(\nu_{\rm L u}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R r}u_{\rm L t a}\right)\left(\overline{N}_{\rm R p}C\overline{u}_{\rm R s}{}^a\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(u_{\rm L t a}C\nu_{\rm L v}\right)\left(\overline{u}_{\rm R s}{}^a\nu_{\rm L u}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \boxed{u\,v}\right] \left(\nu_{\rm L u}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(\overline{u}_{\rm R s}{}^a u_{\rm L t a}\right) \end{array} \right. \tag{5.498}$$

$$\mathcal{O}^{(1\sim3)}_{\nu_{\rm L} \bar{N}_{\rm R}^3 \bar{u}_{\rm R} u_{\rm L}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \left(\overline{N}_{\rm R s}\nu_{\rm L v}\right)\left(\overline{N}_{\rm R r}u_{\rm L u a}\right)\left(\overline{N}_{\rm R p}C\overline{u}_{\rm R t}{}^a\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(u_{\rm L u a}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R s}C\overline{u}_{\rm R t}{}^a\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(\overline{N}_{\rm R s}u_{\rm L u a}\right)\left(\overline{u}_{\rm R t}{}^a\nu_{\rm L v}\right) \end{array} \right. \tag{5.499}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\rm R}^4 \bar{u}_{\rm R} u_{\rm L}}(0,-4) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \\ t \end{smallmatrix}\right] \left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(\overline{N}_{\rm R t}u_{\rm L v a}\right)\left(\overline{N}_{\rm R s}C\overline{u}_{\rm R u}{}^a\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s & t \end{smallmatrix}\right] \left(\overline{N}_{\rm R p}C\overline{N}_{\rm R r}\right)\left(\overline{N}_{\rm R s}C\overline{N}_{\rm R t}\right)\left(\overline{u}_{\rm R u}{}^a u_{\rm L v a}\right) \end{array} \right. \tag{5.500}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_{\rm R} d_{\rm L}^3 \bar{N}_{\rm R} u_{\rm L}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_{\rm R u}u_{\rm L v e}\right)\left(d_{\rm L s c}C d_{\rm L t d}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r a}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\rm R u}u_{\rm L v a}\right)\left(d_{\rm L s c}C d_{\rm L t d}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_{\rm R u}d_{\rm L s c}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r a}\right)\left(d_{\rm L t d}C u_{\rm L v e}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{bde}\left(\overline{N}_{\rm R u}d_{\rm L s a}\right)\left(d_{\rm L t d}C u_{\rm L v e}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\rm R u}d_{\rm L s c}\right)\left(d_{\rm L t d}C u_{\rm L v a}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s\,t}\right] \epsilon^{bde}\left(\overline{N}_{\rm R u}u_{\rm L v e}\right)\left(d_{\rm L s a}C d_{\rm L t d}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s\,t}\right] \epsilon^{cde}\left(\overline{N}_{\rm R u}d_{\rm L s c}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r a}\right)\left(d_{\rm L t d}C u_{\rm L v e}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s\,t}\right] \epsilon^{bde}\left(\overline{N}_{\rm R u}d_{\rm L s a}\right)\left(d_{\rm L t d}C u_{\rm L v e}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r \\ s \\ t \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_{\rm R u}u_{\rm L v e}\right)\left(d_{\rm L s c}C d_{\rm L t d}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r a}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} r \\ s \\ t \end{smallmatrix}\right] \epsilon^{bde}\left(\overline{N}_{\rm R u}d_{\rm L s a}\right)\left(d_{\rm L t d}C u_{\rm L v e}\right)\left(\overline{d}_{\rm R p}{}^a d_{\rm L r b}\right) \end{array} \right. \tag{5.501}$$

$$\mathcal{O}^{(1\sim5)}_{d_{\rm L}^2 \bar{e}_{\rm R} e_{\rm L} \bar{N}_{\rm R} u_{\rm L}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon^{abc}\left(\overline{e}_{\rm R s}d_{\rm L p a}\right)\left(\overline{N}_{\rm R u}u_{\rm L v c}\right)\left(d_{\rm L r b}C e_{\rm L t}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon^{abc}\left(\overline{e}_{\rm R s}d_{\rm L p a}\right)\left(\overline{N}_{\rm R u}d_{\rm L r b}\right)\left(e_{\rm L t}C u_{\rm L v c}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right] \epsilon^{abc}\left(\overline{N}_{\rm R u}d_{\rm L r b}\right)\left(\overline{e}_{\rm R s}u_{\rm L v c}\right)\left(d_{\rm L p a}C e_{\rm L t}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{e}_{\rm R s}e_{\rm L t}\right)\left(\overline{N}_{\rm R u}u_{\rm L v c}\right)\left(d_{\rm L p a}C d_{\rm L r b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{e}_{\rm R s}C\overline{N}_{\rm R u}\right)\left(d_{\rm L p a}C d_{\rm L r b}\right)\left(e_{\rm L t}C u_{\rm L v c}\right) \end{array} \right. \tag{5.502}$$

$$\mathcal{O}^{(1\sim5)}_{d_{\rm L}^2 \nu_{\rm L}^2 \bar{N}_{\rm R} u_{\rm L}}(1,1) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_{\rm R s}d_{\rm L p a}\right)\left(d_{\rm L r b}C\nu_{\rm L u}\right)\left(u_{\rm L t c}C\nu_{\rm L v}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_{\rm R s}\nu_{\rm L v}\right)\left(d_{\rm L r b}C\nu_{\rm L u}\right)\left(d_{\rm L p a}C u_{\rm L t c}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \boxed{u\,v}\right] \epsilon^{abc}\left(\nu_{\rm L u}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R s}d_{\rm L p a}\right)\left(d_{\rm L r b}C u_{\rm L t c}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_{\rm R s}\nu_{\rm L u}\right)\left(d_{\rm L p a}C d_{\rm L r b}\right)\left(u_{\rm L t c}C\nu_{\rm L v}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{u\,v}\right] \epsilon^{abc}\left(\nu_{\rm L u}C\nu_{\rm L v}\right)\left(\overline{N}_{\rm R s}u_{\rm L t c}\right)\left(d_{\rm L p a}C d_{\rm L r b}\right) \end{array} \right. \tag{5.503}$$

$$\mathcal{O}^{(1\sim5)}_{d_\mathrm{L}^2\nu_\mathrm{L}\bar{N}_\mathrm{R}^2 u_\mathrm{L}}(1,-1) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(d_{\mathrm{L}rb}Cu_{\mathrm{L}uc}) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(d_{\mathrm{L}rb}Cu_{\mathrm{L}uc}) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}uc}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})(u_{\mathrm{L}uc}C\nu_{\mathrm{L}v}) \end{array}\right. \tag{5.504}$$

$$\mathcal{O}^{(1\sim3)}_{d_\mathrm{L}^2\bar{N}_\mathrm{R}^3 u_\mathrm{L}}(1,-3) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\\u\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vc}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vc}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vc}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}) \end{array}\right. \tag{5.505}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_\mathrm{R}^2 d_\mathrm{L}e_\mathrm{L}\bar{N}_\mathrm{R}u_\mathrm{L}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)(d_{\mathrm{L}sa}Ce_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sa}\right)(e_{\mathrm{L}t}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right](e_{\mathrm{L}t}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\right]\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}t}\right)(d_{\mathrm{L}sa}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)(d_{\mathrm{L}sa}Ce_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sa}\right)(e_{\mathrm{L}t}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\right](e_{\mathrm{L}t}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}}\right]\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}t}\right)(d_{\mathrm{L}sa}Cu_{\mathrm{L}vb})\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}u}\right) \end{array}\right. \tag{5.506}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_\mathrm{R}\bar{e}_\mathrm{R}e_\mathrm{L}^2\bar{N}_\mathrm{R}u_\mathrm{L}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}u}e_{\mathrm{L}s}\right)(e_{\mathrm{L}t}Cu_{\mathrm{L}va})\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\bar{e}_{\mathrm{R}r}e_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}u}\right)(e_{\mathrm{L}t}Cu_{\mathrm{L}va})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right](e_{\mathrm{L}s}Ce_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}u}\right)(e_{\mathrm{L}t}Cu_{\mathrm{L}va})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \end{array}\right. \tag{5.507}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_\mathrm{R}e_\mathrm{L}\nu_\mathrm{L}^2\bar{N}_\mathrm{R}u_\mathrm{L}}(0,2) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}u}\right)(u_{\mathrm{L}ta}C\nu_{\mathrm{L}v})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right](e_{\mathrm{L}r}C\nu_{\mathrm{L}u})(u_{\mathrm{L}ta}C\nu_{\mathrm{L}v})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}v}\right)(e_{\mathrm{L}r}C\nu_{\mathrm{L}u})\left(\bar{d}_{\mathrm{R}p}^a u_{\mathrm{L}ta}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}u&v\end{smallmatrix}}\right](\nu_{\mathrm{L}u}C\nu_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}u&v\end{smallmatrix}}\right](\nu_{\mathrm{L}u}C\nu_{\mathrm{L}v})(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.508}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_\mathrm{R}e_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R}^2 u_\mathrm{L}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(u_{\mathrm{L}ua}C\nu_{\mathrm{L}v})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right) \\ \mathcal{Y}\left[\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}t}\nu_{\mathrm{L}v}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.509}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\\u\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s&t\\u\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s&t\\u\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}u}u_{\mathrm{L}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\end{array}\right. \tag{5.510}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^3}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u&v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}t}^a\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}u}^b\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}t&u\\v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^a\right)\left(\bar{u}_{\mathrm{R}u}^b C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix},\begin{smallmatrix}t&u\\v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\left(\bar{u}_{\mathrm{R}u}^b C\bar{u}_{\mathrm{R}v}^c\right)\end{array}\right. \tag{5.511}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}t&u\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}u}^c\nu_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t&u\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}u}^c\nu_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t&u\end{smallmatrix}\right]\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}v}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}u}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}t}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t\\u\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}u}^c\nu_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}t\\u\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}u}^c\nu_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^b\right)\end{array}\right. \tag{5.512}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}^2}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}u}^b\right)\left(\overline{N}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}u}^b\right)\left(\overline{N}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{R}u}^b C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u&v\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}u}^b\right)\left(\overline{N}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}u}^b C\bar{u}_{\mathrm{R}v}^c\right)\end{array}\right. \tag{5.513}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}^2\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\bar{e}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}u}C\bar{u}_{\mathrm{R}v}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\bar{e}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{N}_{\mathrm{R}u}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{e}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{e}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}rb}\right)\left(\bar{u}_{\mathrm{R}v}^b d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]\left(\bar{e}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}u}C\bar{u}_{\mathrm{R}v}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]\left(\bar{e}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{N}_{\mathrm{R}u}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{e}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{e}_{\mathrm{R}t}C\bar{u}_{\mathrm{R}v}^c\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}u}d_{\mathrm{L}rb}\right)\left(\bar{u}_{\mathrm{R}v}^b d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}t}\right)\end{array}\right. \tag{5.514}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_\mathrm{R}^3 d_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c d_{\mathrm{L}tb}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{bce} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c d_{\mathrm{L}ta}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{u}_{\mathrm{R}v}^e d_{\mathrm{L}tb}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{bce} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{u}_{\mathrm{R}v}^e d_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{bce} \left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{R}r}^b C \bar{N}_{\mathrm{R}u}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c d_{\mathrm{L}tb}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{u}_{\mathrm{R}v}^e d_{\mathrm{L}tb}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}tb}\right) \left(\bar{d}_{\mathrm{R}r}^b C \bar{N}_{\mathrm{R}u}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c d_{\mathrm{L}tb}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{u}_{\mathrm{R}v}^e d_{\mathrm{L}tb}\right) \left(\bar{d}_{\mathrm{R}s}^c C \bar{N}_{\mathrm{R}u}\right) \end{array} \right.$$

(5.515)

$$\mathcal{O}^{(1\sim5)}_{d_\mathrm{L} \bar{e}_\mathrm{R}^2 e_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}s} e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}s} C \bar{N}_{\mathrm{R}u}\right) \left(\bar{u}_{\mathrm{R}v}^a e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}r} C \bar{N}_{\mathrm{R}u}\right) \left(d_{\mathrm{L}pa} C e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}v}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}s} e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}s} C \bar{N}_{\mathrm{R}u}\right) \left(\bar{u}_{\mathrm{R}v}^a e_{\mathrm{L}t}\right) \end{array} \right.$$

(5.516)

$$\mathcal{O}^{(1\sim5)}_{d_\mathrm{L} \bar{e}_\mathrm{R} \nu_\mathrm{L}^2 \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} \nu_{\mathrm{L}u}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{u}_{\mathrm{R}t}^a \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}u}\right) \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{u}_{\mathrm{R}t}^a \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}u}\right) \left(\bar{N}_{\mathrm{R}s} \nu_{\mathrm{L}v}\right) \left(\bar{u}_{\mathrm{R}t}^a d_{\mathrm{L}pa}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^a\right) \end{array} \right.$$

(5.517)

$$\mathcal{O}^{(1\sim5)}_{d_\mathrm{L} \bar{e}_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R}^2 \bar{u}_\mathrm{R}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}u}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{N}_{\mathrm{R}t}\right) \left(\bar{u}_{\mathrm{R}u}^a \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}u}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} C \bar{N}_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{u}_{\mathrm{R}u}^a \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}u}^a\right) \end{array} \right.$$

(5.518)

$$\mathcal{O}^{(1\sim3)}_{d_\mathrm{L} \bar{e}_\mathrm{R} \bar{N}_\mathrm{R}^3 \bar{u}_\mathrm{R}}(0,-4) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \\ u \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{N}_{\mathrm{R}t}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} C \bar{N}_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^a\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u \end{smallmatrix}\right] \left(\bar{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{R}r} C \bar{N}_{\mathrm{R}t}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^a\right) \end{array} \right.$$

(5.519)

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_\mathrm{R}^2 \bar{e}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{d}_{\mathrm{R}r}^b e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{u}_{\mathrm{R}v}^c e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \left(\bar{d}_{\mathrm{R}r}^b C \bar{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}r}^b C \bar{N}_{\mathrm{R}u}\right) \left(\bar{e}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}v}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{e}_{\mathrm{R}s} e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{N}_{\mathrm{R}u} C \bar{u}_{\mathrm{R}v}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{e}_{\mathrm{R}s} C \bar{N}_{\mathrm{R}u}\right) \left(\bar{u}_{\mathrm{R}v}^c e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \end{array} \right.$$

(5.520)

$$\mathcal{O}^{(1\sim5)}_{\bar d_{\rm R}^2\nu_{\rm L}^2\bar N_{\rm R}\bar u_{\rm R}}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\bar d_{{\rm R}r}^b\nu_{{\rm L}u}\right)\left(\bar u_{{\rm R}t}^c\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}s}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}r}^b\nu_{{\rm L}u}\right)\left(\bar d_{{\rm R}p}^a C\bar u_{{\rm R}t}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}u&v\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\nu_{{\rm L}u}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\bar u_{{\rm R}t}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}s}\nu_{{\rm L}u}\right)\left(\bar u_{{\rm R}t}^c\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u&v\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\nu_{{\rm L}u}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\left(\overline N_{{\rm R}s}C\bar u_{{\rm R}t}^c\right)\end{array}\right.\tag{5.521}$$

$$\mathcal{O}^{(1\sim5)}_{\bar d_{\rm R}^2\nu_{\rm L}\bar N_{\rm R}^2\bar u_{\rm R}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\bar u_{{\rm R}u}^c\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}t}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}t}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\bar u_{{\rm R}u}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}t}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\bar u_{{\rm R}u}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}t}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\left(\overline N_{{\rm R}s}C\bar u_{{\rm R}u}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}s}C\overline N_{{\rm R}t}\right)\left(\bar u_{{\rm R}u}^c\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\end{array}\right.\tag{5.522}$$

$$\mathcal{O}^{(1\sim3)}_{\bar d_{\rm R}^2\bar N_{\rm R}^3\bar u_{\rm R}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\\u\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}t}\right)\left(\overline N_{{\rm R}u}C\bar u_{{\rm R}v}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\bar d_{{\rm R}p}^a C\overline N_{{\rm R}s}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}t}\right)\left(\overline N_{{\rm R}u}C\bar u_{{\rm R}v}^c\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\\u\end{smallmatrix}}\right]\,\epsilon_{abc}\left(\overline N_{{\rm R}s}C\overline N_{{\rm R}t}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\left(\overline N_{{\rm R}u}C\bar u_{{\rm R}v}^c\right)\end{array}\right.\tag{5.523}$$

$$\mathcal{O}^{(1\sim3)}_{d_{\rm L}^3\bar e_{\rm R}\nu_{\rm L}\bar N_{\rm R}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r&s\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\bar e_{{\rm R}t}d_{{\rm L}pa}\right)\left(\overline N_{{\rm R}u}d_{{\rm L}rb}\right)\left(d_{{\rm L}sc}C\nu_{{\rm L}v}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\overline N_{{\rm R}u}\nu_{{\rm L}v}\right)\left(\bar e_{{\rm R}t}d_{{\rm L}sc}\right)\left(d_{{\rm L}pa}C d_{{\rm L}rb}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\bar e_{{\rm R}t}\nu_{{\rm L}v}\right)\left(\overline N_{{\rm R}u}d_{{\rm L}sc}\right)\left(d_{{\rm L}pa}C d_{{\rm L}rb}\right)\end{array}\right.\tag{5.524}$$

$$\mathcal{O}^{(1\sim3)}_{d_{\rm L}^3\bar e_{\rm R}\bar N_{\rm R}^2}(1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r&s\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\bar e_{{\rm R}t}d_{{\rm L}pa}\right)\left(\overline N_{{\rm R}u}d_{{\rm L}rb}\right)\left(\overline N_{{\rm R}v}d_{{\rm L}sc}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\overline N_{{\rm R}u}d_{{\rm L}sc}\right)\left(\bar e_{{\rm R}t}C\overline N_{{\rm R}v}\right)\left(d_{{\rm L}pa}C d_{{\rm L}rb}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}u&v\end{smallmatrix}}\right]\,\epsilon^{abc}\left(\overline N_{{\rm R}u}C\overline N_{{\rm R}v}\right)\left(\bar e_{{\rm R}t}d_{{\rm L}sc}\right)\left(d_{{\rm L}pa}C d_{{\rm L}rb}\right)\end{array}\right.\tag{5.525}$$

$$\mathcal{O}^{(1\sim10)}_{\bar d_{\rm R}^2 d_{\rm L}^2\nu_{\rm L}\bar N_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}\nu_{{\rm L}v}\right)\left(d_{{\rm L}sa}C d_{{\rm L}tb}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b d_{{\rm L}tb}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}u}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}\nu_{{\rm L}v}\right)\left(d_{{\rm L}sa}C d_{{\rm L}tb}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b d_{{\rm L}tb}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}u}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}d_{{\rm L}sa}\right)\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s&t\end{smallmatrix}}\right]\,\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}u}\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\left(\overline N_{{\rm R}u}d_{{\rm L}sa}\right)\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a C\bar d_{{\rm R}r}^b\right)\\[4pt]\mathcal{Y}\left[\boxed{\begin{smallmatrix}p&r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\,\left(d_{{\rm L}tb}C\nu_{{\rm L}v}\right)\left(\bar d_{{\rm R}p}^a d_{{\rm L}sa}\right)\left(\bar d_{{\rm R}r}^b C\overline N_{{\rm R}u}\right)\end{array}\right.\tag{5.526}$$

$$\mathcal{O}^{(1\sim10)}_{\bar{d}_R^2 d_L^2 \bar{N}_R^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}, \begin{smallmatrix}s\\t\end{smallmatrix}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b C\overline{N}_{Ru}\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b C\overline{N}_{Ru}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}, \begin{smallmatrix}s\\t\end{smallmatrix}, \boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(d_{Lsa} C d_{Ltb}\right)\left(\bar{d}_{R_p}^a C\bar{d}_{R_r}^b\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}, \begin{smallmatrix}s\\t\end{smallmatrix}, \boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b d_{Ltb}\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(d_{Lsa} C d_{Ltb}\right)\left(\bar{d}_{R_p}^a C\bar{d}_{R_r}^b\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b d_{Ltb}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}, \boxed{s\,t}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Ru} d_{Lsa}\right)\left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a C\bar{d}_{R_r}^b\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\r\end{smallmatrix}, \boxed{s\,t}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b C\overline{N}_{Ru}\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix}s\\t\end{smallmatrix}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Ru} d_{Lsa}\right)\left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a C\bar{d}_{R_r}^b\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix}s\\t\end{smallmatrix}, \begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} d_{Ltb}\right)\left(\bar{d}_{R_p}^a d_{Lsa}\right)\left(\bar{d}_{R_r}^b C\overline{N}_{Ru}\right)
\end{array}\right. \tag{5.527}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_R d_L \bar{e}_R e_L \nu_L \bar{N}_R}(0,0) \left|
\begin{array}{l}
\left(\bar{e}_{Rs} e_{Lt}\right)\left(\overline{N}_{Ru} \nu_{Lv}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\left(e_{Lt} C\nu_{Lv}\right)\left(\bar{e}_{Rs} C\overline{N}_{Ru}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\left(\overline{N}_{Ru} \nu_{Lv}\right)\left(d_{Lra} C e_{Lt}\right)\left(\bar{d}_{R_p}^a C\bar{e}_{Rs}\right) \\
\left(e_{Lt} C\nu_{Lv}\right)\left(\overline{N}_{Ru} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\bar{e}_{Rs}\right) \\
\left(\bar{e}_{Rs} \nu_{Lv}\right)\left(\overline{N}_{Ru} d_{Lra}\right)\left(\bar{d}_{R_p}^a e_{Lt}\right)
\end{array}\right. \tag{5.528}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_R d_L \bar{e}_R e_L \bar{N}_R^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} e_{Lt}\right)\left(\bar{e}_{Rs} C\overline{N}_{Ru}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Rv} e_{Lt}\right)\left(\overline{N}_{Ru} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\bar{e}_{Rs}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{u}\\v\end{smallmatrix}\right] \left(\overline{N}_{Ru} d_{Lra}\right)\left(\bar{e}_{Rs} C\overline{N}_{Rv}\right)\left(\bar{d}_{R_p}^a e_{Lt}\right) \\
\mathcal{Y}\left[\boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(\bar{e}_{Rs} e_{Lt}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\mathcal{Y}\left[\boxed{u\,v}\right] \left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(d_{Lra} C e_{Lt}\right)\left(\bar{d}_{R_p}^a C\bar{e}_{Rs}\right)
\end{array}\right. \tag{5.529}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_R d_L \nu_L^3 \bar{N}_R}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}t\\u\\v\end{smallmatrix}\right] \left(\overline{N}_{Rs} \nu_{Lv}\right)\left(d_{Lra} C\nu_{Lu}\right)\left(\bar{d}_{R_p}^a \nu_{Lt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}t\,u\\v\end{smallmatrix}\right] \left(\nu_{Lu} C\nu_{Lv}\right)\left(\overline{N}_{Rs} \nu_{Lt}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\mathcal{Y}\left[\boxed{\begin{smallmatrix}t\,u\\v\end{smallmatrix}}\right] \left(\nu_{Lu} C\nu_{Lv}\right)\left(d_{Lra} C\nu_{Lt}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)
\end{array}\right. \tag{5.530}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{d}_R d_L \nu_L^2 \bar{N}_R^2}(0,0) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}, \begin{smallmatrix}u\\v\end{smallmatrix}\right] \left(\overline{N}_{Rs} \nu_{Lu}\right)\left(\overline{N}_{Rt} \nu_{Lv}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}, \begin{smallmatrix}u\\v\end{smallmatrix}\right] \left(\overline{N}_{Rt} \nu_{Lv}\right)\left(d_{Lra} C\nu_{Lu}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}, \boxed{u\,v}\right] \left(\nu_{Lu} C\nu_{Lv}\right)\left(\overline{N}_{Rt} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right) \\
\mathcal{Y}\left[\boxed{s\,t}, \begin{smallmatrix}u\\v\end{smallmatrix}\right] \left(\overline{N}_{Rt} \nu_{Lv}\right)\left(d_{Lra} C\nu_{Lu}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right) \\
\mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right] \left(\nu_{Lu} C\nu_{Lv}\right)\left(\overline{N}_{Rs} C\overline{N}_{Rt}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right)
\end{array}\right. \tag{5.531}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_R d_L \nu_L \bar{N}_R^3}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s}\\t\\u\end{smallmatrix}\right] \left(\overline{N}_{Ru} \nu_{Lv}\right)\left(\overline{N}_{Rt} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\\u\end{smallmatrix}\right] \left(\overline{N}_{Rs} C\overline{N}_{Rt}\right)\left(\overline{N}_{Ru} \nu_{Lv}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\\u\end{smallmatrix}\right] \left(\overline{N}_{Ru} \nu_{Lv}\right)\left(\overline{N}_{Rt} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right)
\end{array}\right. \tag{5.532}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R d_L \bar{N}_R^4}(0,-4) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\\u\\v\end{smallmatrix}\right] \left(\overline{N}_{Rt} C\overline{N}_{Rv}\right)\left(\overline{N}_{Ru} d_{Lra}\right)\left(\bar{d}_{R_p}^a C\overline{N}_{Rs}\right) \\
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\\u\,v\end{smallmatrix}\right] \left(\overline{N}_{Rs} C\overline{N}_{Rt}\right)\left(\overline{N}_{Ru} C\overline{N}_{Rv}\right)\left(\bar{d}_{R_p}^a d_{Lra}\right)
\end{array}\right. \tag{5.533}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_\mathrm{R}^3 e_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}s}^c \nu_{\mathrm{L}v}\right) \left(\bar{d}_{\mathrm{R}r}^b C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \left(\bar{d}_{\mathrm{R}s}^c e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{abc} \left(e_{\mathrm{L}t} C \nu_{\mathrm{L}v}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c C \overline{N}_{\mathrm{R}u}\right) \end{array}\right. \tag{5.534}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{d}_\mathrm{R}^3 e_\mathrm{L} \bar{N}_\mathrm{R}^2}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}, \begin{smallmatrix} u \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}r}^b C \overline{N}_{\mathrm{R}u}\right) \left(\bar{d}_{\mathrm{R}s}^c C \overline{N}_{\mathrm{R}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{\mathrm{R}v} e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \left(\bar{d}_{\mathrm{R}s}^c C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{\mathrm{R}u} C \overline{N}_{\mathrm{R}v}\right) \left(\bar{d}_{\mathrm{R}s}^c e_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \end{array}\right. \tag{5.535}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}_\mathrm{R}^2 e_\mathrm{L}^2 \nu_\mathrm{L} \bar{N}_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(\bar{e}_{\mathrm{R}r} e_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(e_{\mathrm{L}t} C \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(e_{\mathrm{L}t} C \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} C \bar{e}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}u} e_{\mathrm{L}s}\right) \left(e_{\mathrm{L}t} C \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \left(e_{\mathrm{L}s} C e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}p} C \bar{e}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \end{array}\right. \tag{5.536}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}_\mathrm{R}^2 e_\mathrm{L}^2 \bar{N}_\mathrm{R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(\overline{N}_{\mathrm{R}v} e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}u} C \overline{N}_{\mathrm{R}v}\right) \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(\bar{e}_{\mathrm{R}r} e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}s}\right) \left(\overline{N}_{\mathrm{R}v} e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} C \bar{e}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}u} e_{\mathrm{L}s}\right) \left(\overline{N}_{\mathrm{R}v} e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(e_{\mathrm{L}s} C e_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}p} C \bar{e}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}u} C \overline{N}_{\mathrm{R}v}\right) \end{array}\right. \tag{5.537}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \nu_\mathrm{L}^3 \bar{N}_\mathrm{R}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} t \\ u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}v}\right) \left(e_{\mathrm{L}r} C \nu_{\mathrm{L}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} t & u \\ v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \left(\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} t & u \\ v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(e_{\mathrm{L}r} C \nu_{\mathrm{L}t}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.538}$$

$$\mathcal{O}^{(1\sim5)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \nu_\mathrm{L}^2 \bar{N}_\mathrm{R}^2}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \left(\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}u}\right) \left(\overline{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \left(e_{\mathrm{L}r} C \nu_{\mathrm{L}u}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\overline{N}_{\mathrm{R}t} e_{\mathrm{L}r}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t} \nu_{\mathrm{L}v}\right) \left(e_{\mathrm{L}r} C \nu_{\mathrm{L}u}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \end{array}\right. \tag{5.539}$$

$$\mathcal{O}^{(1\sim3)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}^3}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \\ u \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t} e_{\mathrm{L}r}\right) \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}\right) \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t} e_{\mathrm{L}r}\right) \left(\overline{N}_{\mathrm{R}u} \nu_{\mathrm{L}v}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.540}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R}^4}(0,-4) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u \\ v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t} C \overline{N}_{\mathrm{R}v}\right) \left(\overline{N}_{\mathrm{R}u} e_{\mathrm{L}r}\right) \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \\ u & v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}\right) \left(\overline{N}_{\mathrm{R}u} C \overline{N}_{\mathrm{R}v}\right) \left(\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}\right) \end{array}\right. \tag{5.541}$$

$$\mathcal{O}_{\nu_\mathrm{L}^5 \bar{N}_\mathrm{R}}(0,4) \left| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t & u \\ v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right) \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}r}\right) \right. \tag{5.542}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^4 \bar{N}_\mathrm{R}^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \\ u \\ v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}t} C \nu_{\mathrm{L}v}\right) \left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right) \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}u}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \\ u & v \end{smallmatrix}\right] \left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right) \left(\nu_{\mathrm{L}u} C \nu_{\mathrm{L}v}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \end{array}\right. \tag{5.543}$$

$$\mathcal{O}^{(1,2)}_{\nu_L^3 \bar{N}_R^3}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & t \\ r & u \\ s & v \end{smallmatrix}\right] \left(\overline{N}_{Rp}\nu_{Lt}\right)\left(\overline{N}_{Rr}\nu_{Lu}\right)\left(\overline{N}_{Rs}\nu_{Lv}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}, \begin{smallmatrix} t & u \\ v \end{smallmatrix}\right] \left(\nu_{Lu}C\nu_{Lv}\right)\left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(\overline{N}_{Rs}\nu_{Lt}\right) \end{array} \right.$$
(5.544)

$$\mathcal{O}^{(1,2)}_{\nu_L^2 \bar{N}_R^4}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(\overline{N}_{Rs}\nu_{Lu}\right)\left(\overline{N}_{Rt}\nu_{Lv}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s & t \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\nu_{Lu}C\nu_{Lv}\right)\left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right) \end{array} \right.$$
(5.545)

$$\mathcal{O}_{\nu_L \bar{N}_R^5}(0,-4) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s & t \\ u \end{smallmatrix}\right] \left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right)\left(\overline{N}_{Ru}\nu_{Lv}\right) \right.$$
(5.546)

$$\mathcal{O}_{\bar{N}_R^6}(0,-6) \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s & t \\ u & v \end{smallmatrix}\right] \left(\overline{N}_{Rp}C\overline{N}_{Rr}\right)\left(\overline{N}_{Rs}C\overline{N}_{Rt}\right)\left(\overline{N}_{Ru}C\overline{N}_{Rv}\right) \right.$$
(5.547)

5.5.4 Classes involving six-fermions: $\psi^4\psi^{\dagger 2}$

$(\Delta B, \Delta L) = (0,0)$.

$$\mathcal{O}^{(1\sim4)}_{\bar{\nu}_L N_R \bar{u}_R^2 u_L^2}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & s \\ r & t \end{smallmatrix}\right] \left(\overline{\nu}_{Lv}N_{Ru}\right)\left(u_{Lsa}Cu_{Ltb}\right)\left(\overline{u}_{Rp}^a C\overline{u}_{Rr}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & s \\ r & t \end{smallmatrix}\right] \left(\overline{\nu}_{Lv}N_{Ru}\right)\left(\overline{u}_{Rp}^a u_{Lsa}\right)\left(\overline{u}_{Rr}^b u_{Ltb}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{\nu}_{Lv}N_{Ru}\right)\left(u_{Lsa}Cu_{Ltb}\right)\left(\overline{u}_{Rp}^a C\overline{u}_{Rr}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{\nu}_{Lv}N_{Ru}\right)\left(\overline{u}_{Rp}^a u_{Lsa}\right)\left(\overline{u}_{Rr}^b u_{Ltb}\right) \end{array} \right.$$
(5.548)

$$\mathcal{O}^{(1\sim4)}_{\bar{N}_R N_R \bar{u}_R u_L^2 \bar{u}_L}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{u}_{Lv}^b N_{Ru}\right)\left(\overline{N}_{Rp}C\overline{u}_{Rr}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lsb}\right)\left(\overline{u}_{Rr}^a u_{Lta}\right)\left(\overline{u}_{Lv}^b N_{Ru}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{u}_{Lv}^b N_{Ru}\right)\left(\overline{N}_{Rp}C\overline{u}_{Rr}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lsb}\right)\left(\overline{u}_{Rr}^a u_{Lta}\right)\left(\overline{u}_{Lv}^b N_{Ru}\right) \end{array} \right.$$
(5.549)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_L e_R \bar{N}_R \bar{u}_R u_L^2}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{d}_{Lu}^b e_{Rv}\right)\left(\overline{N}_{Rp}C\overline{u}_{Rr}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lsb}\right)\left(\overline{u}_{Rr}^a u_{Lta}\right)\left(\overline{d}_{Lu}^b e_{Rv}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{d}_{Lu}^b e_{Rv}\right)\left(\overline{N}_{Rp}C\overline{u}_{Rr}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lsb}\right)\left(\overline{u}_{Rr}^a u_{Lta}\right)\left(\overline{d}_{Lu}^b e_{Rv}\right) \end{array} \right.$$
(5.550)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_R e_R \bar{N}_R u_L^2 \bar{u}_L}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{u}_{Lv}^b e_{Ru}\right)\left(\overline{d}_{Rp}^a C\overline{N}_{Rr}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rr}u_{Lta}\right)\left(\overline{u}_{Lv}^b e_{Ru}\right)\left(\overline{d}_{Rp}^a u_{Lsb}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(u_{Lsb}Cu_{Lta}\right)\left(\overline{u}_{Lv}^b e_{Ru}\right)\left(\overline{d}_{Rp}^a C\overline{N}_{Rr}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{N}_{Rr}u_{Lta}\right)\left(\overline{u}_{Lv}^b e_{Ru}\right)\left(\overline{d}_{Rp}^a u_{Lsb}\right) \end{array} \right.$$
(5.551)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_L e_L \bar{N}_R u_L^2 \bar{u}_L}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rr}e_{Lp}\right)\left(u_{Lsa}Cu_{Ltb}\right)\left(\overline{d}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rr}u_{Ltb}\right)\left(e_{Lp}Cu_{Lsa}\right)\left(\overline{d}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{N}_{Rr}e_{Lp}\right)\left(u_{Lsa}Cu_{Ltb}\right)\left(\overline{d}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \left(\overline{N}_{Rr}u_{Ltb}\right)\left(e_{Lp}Cu_{Lsa}\right)\left(\overline{d}_{Lu}^a C\overline{u}_{Lv}^b\right) \end{array} \right.$$
(5.552)

$$\mathcal{O}^{(1\sim4)}_{\nu_L \bar{N}_R u_L^2 \bar{u}_L^2}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lra}\right)\left(u_{Lsb}C\nu_{Lt}\right)\left(\overline{u}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lra}\right)\left(u_{Lsb}C\nu_{Lt}\right)\left(\overline{u}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lra}\right)\left(u_{Lsb}C\nu_{Lt}\right)\left(\overline{u}_{Lu}^a C\overline{u}_{Lv}^b\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \left(\overline{N}_{Rp}u_{Lra}\right)\left(u_{Lsb}C\nu_{Lt}\right)\left(\overline{u}_{Lu}^a C\overline{u}_{Lv}^b\right) \end{array} \right.$$
(5.553)

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{L}\bar{e}_\mathrm{L}N_\mathrm{R}\bar{u}^2_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{\,a}_{\mathrm{R}s}u_{\mathrm{L}tb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{u}^{\,a}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{\,c}_{\mathrm{R}s}u_{\mathrm{L}tc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{\,a}_{\mathrm{R}s}u_{\mathrm{L}tb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{u}^{\,a}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}^{\,c}_{\mathrm{R}s}u_{\mathrm{L}tc}\right) \end{array} \right. \tag{5.554}$$

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{R}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}^2_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.555}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}^2_\mathrm{R}u_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\\\hline s\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}r\mid s\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.556}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}d_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\bar{d}^{\,a}_{\mathrm{R}p}d_{\mathrm{L}rb}\right)\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right) \\ (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\bar{d}^{\,a}_{\mathrm{R}p}d_{\mathrm{L}ra}\right)\left(\bar{u}^{\,c}_{\mathrm{R}s}u_{\mathrm{L}tc}\right) \\ (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(d_{\mathrm{L}rb}Cu_{\mathrm{L}ta})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,b}_{\mathrm{R}s}\right) \\ (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(d_{\mathrm{L}ra}Cu_{\mathrm{L}tc})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,c}_{\mathrm{R}s}\right) \end{array} \right. \tag{5.557}$$

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{L}\bar{e}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,0) \left| \begin{array}{l} (\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{u}^{\,a}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right) \\ (\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{u}^{\,c}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\bar{u}^{\,a}_{\mathrm{R}s}u_{\mathrm{L}tc}\right) \\ (\bar{e}_{\mathrm{R}r}u_{\mathrm{L}tb})\left(\bar{u}^{\,a}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\bar{u}^{\,b}_{\mathrm{R}s}d_{\mathrm{L}pa}\right) \\ (\bar{e}_{\mathrm{R}r}u_{\mathrm{L}tc})\left(\bar{u}^{\,a}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}^{\,c}_{\mathrm{L}v}N_{\mathrm{R}u}\right) \end{array} \right. \tag{5.558}$$

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{L}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}^{\,a}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right) \\ \left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}^{\,c}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{u}^{\,a}_{\mathrm{R}s}u_{\mathrm{L}tc}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{d}^{\,a}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{u}^{\,b}_{\mathrm{R}s}d_{\mathrm{L}pa}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(\bar{u}^{\,a}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{d}^{\,c}_{\mathrm{L}u}N_{\mathrm{R}v}\right) \end{array} \right. \tag{5.559}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}e_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} (e_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}^{\,a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \\ (e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{d}^{\,a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,b}_{\mathrm{R}s}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,b}_{\mathrm{R}s}\right) \end{array} \right. \tag{5.560}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}d_\mathrm{R}\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} (d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}^{\,a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \\ (d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{u}^{\,b}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{d}^{\,a}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)(d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,b}_{\mathrm{R}s}\right) \\ \left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}^{\,a}_{\mathrm{R}p}C\bar{u}^{\,b}_{\mathrm{R}s}\right) \end{array} \right. \tag{5.561}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\bar{\nu}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,0) \left| \begin{array}{l} (\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\bar{u}^{\,a}_{\mathrm{R}s}u_{\mathrm{L}ta}\right) \\ (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{e}_{\mathrm{R}p}C\bar{u}^{\,a}_{\mathrm{R}s}\right) \end{array} \right. \tag{5.562}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right)\left(\overline{d}_{\mathrm{L}u}^{b} u_{\mathrm{R}va}\right)\left(\overline{u}_{\mathrm{R}s}^{a} u_{\mathrm{L}tb}\right) \\
\left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right)\left(\overline{u}_{\mathrm{R}s}^{a} u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{L}u}^{c} u_{\mathrm{R}vc}\right) \\
\left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}tb}\right)\left(\overline{u}_{\mathrm{R}s}^{a} e_{\mathrm{L}p}\right)\left(\overline{d}_{\mathrm{L}u}^{b} u_{\mathrm{R}va}\right) \\
\left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{R}s}^{a} e_{\mathrm{L}p}\right)\left(\overline{d}_{\mathrm{L}u}^{c} u_{\mathrm{R}vc}\right)
\end{array}\right. \tag{5.563}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right)\left(\overline{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\overline{u}_{\mathrm{R}s}^{a} u_{\mathrm{L}ta}\right) \\
\left(\overline{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{R}s}^{a} e_{\mathrm{L}p}\right)
\end{array}\right. \tag{5.564}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\overline{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(\overline{u}_{\mathrm{R}s}^{a} u_{\mathrm{L}ta}\right) \\
\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}ta}\right)\left(\overline{e}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}s}^{a}\right)
\end{array}\right. \tag{5.565}$$

$$\mathcal{O}^{(1\sim4)}_{\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{b} u_{\mathrm{R}ua}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{c} u_{\mathrm{R}uc}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sb}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{b} u_{\mathrm{R}ua}\right) \\
\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{c} u_{\mathrm{R}uc}\right)
\end{array}\right. \tag{5.566}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{R}} \bar{d}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{L}v}^{b} d_{\mathrm{R}ua}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{L}v}^{c} d_{\mathrm{R}uc}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sb}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{L}v}^{b} d_{\mathrm{R}ua}\right) \\
\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{L}v}^{c} d_{\mathrm{R}uc}\right)
\end{array}\right. \tag{5.567}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{R}} \bar{e}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(\overline{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.568}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}r}^{a}\right) \\
\left(\overline{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{a} \nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.569}$$

$$\mathcal{O}^{(1,2)}_{\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}^2 \bar{u}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{u\,v}\right]\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}s}^{a}\right) \\
\mathcal{Y}\left[\boxed{p\,r}, \boxed{u\,v}\right]\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(\overline{u}_{\mathrm{R}s}^{a} u_{\mathrm{L}ta}\right)
\end{array}\right. \tag{5.570}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{L}v}^{b} N_{\mathrm{R}u}\right)\left(\overline{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}rb}\right) \\
\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(\overline{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^{c} N_{\mathrm{R}u}\right) \\
\left(\overline{u}_{\mathrm{L}v}^{b} N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right) \\
\left(\overline{u}_{\mathrm{L}v}^{c} N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}ra} C u_{\mathrm{L}tc}\right)\left(\overline{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right)
\end{array}\right. \tag{5.571}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{d}_{\mathrm{L}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left|
\begin{array}{l}
\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{L}u}^{b} e_{\mathrm{R}v}\right)\left(\overline{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}rb}\right) \\
\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(\overline{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}ra}\right)\left(\overline{d}_{\mathrm{L}u}^{c} e_{\mathrm{R}v}\right) \\
\left(\overline{d}_{\mathrm{L}u}^{b} e_{\mathrm{R}v}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right) \\
\left(\overline{d}_{\mathrm{L}u}^{c} e_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra} C u_{\mathrm{L}tc}\right)\left(\overline{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right)
\end{array}\right. \tag{5.572}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}^2 e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\overline{u|v}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)(d_{\mathrm{L}pa}Ce_{\mathrm{L}r})\left(\bar{d}_{\mathrm{L}u}^aC\bar{d}_{\mathrm{L}v}^b\right)\\ \mathcal{Y}\left[\overline{u|v}\right]\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}tb})\left(\bar{d}_{\mathrm{L}u}^aC\bar{d}_{\mathrm{L}v}^b\right)\\ \mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)(d_{\mathrm{L}pa}Ce_{\mathrm{L}r})\left(\bar{d}_{\mathrm{L}u}^aC\bar{d}_{\mathrm{L}v}^b\right)\\ \mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}tb})\left(\bar{d}_{\mathrm{L}u}^aC\bar{d}_{\mathrm{L}v}^b\right)\end{array}\right.$$

(5.573)

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{L}u}^aC\bar{u}_{\mathrm{L}v}^b\right)\\ \left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{L}u}^bC\bar{u}_{\mathrm{L}v}^a\right)\\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb})\left(\bar{d}_{\mathrm{L}u}^aC\bar{u}_{\mathrm{L}v}^b\right)\\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb})\left(\bar{d}_{\mathrm{L}u}^bC\bar{u}_{\mathrm{L}v}^a\right)\end{array}\right.$$

(5.574)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)(d_{\mathrm{R}ub}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^aC\bar{d}_{\mathrm{R}r}^b\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right](d_{\mathrm{R}ub}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}r}^bu_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\\ \mathcal{Y}\left[\overline{p|r}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)(d_{\mathrm{R}ub}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^aC\bar{d}_{\mathrm{R}r}^b\right)\\ \mathcal{Y}\left[\overline{p|r}\right](d_{\mathrm{R}ub}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}r}^bu_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.575)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\left(\bar{u}_{\mathrm{L}v}^bu_{\mathrm{R}ua}\right)\\ \left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\left(\bar{u}_{\mathrm{L}v}^cu_{\mathrm{R}uc}\right)\\ (e_{\mathrm{L}r}Cu_{\mathrm{L}tb})\left(\bar{u}_{\mathrm{L}v}^bu_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\\ (e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{u}_{\mathrm{L}v}^cu_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.576)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{L}v}^bd_{\mathrm{R}ua}\right)\\ \left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{L}v}^cd_{\mathrm{R}uc}\right)\\ (e_{\mathrm{L}r}Cu_{\mathrm{L}tb})\left(\bar{d}_{\mathrm{L}v}^bd_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\\ (e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{L}v}^cd_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.577)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{R}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\\ \left(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.578)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^ae_{\mathrm{L}r}\right)\\ \left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.579)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\overline{u|v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\bar{e}_{\mathrm{R}r}\right)\\ \mathcal{Y}\left[\overline{u|v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}s}\right)\end{array}\right.$$

(5.580)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,0)\left|\begin{array}{l}(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t})\left(\bar{u}_{\mathrm{L}v}^bd_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\\ (u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{u}_{\mathrm{L}v}^cd_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^au_{\mathrm{L}sb}\right)\left(\bar{u}_{\mathrm{L}v}^bd_{\mathrm{R}ua}\right)\\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^au_{\mathrm{L}sa}\right)\left(\bar{u}_{\mathrm{L}v}^cd_{\mathrm{R}uc}\right)\end{array}\right.$$

(5.581)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\left(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\\ \left(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^au_{\mathrm{L}sa}\right)\end{array}\right.$$

(5.582)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] (e_{\mathrm{R}u} C N_{\mathrm{R}v}) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r | s \end{smallmatrix}\right] (e_{\mathrm{R}u} C N_{\mathrm{R}v}) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right) \end{array} \right.$$

(5.583)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{L}}^2 \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s} e_{\mathrm{L}p}\right) (e_{\mathrm{L}r} C u_{\mathrm{L}ta}) \left(\bar{d}_{\mathrm{L}u}^a C \bar{e}_{\mathrm{L}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p | r \end{smallmatrix}\right] (e_{\mathrm{L}p} C e_{\mathrm{L}r}) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{L}u}^a C \bar{e}_{\mathrm{L}v}\right) \end{array} \right.$$

(5.584)

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left| \begin{array}{l} (\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \\ \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) (e_{\mathrm{L}r} C u_{\mathrm{L}ta}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \end{array} \right.$$

(5.585)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} (\bar{e}_{\mathrm{R}p} e_{\mathrm{L}r}) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}\right) \\ \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) (e_{\mathrm{L}r} C u_{\mathrm{L}ta}) \left(\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}\right) \end{array} \right.$$

(5.586)

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right) (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \\ \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) (e_{\mathrm{L}p} C u_{\mathrm{L}sa}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \end{array} \right.$$

(5.587)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{L}} \nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right) (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) \left(\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}\right) \\ \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) (e_{\mathrm{L}p} C u_{\mathrm{L}sa}) \left(\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}\right) \end{array} \right.$$

(5.588)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r | s \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} e_{\mathrm{L}p}\right) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}\right) \end{array} \right.$$

(5.589)

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}} e_{\mathrm{R}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) (\bar{u}_{\mathrm{L}v}^a e_{\mathrm{R}u}) \\ \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) (\bar{e}_{\mathrm{R}p} u_{\mathrm{L}sa}) (\bar{u}_{\mathrm{L}v}^a e_{\mathrm{R}u}) \end{array} \right.$$

(5.590)

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^2 \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right) (u_{\mathrm{L}ra} C \nu_{\mathrm{L}t}) (\bar{u}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \\ \mathcal{Y} \left[\begin{smallmatrix} s | t \end{smallmatrix}\right] (\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}) \left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}ra}\right) (\bar{u}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \end{array} \right.$$

(5.591)

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \\ \mathcal{Y} \left[\begin{smallmatrix} p | r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \end{array} \right.$$

(5.592)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{R}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 u_{\mathrm{L}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right) \left(\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p | r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) \left(\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}\right) \end{array} \right.$$

(5.593)

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b d_{\mathrm{L}pa}\right) (\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^a) \\ \mathcal{Y} \left[\begin{smallmatrix} s | t \end{smallmatrix}\right] (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s | t \end{smallmatrix}\right] (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b d_{\mathrm{L}pa}\right) (\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^a) \end{array} \right.$$

(5.594)

$$\mathcal{O}^{(1\sim4)}_{\nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}^2}(0,0) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}, \begin{smallmatrix} u | v \end{smallmatrix}\right] (u_{\mathrm{R}ua} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r | s \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] (u_{\mathrm{R}ua} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r | s \end{smallmatrix}, \begin{smallmatrix} u | v \end{smallmatrix}\right] (u_{\mathrm{R}ua} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] (u_{\mathrm{R}ua} C u_{\mathrm{R}vb}) \left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right) \end{array} \right.$$

(5.595)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}^2\bar{e}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{u}_{\mathrm{R}t}^b d_{\mathrm{L}sa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}sc}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{u}_{\mathrm{R}t}^b d_{\mathrm{L}sa}\right)\\\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}sc}\right)\end{array}\right.\tag{5.596}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^2\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right](d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^b N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right](\bar{e}_{\mathrm{R}s}d_{\mathrm{L}pa})\left(\bar{d}_{\mathrm{L}u}^b N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right](d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^b N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right](\bar{e}_{\mathrm{R}s}d_{\mathrm{L}pa})\left(\bar{d}_{\mathrm{L}u}^b N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)\end{array}\right.\tag{5.597}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}d_{\mathrm{L}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\(d_{\mathrm{R}uc}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^c\right)\\(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{u}_{\mathrm{R}t}^b d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}s}\right)\\(d_{\mathrm{R}uc}CN_{\mathrm{R}v})\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.598}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\(N_{\mathrm{R}u}Cu_{\mathrm{R}vc})\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^c\right)\\(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{u}_{\mathrm{R}t}^b d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\(N_{\mathrm{R}u}Cu_{\mathrm{R}vc})\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.599}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})(\bar{u}_{\mathrm{R}t}^a e_{\mathrm{L}s})\\(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})(d_{\mathrm{L}pa}Ce_{\mathrm{L}s})\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^a\right)\end{array}\right.\tag{5.600}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\\mathcal{Y}\left[\begin{smallmatrix}r&s\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{e}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\end{array}\right.\tag{5.601}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})(\bar{u}_{\mathrm{R}s}^a\nu_{\mathrm{L}t})\\(\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t})(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(\bar{u}_{\mathrm{R}s}^a d_{\mathrm{L}pa})\end{array}\right.\tag{5.602}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}u&v\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\\mathcal{Y}\left[\begin{smallmatrix}u&v\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^a\right)\end{array}\right.\tag{5.603}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}_{\mathrm{R}s}^b\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}vb}\right)\\\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}_{\mathrm{R}s}^a\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^c u_{\mathrm{R}vc}\right)\\\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{R}s}^b d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}vb}\right)\\\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{u}_{\mathrm{R}s}^a d_{\mathrm{L}pa})\left(\bar{d}_{\mathrm{L}u}^c u_{\mathrm{R}vc}\right)\end{array}\right.\tag{5.604}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)(\bar{u}_{\mathrm{R}s}^a\nu_{\mathrm{L}t})\\(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{u}_{\mathrm{R}s}^a d_{\mathrm{L}pa})\end{array}\right.\tag{5.605}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}u&v\end{smallmatrix}\right](u_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\\mathcal{Y}\left[\begin{smallmatrix}u&v\end{smallmatrix}\right](u_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{u}_{\mathrm{R}t}^b e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right](u_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^b\right)\\\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right](u_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{u}_{\mathrm{R}t}^b e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.606}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R} d_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\overline{u}_{\mathrm{R}s}^{\ b}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{N}_{\mathrm{R}r}\right) \\ \left(\overline{u}_{\mathrm{R}s}^{\ b}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ub}Cu_{\mathrm{R}va})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{N}_{\mathrm{R}r}\right) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{u}_{\mathrm{R}s}^{\ b}\right) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ub}Cu_{\mathrm{R}va})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{u}_{\mathrm{R}s}^{\ b}\right) \end{array}\right. \tag{5.607}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} \bar{e}_\mathrm{R}^2 e_\mathrm{L} N_\mathrm{R} \bar{u}_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right](\overline{e}_{\mathrm{R}p}e_{\mathrm{L}s})(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\overline{e}_{\mathrm{R}r}C\overline{u}_{\mathrm{R}t}^{\ a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \mid r \end{smallmatrix}\right](\overline{e}_{\mathrm{R}p}C\overline{e}_{\mathrm{R}r})(d_{\mathrm{R}ua}CN_{\mathrm{R}v})(\overline{u}_{\mathrm{R}t}^{\ a}e_{\mathrm{L}s}) \end{array}\right. \tag{5.608}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} (\overline{e}_{\mathrm{R}p}e_{\mathrm{L}r})(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\overline{u}_{\mathrm{R}t}^{\ a}\right) \\ (\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s})(N_{\mathrm{R}u}Cu_{\mathrm{R}va})(\overline{u}_{\mathrm{R}t}^{\ a}e_{\mathrm{L}r}) \end{array}\right. \tag{5.609}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L} \bar{e}_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\overline{e}_{\mathrm{L}u}u_{\mathrm{R}va})(\overline{u}_{\mathrm{R}s}^{\ a}\nu_{\mathrm{L}t}) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\overline{e}_{\mathrm{L}u}u_{\mathrm{R}va})(\overline{u}_{\mathrm{R}s}^{\ a}e_{\mathrm{L}p}) \end{array}\right. \tag{5.610}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})(\overline{u}_{\mathrm{R}s}^{\ a}\nu_{\mathrm{L}t}) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})(\overline{e}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^{\ a}) \end{array}\right. \tag{5.611}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} \bar{e}_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R} \bar{u}_\mathrm{R}}(0,0) \left| \begin{array}{l} \left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})(\overline{u}_{\mathrm{R}s}^{\ a}\nu_{\mathrm{L}t}) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})(\overline{e}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^{\ a}) \end{array}\right. \tag{5.612}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2 \bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})(\overline{u}_{\mathrm{R}r}^{\ a}\nu_{\mathrm{L}t}) \\ \mathcal{Y}\left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{\ a}\right) \end{array}\right. \tag{5.613}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} \bar{e}_\mathrm{L} \nu_\mathrm{L}^2 \bar{N}_\mathrm{R} \bar{u}_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)(\overline{e}_{\mathrm{L}v}d_{\mathrm{R}ua})(\overline{u}_{\mathrm{R}r}^{\ a}\nu_{\mathrm{L}t}) \\ \mathcal{Y}\left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(\overline{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{\ a}\right) \end{array}\right. \tag{5.614}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L} \bar{N}_\mathrm{R}^2 N_\mathrm{R} \bar{u}_\mathrm{R} u_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^{\ a}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \mid r \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(N_{\mathrm{R}u}Cu_{\mathrm{R}va})(\overline{u}_{\mathrm{R}s}^{\ a}\nu_{\mathrm{L}t}) \end{array}\right. \tag{5.615}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}^2 d_\mathrm{L}^2 \bar{\nu}_\mathrm{L} N_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right](\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(d_{\mathrm{L}sa}Cd_{\mathrm{L}tb})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{d}_{\mathrm{R}r}^{\ b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right](\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}sa}\right)\left(\overline{d}_{\mathrm{R}r}^{\ b}d_{\mathrm{L}tb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \mid r \end{smallmatrix}, \begin{smallmatrix} s \mid t \end{smallmatrix}\right](\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(d_{\mathrm{L}sa}Cd_{\mathrm{L}tb})\left(\overline{d}_{\mathrm{R}p}^{\ a}C\overline{d}_{\mathrm{R}r}^{\ b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \mid r \end{smallmatrix}, \begin{smallmatrix} s \mid t \end{smallmatrix}\right](\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}sa}\right)\left(\overline{d}_{\mathrm{R}r}^{\ b}d_{\mathrm{L}tb}\right) \end{array}\right. \tag{5.616}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R} d_\mathrm{L}^2 \bar{e}_\mathrm{R} N_\mathrm{R} \bar{u}_\mathrm{L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right](\overline{e}_{\mathrm{R}t}d_{\mathrm{L}sa})\left(\overline{u}_{\mathrm{L}v}^{\ b}N_{\mathrm{R}u}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right](\overline{e}_{\mathrm{R}t}d_{\mathrm{L}sc})\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}ra}\right)(\overline{u}_{\mathrm{L}v}^{\ c}N_{\mathrm{R}u}) \\ \mathcal{Y}\left[\begin{smallmatrix} r \mid s \end{smallmatrix}\right](\overline{e}_{\mathrm{R}t}d_{\mathrm{L}sa})\left(\overline{u}_{\mathrm{L}v}^{\ b}N_{\mathrm{R}u}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \mid s \end{smallmatrix}\right](\overline{e}_{\mathrm{R}t}d_{\mathrm{L}sc})\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}ra}\right)(\overline{u}_{\mathrm{L}v}^{\ c}N_{\mathrm{R}u}) \end{array}\right. \tag{5.617}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R} d_\mathrm{L}^2 \bar{d}_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\overline{d}_{\mathrm{L}u}^{\ b}N_{\mathrm{R}v}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}ra}\right)\left(\overline{d}_{\mathrm{L}u}^{\ c}N_{\mathrm{R}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \mid s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\overline{d}_{\mathrm{L}u}^{\ b}N_{\mathrm{R}v}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \mid s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\overline{d}_{\mathrm{R}p}^{\ a}d_{\mathrm{L}ra}\right)\left(\overline{d}_{\mathrm{L}u}^{\ c}N_{\mathrm{R}v}\right) \end{array}\right. \tag{5.618}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}}^2 \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{u\,v}\end{array}\right] \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^a C\bar{d}_{\mathrm{L}v}^b\right) \\ \mathcal{Y}\left[\begin{array}{c}\boxed{p\,r},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\end{array}\right] \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^a C\bar{d}_{\mathrm{L}v}^b\right) \\ \mathcal{Y}\left[\begin{array}{c}\boxed{p\,r},\boxed{u\,v}\end{array}\right] \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^a C\bar{d}_{\mathrm{L}v}^b\right) \\ \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\end{array}\right] \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^a C\bar{d}_{\mathrm{L}v}^b\right) \end{array}\right. \tag{5.619}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{L}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}} u_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\end{array}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\end{array}\right] \left(e_{\mathrm{R}u}Cu_{\mathrm{R}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \left(e_{\mathrm{R}u}Cu_{\mathrm{R}vb}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right) \end{array}\right. \tag{5.620}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{R}} d_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\end{array}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\begin{array}{c}\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\end{array}\right] \left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right) \end{array}\right. \tag{5.621}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} N_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(\bar{e}_{\mathrm{R}s}e_{\mathrm{L}t}\right)\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}ra}Ce_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.622}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{d}_{\mathrm{L}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^b u_{\mathrm{R}va}\right) \\ \left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}u}^c u_{\mathrm{R}vc}\right) \\ \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}u}^b u_{\mathrm{R}va}\right) \\ \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}u}^c u_{\mathrm{R}vc}\right) \end{array}\right. \tag{5.623}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)\left(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \end{array}\right. \tag{5.624}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.625}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,0) \left|\begin{array}{l} \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right) \\ \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right) \\ \left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \\ \left(d_{\mathrm{L}ra}C\nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.626}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{R}} d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right) \\ \left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right) \\ \left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \\ \left(d_{\mathrm{L}ra}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.627}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{R}} \bar{e}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,0) \left|\begin{array}{l} \left(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(d_{\mathrm{L}ra}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.628}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R} d_{\mathrm L} \nu_{\mathrm L} \bar\nu_{\mathrm L} \bar N_{\mathrm R} N_{\mathrm R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)\left(\overline{\nu}_{\mathrm L v}N_{\mathrm R u}\right)\left(\bar d_{\mathrm R_p}^{\,a}d_{\mathrm L r a}\right) \\[4pt] \left(\overline{\nu}_{\mathrm L v}N_{\mathrm R u}\right)\left(d_{\mathrm L r a}C\nu_{\mathrm L t}\right)\left(\bar d_{\mathrm R_p}^{\,a}C\overline{N}_{\mathrm R s}\right) \end{array}\right. \tag{5.629}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R} d_{\mathrm L} \bar N_{\mathrm R}^2 N_{\mathrm R}^2}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \boxed{u\,v}\right](N_{\mathrm R u}CN_{\mathrm R v})\left(\overline{N}_{\mathrm R t}d_{\mathrm L r a}\right)\left(\bar d_{\mathrm R_p}^{\,a}C\overline{N}_{\mathrm R s}\right) \\[4pt] \mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right](N_{\mathrm R u}CN_{\mathrm R v})\left(\overline{N}_{\mathrm R s}C\overline{N}_{\mathrm R t}\right)\left(\bar d_{\mathrm R_p}^{\,a}d_{\mathrm L r a}\right) \end{array}\right. \tag{5.630}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{e}_{\mathrm R}^2 e_{\mathrm L} N_{\mathrm R} \bar u_{\mathrm L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right](\bar e_{\mathrm R s}e_{\mathrm L t})(\bar e_{\mathrm R r}d_{\mathrm L p a})\left(\bar u_{\mathrm L v}^{\,a}N_{\mathrm R u}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s}\right](\bar e_{\mathrm R s}e_{\mathrm L t})(\bar e_{\mathrm R r}d_{\mathrm L p a})\left(\bar u_{\mathrm L v}^{\,a}N_{\mathrm R u}\right) \end{array}\right. \tag{5.631}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{d}_{\mathrm L} \bar{e}_{\mathrm R} e_{\mathrm L} \bar N_{\mathrm R} N_{\mathrm R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(\bar e_{\mathrm R r}d_{\mathrm L p a})\left(\bar d_{\mathrm L u}^{\,a}N_{\mathrm R v}\right) \\[4pt] \left(\bar e_{\mathrm R r}C\overline{N}_{\mathrm R t}\right)(d_{\mathrm L p a}Ce_{\mathrm L s})\left(\bar d_{\mathrm L u}^{\,a}N_{\mathrm R v}\right) \end{array}\right. \tag{5.632}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{d}_{\mathrm L} e_{\mathrm L} \bar{e}_{\mathrm L} \nu_{\mathrm L} \bar N_{\mathrm R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)(d_{\mathrm L p a}Ce_{\mathrm L r})\left(\bar d_{\mathrm L u}^{\,a}C\bar e_{\mathrm L v}\right) \\[4pt] (e_{\mathrm L r}C\nu_{\mathrm L t})\left(\overline{N}_{\mathrm R s}d_{\mathrm L p a}\right)\left(\bar d_{\mathrm L u}^{\,a}C\bar e_{\mathrm L v}\right) \end{array}\right. \tag{5.633}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{e}_{\mathrm R} \nu_{\mathrm L} \bar N_{\mathrm R} N_{\mathrm R} \bar u_{\mathrm L}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)(\bar e_{\mathrm R r}d_{\mathrm L p a})\left(\bar u_{\mathrm L v}^{\,a}N_{\mathrm R u}\right) \\[4pt] (\bar e_{\mathrm R r}\nu_{\mathrm L t})\left(\overline{N}_{\mathrm R s}d_{\mathrm L p a}\right)\left(\bar u_{\mathrm L v}^{\,a}N_{\mathrm R u}\right) \end{array}\right. \tag{5.634}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{d}_{\mathrm L} \bar{e}_{\mathrm R} e_{\mathrm R} \nu_{\mathrm L} \bar N_{\mathrm R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)(\bar e_{\mathrm R r}d_{\mathrm L p a})\left(\bar d_{\mathrm L u}^{\,a}e_{\mathrm R v}\right) \\[4pt] (\bar e_{\mathrm R r}\nu_{\mathrm L t})\left(\overline{N}_{\mathrm R s}d_{\mathrm L p a}\right)\left(\bar d_{\mathrm L u}^{\,a}e_{\mathrm R v}\right) \end{array}\right. \tag{5.635}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{e}_{\mathrm L} \nu_{\mathrm L}^2 \bar N_{\mathrm R} \bar u_{\mathrm L}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R r}\nu_{\mathrm L t}\right)(d_{\mathrm L p a}C\nu_{\mathrm L s})\left(\bar e_{\mathrm L u}C\bar u_{\mathrm L v}^{\,a}\right) \\[4pt] \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm L s}C\nu_{\mathrm L t})\left(\overline{N}_{\mathrm R r}d_{\mathrm L p a}\right)\left(\bar e_{\mathrm L u}C\bar u_{\mathrm L v}^{\,a}\right) \end{array}\right. \tag{5.636}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{d}_{\mathrm L} \nu_{\mathrm L}^2 \bar\nu_{\mathrm L} \bar N_{\mathrm R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R r}\nu_{\mathrm L t}\right)(d_{\mathrm L p a}C\nu_{\mathrm L s})\left(\bar d_{\mathrm L u}^{\,a}C\bar\nu_{\mathrm L v}\right) \\[4pt] \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm L s}C\nu_{\mathrm L t})\left(\overline{N}_{\mathrm R r}d_{\mathrm L p a}\right)\left(\bar d_{\mathrm L u}^{\,a}C\bar\nu_{\mathrm L v}\right) \end{array}\right. \tag{5.637}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L} \bar{d}_{\mathrm L} \nu_{\mathrm L} \bar N_{\mathrm R}^2 N_{\mathrm R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)\left(\overline{N}_{\mathrm R r}d_{\mathrm L p a}\right)\left(\bar d_{\mathrm L u}^{\,a}N_{\mathrm R v}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)\left(\overline{N}_{\mathrm R r}d_{\mathrm L p a}\right)\left(\bar d_{\mathrm L u}^{\,a}N_{\mathrm R v}\right) \end{array}\right. \tag{5.638}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm R}^2 d_{\mathrm R} e_{\mathrm L} \bar N_{\mathrm R} u_{\mathrm R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(d_{\mathrm R u a}Cu_{\mathrm R v b})\left(\bar d_{\mathrm R_p}^{\,a}C\bar d_{\mathrm R_r}^{\,b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right]\left(\bar d_{\mathrm R_p}^{\,a}e_{\mathrm L s}\right)(d_{\mathrm R u a}Cu_{\mathrm R v b})\left(\bar d_{\mathrm R_r}^{\,b}C\overline{N}_{\mathrm R t}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]\left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(d_{\mathrm R u a}Cu_{\mathrm R v b})\left(\bar d_{\mathrm R_p}^{\,a}C\bar d_{\mathrm R_r}^{\,b}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}\right]\left(\bar d_{\mathrm R_p}^{\,a}e_{\mathrm L s}\right)(d_{\mathrm R u a}Cu_{\mathrm R v b})\left(\bar d_{\mathrm R_r}^{\,b}C\overline{N}_{\mathrm R t}\right) \end{array}\right. \tag{5.639}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm R}^2 d_{\mathrm R}^2 \nu_{\mathrm L} \bar N_{\mathrm R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{u\,v}\right](d_{\mathrm R u a}Cd_{\mathrm R v b})\left(\bar d_{\mathrm R_r}^{\,b}\nu_{\mathrm L t}\right)\left(\bar d_{\mathrm R_p}^{\,a}C\overline{N}_{\mathrm R s}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right](d_{\mathrm R u a}Cd_{\mathrm R v b})\left(\bar d_{\mathrm R_r}^{\,b}\nu_{\mathrm L t}\right)\left(\bar d_{\mathrm R_p}^{\,a}C\overline{N}_{\mathrm R s}\right) \\[4pt] \mathcal{Y}\left[\boxed{p\,r}, \boxed{u\,v}\right]\left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)(d_{\mathrm R u a}Cd_{\mathrm R v b})\left(\bar d_{\mathrm R_p}^{\,a}C\bar d_{\mathrm R_r}^{\,b}\right) \\[4pt] \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R s}\nu_{\mathrm L t}\right)(d_{\mathrm R u a}Cd_{\mathrm R v b})\left(\bar d_{\mathrm R_p}^{\,a}C\bar d_{\mathrm R_r}^{\,b}\right) \end{array}\right. \tag{5.640}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R} e_{\mathrm L}^2 \bar{e}_{\mathrm L} \bar N_{\mathrm R} u_{\mathrm R}}(0,0) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right]\left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(\bar e_{\mathrm L u}u_{\mathrm R v a})\left(\bar d_{\mathrm R_p}^{\,a}e_{\mathrm L r}\right) \\[4pt] \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(\bar e_{\mathrm L u}u_{\mathrm R v a})\left(\bar d_{\mathrm R_p}^{\,a}e_{\mathrm L r}\right) \end{array}\right. \tag{5.641}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R} \bar{e}_{\mathrm R} e_{\mathrm R} e_{\mathrm L} \bar N_{\mathrm R} u_{\mathrm R}}(0,0) \left| \begin{array}{l} \left(\overline{N}_{\mathrm R t}e_{\mathrm L s}\right)(e_{\mathrm R u}Cu_{\mathrm R v a})\left(\bar d_{\mathrm R_p}^{\,a}C\bar e_{\mathrm R r}\right) \\[4pt] \left(\bar e_{\mathrm R r}C\overline{N}_{\mathrm R t}\right)(e_{\mathrm R u}Cu_{\mathrm R v a})\left(\bar d_{\mathrm R_p}^{\,a}e_{\mathrm L s}\right) \end{array}\right. \tag{5.642}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}d_{\rm R}\bar{e}_{\rm R}e_{\rm L}\bar{N}_{\rm R}N_{\rm R}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(d_{\rm R}{}_{ua}CN_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a C\bar{e}_{\rm R}r\right)\\ \left(\bar{e}_{\rm R}r C\overline{N}_{\rm R}t\right)\left(d_{\rm R}{}_{ua}CN_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a e_{\rm L}s\right)\end{array}\right.\tag{5.643}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}e_{\rm L}\nu_{\rm L}\bar{\nu}_{\rm L}\bar{N}_{\rm R}u_{\rm R}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(\bar{\nu}_{\rm L}v u_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a e_{\rm L}r\right)\\ \left(e_{\rm L}r C\nu_{\rm L}t\right)\left(\bar{\nu}_{\rm L}v u_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}s\right)\end{array}\right.\tag{5.644}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}d_{\rm R}e_{\rm L}\bar{e}_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(\bar{e}_{\rm L}v d_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a e_{\rm L}r\right)\\ \left(e_{\rm L}r C\nu_{\rm L}t\right)\left(\bar{e}_{\rm L}v d_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}s\right)\end{array}\right.\tag{5.645}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}e_{\rm L}\bar{N}_{\rm R}^2 N_{\rm R}u_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}s\\t\end{array}\right]\left(\overline{N}_{\rm R}t e_{\rm L}r\right)\left(N_{\rm R}u Cu_{\rm R}{}_{va}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}s\right)\\ \mathcal{Y}\left[\begin{array}{c|c}s&t\end{array}\right]\left(\overline{N}_{\rm R}s C\overline{N}_{\rm R}t\right)\left(N_{\rm R}u Cu_{\rm R}{}_{va}\right)\left(\bar{d}_{\rm R}{}_p^a e_{\rm L}r\right)\end{array}\right.\tag{5.646}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}d_{\rm R}\bar{e}_{\rm R}e_{\rm R}\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(d_{\rm R}{}_{ua}Ce_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a C\bar{e}_{\rm R}r\right)\\ \left(\bar{e}_{\rm R}r\nu_{\rm L}t\right)\left(d_{\rm R}{}_{ua}Ce_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}s\right)\end{array}\right.\tag{5.647}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}d_{\rm R}\nu_{\rm L}^2\bar{\nu}_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}s\\t\end{array}\right]\left(\overline{N}_{\rm R}r\nu_{\rm L}t\right)\left(\bar{\nu}_{\rm L}v d_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a\nu_{\rm L}s\right)\\ \mathcal{Y}\left[\begin{array}{c|c}s&t\end{array}\right]\left(\nu_{\rm L}s C\nu_{\rm L}t\right)\left(\bar{\nu}_{\rm L}v d_{\rm R}{}_{ua}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}r\right)\end{array}\right.\tag{5.648}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}e_{\rm R}\nu_{\rm L}\bar{N}_{\rm R}^2 u_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(e_{\rm R}u Cu_{\rm R}{}_{va}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}r\right)\\ \mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(e_{\rm R}u Cu_{\rm R}{}_{va}\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}r\right)\end{array}\right.\tag{5.649}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}d_{\rm R}\nu_{\rm L}\bar{N}_{\rm R}^2 N_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(d_{\rm R}{}_{ua}CN_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}r\right)\\ \mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(d_{\rm R}{}_{ua}CN_{\rm R}v\right)\left(\bar{d}_{\rm R}{}_p^a C\overline{N}_{\rm R}r\right)\end{array}\right.\tag{5.650}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\rm R}^2 e_{\rm L}^2\bar{\nu}_{\rm L}N_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}p\\r\end{array},\begin{array}{c}s\\t\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}s\right)\left(\bar{e}_{\rm R}r e_{\rm L}t\right)\left(\bar{\nu}_{\rm L}v N_{\rm R}u\right)\\ \mathcal{Y}\left[\begin{array}{c|c}p&r\end{array},\begin{array}{c|c}s&t\end{array}\right]\left(e_{\rm L}s Ce_{\rm L}t\right)\left(\bar{e}_{\rm R}p C\bar{e}_{\rm R}r\right)\left(\bar{\nu}_{\rm L}v N_{\rm R}u\right)\end{array}\right.\tag{5.651}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm L}\bar{e}_{\rm R}e_{\rm L}^2\bar{N}_{\rm R}u_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(\bar{d}_{\rm L}{}_u^a u_{\rm R}{}_{va}\right)\\ \mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(\bar{d}_{\rm L}{}_u^a u_{\rm R}{}_{va}\right)\end{array}\right.\tag{5.652}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\rm R}e_{\rm L}^2\bar{e}_{\rm L}\bar{N}_{\rm R}N_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(\bar{e}_{\rm L}u N_{\rm R}v\right)\\ \mathcal{Y}\left[\begin{array}{c|c}r&s\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(\bar{e}_{\rm L}u N_{\rm R}v\right)\end{array}\right.\tag{5.653}$$

$$\mathcal{O}^{(1,2)}_{e_{\rm L}^2\bar{e}_{\rm L}^2\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}p\\r\end{array},\begin{array}{c|c}u&v\end{array}\right]\left(\bar{e}_{\rm L}u C\bar{e}_{\rm L}v\right)\left(\overline{N}_{\rm R}s e_{\rm L}p\right)\left(e_{\rm L}r C\nu_{\rm L}t\right)\\ \mathcal{Y}\left[\begin{array}{c|c}p&r\end{array},\begin{array}{c|c}u&v\end{array}\right]\left(e_{\rm L}p Ce_{\rm L}r\right)\left(\bar{e}_{\rm L}u C\bar{e}_{\rm L}v\right)\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\end{array}\right.\tag{5.654}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\rm R}^2 e_{\rm R}e_{\rm L}\bar{N}_{\rm R}N_{\rm R}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\begin{array}{c}p\\r\end{array}\right]\left(\bar{e}_{\rm R}p e_{\rm L}s\right)\left(e_{\rm R}u CN_{\rm R}v\right)\left(\bar{e}_{\rm R}r C\overline{N}_{\rm R}t\right)\\ \mathcal{Y}\left[\begin{array}{c|c}p&r\end{array}\right]\left(\bar{e}_{\rm R}p C\bar{e}_{\rm R}r\right)\left(\overline{N}_{\rm R}t e_{\rm L}s\right)\left(e_{\rm R}u CN_{\rm R}v\right)\end{array}\right.\tag{5.655}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\rm R}e_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}u_{\rm R}\bar{u}_{\rm L}}(0,0)\left|\begin{array}{l}\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(\bar{u}_{\rm L}{}_v^a u_{\rm R}{}_{ua}\right)\\ \left(e_{\rm L}r C\nu_{\rm L}t\right)\left(\bar{e}_{\rm R}p C\overline{N}_{\rm R}s\right)\left(\bar{u}_{\rm L}{}_v^a u_{\rm R}{}_{ua}\right)\end{array}\right.\tag{5.656}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm R}\bar{d}_{\rm L}\bar{e}_{\rm R}e_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\left(\bar{d}_{\rm L}{}_v^a d_{\rm R}{}_{ua}\right)\\ \left(e_{\rm L}r C\nu_{\rm L}t\right)\left(\bar{e}_{\rm R}p C\overline{N}_{\rm R}s\right)\left(\bar{d}_{\rm L}{}_v^a d_{\rm R}{}_{ua}\right)\end{array}\right.\tag{5.657}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\rm R}e_{\rm R}e_{\rm L}\bar{e}_{\rm L}\nu_{\rm L}\bar{N}_{\rm R}}(0,0)\left|\begin{array}{l}\left(\bar{e}_{\rm R}p e_{\rm L}r\right)\left(\bar{e}_{\rm L}v e_{\rm R}u\right)\left(\overline{N}_{\rm R}s\nu_{\rm L}t\right)\\ \left(\bar{e}_{\rm L}v e_{\rm R}u\right)\left(e_{\rm L}r C\nu_{\rm L}t\right)\left(\bar{e}_{\rm R}p C\overline{N}_{\rm R}s\right)\end{array}\right.\tag{5.658}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,0)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\\[2mm] (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\end{array}\right. \tag{5.659}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{s}{t},\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\\[2mm] \mathcal{Y}\left[\boxed{s\,t},\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\end{array}\right. \tag{5.660}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{L}p}C\nu_{\mathrm{L}s})(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\\[2mm] \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\end{array}\right. \tag{5.661}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}va}\right)\\[2mm] \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}va}\right)\end{array}\right. \tag{5.662}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\\[2mm] \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\end{array}\right. \tag{5.663}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}}^2\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\boxed{u\,v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\\[2mm] \mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\end{array}\right. \tag{5.664}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{s}{t}\right](\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s})\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua})\\[2mm] \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua})\end{array}\right. \tag{5.665}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{s}{t}\right](\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s})(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\\[2mm] \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\end{array}\right. \tag{5.666}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\\[2mm] \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\end{array}\right. \tag{5.667}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^3\bar{\nu}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}}(0,0)\left|\mathcal{Y}\left[\frac{r\,s}{t},\boxed{u\,v}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\right. \tag{5.668}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua})\\[2mm] \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua})\end{array}\right. \tag{5.669}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right)\\[2mm] \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right)\end{array}\right. \tag{5.670}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^2}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{s}{t}\right](\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\\[2mm] \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\end{array}\right. \tag{5.671}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}}(0,0)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\\[2mm] \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\end{array}\right. \tag{5.672}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}}^2}(0,0)\left|\mathcal{Y}\left[\frac{p\,r}{s},\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\right. \tag{5.673}$$

$$(\Delta B, \Delta L) = (0, \pm 2).$$

$$\mathcal{O}^{(1\sim4)}_{N_{\mathrm{R}}^2 \bar{u}_{\mathrm{R}}^2 u_{\mathrm{L}}^2}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}},\boxed{\frac{s}{t}},\boxed{u\,v}\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{u}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}},\boxed{\frac{s}{t}},\boxed{u\,v}\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}u_{\mathrm{L}tb}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{u}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\end{smallmatrix}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}u_{\mathrm{L}tb}\right)
\end{array}\right. \tag{5.674}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}^2}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{d}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{d}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}u_{\mathrm{L}tb}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{d}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{d}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}u_{\mathrm{L}tb}\right)
\end{array}\right. \tag{5.675}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}^2}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{u}_{\mathrm{R}r}^{\,a}e_{\mathrm{L}p}\right)\left(\overline{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](e_{\mathrm{L}p}Cu_{\mathrm{L}sb})\left(\overline{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{u}_{\mathrm{R}r}^{\,a}e_{\mathrm{L}p}\right)\left(\overline{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](e_{\mathrm{L}p}Cu_{\mathrm{L}sb})\left(\overline{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}ta}\right)\left(\overline{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)
\end{array}\right. \tag{5.676}$$

$$\mathcal{O}^{(1\sim4)}_{\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{r}{s}}\end{smallmatrix}\right](u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}rb}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{r}{s}}\end{smallmatrix}\right](u_{\mathrm{L}sc}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^{\,c}N_{\mathrm{R}u}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{r\,s}\end{smallmatrix}\right](u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}rb}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{r\,s}\end{smallmatrix}\right](u_{\mathrm{L}sc}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^{\,c}N_{\mathrm{R}u}\right)
\end{array}\right. \tag{5.677}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{\,a}\right)\left(\overline{u}_{\mathrm{L}u}^{\,b}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(\overline{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{L}u}^{\,b}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^{\,a}\right)\left(\overline{u}_{\mathrm{L}u}^{\,b}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(\overline{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}ta}\right)\left(\overline{u}_{\mathrm{L}u}^{\,b}C\overline{\nu}_{\mathrm{L}v}\right)
\end{array}\right. \tag{5.678}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{d}_{\mathrm{R}p}^{\,a}e_{\mathrm{L}r}\right)\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{s}{t}}\end{smallmatrix}\right](e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\left(\overline{d}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sb}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](u_{\mathrm{L}sb}Cu_{\mathrm{L}ta})\left(\overline{d}_{\mathrm{R}p}^{\,a}e_{\mathrm{L}r}\right)\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{s\,t}\end{smallmatrix}\right](e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\overline{u}_{\mathrm{L}v}^{\,b}N_{\mathrm{R}u}\right)\left(\overline{d}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sb}\right)
\end{array}\right. \tag{5.679}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}_{\mathrm{R}}^2u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}^2}(0,-2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}},\boxed{\frac{s}{t}},\boxed{u\,v}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{u}_{\mathrm{L}u}^{\,a}C\overline{u}_{\mathrm{L}v}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}},\boxed{s\,t},\boxed{\frac{u}{v}}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{u}_{\mathrm{L}u}^{\,a}C\overline{u}_{\mathrm{L}v}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{u}_{\mathrm{L}u}^{\,a}C\overline{u}_{\mathrm{L}v}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r},\boxed{\frac{s}{t}},\boxed{\frac{u}{v}}\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})\left(\overline{u}_{\mathrm{L}u}^{\,a}C\overline{u}_{\mathrm{L}v}^{\,b}\right)
\end{array}\right. \tag{5.680}$$

$$\mathcal{O}^{(1\sim4)}_{\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2u_{\mathrm{R}}u_{\mathrm{L}}}(0,2) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}}\end{smallmatrix}\right](u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})(N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\overline{u}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{\frac{p}{r}}\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right](u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})(N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\overline{u}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]
\mathcal{Y}\left[\begin{smallmatrix}\boxed{p\,r}\end{smallmatrix}\right](N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\overline{u}_{\mathrm{R}p}^{\,a}u_{\mathrm{L}sa}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)
\end{array}\right. \tag{5.681}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}} u_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right] (\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}ub}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right] (\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}ua}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{cc}r&s\end{array}\right] (\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}ub}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{cc}r&s\end{array}\right] (\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}ua}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \end{array} \right. \tag{5.682}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2 u_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right] (\overline{e}_{\mathrm{L}v} d_{\mathrm{R}ub}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{c}r\\s\end{array}\right] (\overline{e}_{\mathrm{L}v} d_{\mathrm{R}ua}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{cc}r&s\end{array}\right] (\overline{e}_{\mathrm{L}v} d_{\mathrm{R}ub}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \\ \mathcal{Y}\left[\begin{array}{cc}r&s\end{array}\right] (\overline{e}_{\mathrm{L}v} d_{\mathrm{R}ua}) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{N}_{\mathrm{R}p} C \overline{u}_{\mathrm{R}\,r}^{\,a}\right) \end{array} \right. \tag{5.683}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}N_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{array}{cc}u&v\end{array}\right] (N_{\mathrm{R}u} C N_{\mathrm{R}v}) \left(\overline{d}_{\mathrm{R}p}^{\,a} d_{\mathrm{L}rb}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \\ \mathcal{Y}\left[\begin{array}{cc}u&v\end{array}\right] (N_{\mathrm{R}u} C N_{\mathrm{R}v}) \left(\overline{d}_{\mathrm{R}p}^{\,a} d_{\mathrm{L}ra}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,c} u_{\mathrm{L}tc}\right) \\ \mathcal{Y}\left[\begin{array}{cc}u&v\end{array}\right] (N_{\mathrm{R}u} C N_{\mathrm{R}v}) (d_{\mathrm{L}rb} C u_{\mathrm{L}ta}) \left(\overline{d}_{p}^{\,a} C \overline{u}_{\mathrm{R}\,s}^{\,b}\right) \\ \mathcal{Y}\left[\begin{array}{cc}u&v\end{array}\right] (N_{\mathrm{R}u} C N_{\mathrm{R}v}) (d_{\mathrm{L}ra} C u_{\mathrm{L}tc}) \left(\overline{d}_{p}^{\,a} C \overline{u}_{\mathrm{R}\,s}^{\,c}\right) \end{array} \right. \tag{5.684}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,2) \left| \begin{array}{l} (u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}) \left(\overline{d}_{\mathrm{L}u}^{\,a} N_{\mathrm{R}v}\right) \left(\overline{u}_{\mathrm{R}\,r}^{\,b} d_{\mathrm{L}pa}\right) \\ (u_{\mathrm{L}sc} C \nu_{\mathrm{L}t}) \left(\overline{u}_{\mathrm{R}\,r}^{\,a} d_{\mathrm{L}pa}\right) \left(\overline{d}_{\mathrm{L}u}^{\,c} N_{\mathrm{R}v}\right) \\ \left(\overline{d}_{\mathrm{L}u}^{\,a} N_{\mathrm{R}v}\right) \left(\overline{u}_{\mathrm{R}\,r}^{\,b} \nu_{\mathrm{L}t}\right) (d_{\mathrm{L}pa} C u_{\mathrm{L}sb}) \\ \left(\overline{u}_{\mathrm{R}\,r}^{\,a} \nu_{\mathrm{L}t}\right) \left(\overline{d}_{\mathrm{L}u}^{\,c} N_{\mathrm{R}v}\right) (d_{\mathrm{L}pa} C u_{\mathrm{L}sc}) \end{array} \right. \tag{5.685}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{e}_{\mathrm{L}u} C \overline{u}_{\mathrm{L}\,v}^{\,a}\right) \\ \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,a} u_{\mathrm{L}tc}\right) \left(\overline{e}_{\mathrm{L}u} C \overline{u}_{\mathrm{L}\,v}^{\,c}\right) \\ \left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}tb}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} d_{\mathrm{L}pa}\right) \left(\overline{e}_{\mathrm{L}u} C \overline{u}_{\mathrm{L}\,v}^{\,a}\right) \\ \left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}tc}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,a} d_{\mathrm{L}pa}\right) \left(\overline{e}_{\mathrm{L}u} C \overline{u}_{\mathrm{L}\,v}^{\,c}\right) \end{array} \right. \tag{5.686}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \left(\overline{d}_{\mathrm{L}u}^{\,a} C \overline{\nu}_{\mathrm{L}v}\right) \\ \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,a} u_{\mathrm{L}tc}\right) \left(\overline{d}_{\mathrm{L}u}^{\,c} C \overline{\nu}_{\mathrm{L}v}\right) \\ \left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}tb}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} d_{\mathrm{L}pa}\right) \left(\overline{d}_{\mathrm{L}u}^{\,a} C \overline{\nu}_{\mathrm{L}v}\right) \\ \left(\overline{N}_{\mathrm{R}r} u_{\mathrm{L}tc}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,a} d_{\mathrm{L}pa}\right) \left(\overline{d}_{\mathrm{L}u}^{\,c} C \overline{\nu}_{\mathrm{L}v}\right) \end{array} \right. \tag{5.687}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}u_{\mathrm{L}}}(0,2) \left| \begin{array}{l} (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\overline{d}_{\mathrm{R}p}^{\,a} e_{\mathrm{L}r}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}ta}\right) \\ (N_{\mathrm{R}u} C u_{\mathrm{R}va}) \left(\overline{d}_{\mathrm{R}p}^{\,a} e_{\mathrm{L}r}\right) \left(\overline{u}_{\mathrm{R}\,s}^{\,b} u_{\mathrm{L}tb}\right) \\ (e_{\mathrm{L}r} C u_{\mathrm{L}ta}) (N_{\mathrm{R}u} C u_{\mathrm{R}vb}) \left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{u}_{\mathrm{R}\,s}^{\,b}\right) \\ (N_{\mathrm{R}u} C u_{\mathrm{R}va}) (e_{\mathrm{L}r} C u_{\mathrm{L}tb}) \left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{u}_{\mathrm{R}\,s}^{\,b}\right) \end{array} \right. \tag{5.688}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,2) \left| \begin{array}{l} (u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}) (d_{\mathrm{R}ub} C N_{\mathrm{R}v}) \left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{u}_{\mathrm{R}\,r}^{\,b}\right) \\ (d_{\mathrm{R}ua} C N_{\mathrm{R}v}) (u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}) \left(\overline{d}_{\mathrm{R}p}^{\,a} C \overline{u}_{\mathrm{R}\,r}^{\,b}\right) \\ (d_{\mathrm{R}ub} C N_{\mathrm{R}v}) \left(\overline{d}_{\mathrm{R}p}^{\,a} u_{\mathrm{L}sa}\right) \left(\overline{u}_{\mathrm{R}\,r}^{\,b} \nu_{\mathrm{L}t}\right) \\ (d_{\mathrm{R}ua} C N_{\mathrm{R}v}) \left(\overline{u}_{\mathrm{R}\,r}^{\,b} \nu_{\mathrm{L}t}\right) \left(\overline{d}_{\mathrm{R}p}^{\,a} u_{\mathrm{L}sb}\right) \end{array} \right. \tag{5.689}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}d_\mathrm{R}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub})\left(\bar{u}_{\mathrm{R}s}^b u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\\(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{u}_{\mathrm{R}s}^b u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\\\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub})\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^b\right)\\(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^b\right)\end{array}\right.\tag{5.690}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}N_\mathrm{R}^2\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta})\\\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\,(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a)\end{array}\right.\tag{5.691}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L}\bar{e}_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left|\begin{array}{l}(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\,(\bar{u}_{\mathrm{R}r}^a e_{\mathrm{L}p})\\(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\,(e_{\mathrm{L}p}Cu_{\mathrm{L}sa})\,(\bar{u}_{\mathrm{R}r}^a \nu_{\mathrm{L}t})\end{array}\right.\tag{5.692}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L}\bar{e}_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta})\\\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(\bar{u}_{\mathrm{R}s}^a e_{\mathrm{L}p})\end{array}\right.\tag{5.693}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{R}\nu_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left|\begin{array}{l}(e_{\mathrm{R}u}CN_{\mathrm{R}v})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\,(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^a)\\(e_{\mathrm{R}u}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}p}u_{\mathrm{L}sa})\,(\bar{u}_{\mathrm{R}r}^a \nu_{\mathrm{L}t})\end{array}\right.\tag{5.694}$$

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{R}\bar{e}_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,-2)\left|\begin{array}{l}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}tb}\right)\\\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\\\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{u}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\end{array}\right.\tag{5.695}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{R}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta}\right)\\(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\end{array}\right.\tag{5.696}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2\bar{\nu}_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\,(u_{\mathrm{L}ra}C\nu_{\mathrm{L}t})\left(\bar{u}_{\mathrm{R}p}^a \nu_{\mathrm{L}s}\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\,(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\bar{u}_{\mathrm{R}p}^a u_{\mathrm{L}ra}\right)\end{array}\right.\tag{5.697}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}\bar{\nu}_\mathrm{L}^2\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\bar{u}_{\mathrm{R}r}^a \nu_{\mathrm{L}t}\right)\end{array}\right.\tag{5.698}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}^2\bar{u}_\mathrm{R}u_\mathrm{L}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\bar{u}_{\mathrm{R}r}^a \nu_{\mathrm{L}t}\right)\end{array}\right.\tag{5.699}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}_\mathrm{R}^2\bar{u}_\mathrm{R}u_\mathrm{R}u_\mathrm{L}\bar{u}_\mathrm{L}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}tb}\right)\left(\bar{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right)\end{array}\right.\tag{5.700}$$

$$\mathcal{O}^{(1\sim4)}_{d_\mathrm{R}\bar{d}_\mathrm{L}\bar{N}_\mathrm{R}^2\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}tb}\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\end{array}\right.\tag{5.701}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{R}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}^2\bar{u}_\mathrm{R}u_\mathrm{L}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^a\right)\\\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\,(\bar{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta})\end{array}\right.\tag{5.702}$$

$$\mathcal{O}^{(1,2)}_{\bar{\nu}_{\mathrm{L}}\bar{N}^2_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}^a_{\mathrm{R}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,|\,r}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\overline{u}^a_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\end{array}\right.\tag{5.703}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^2_{\mathrm{R}}d_{\mathrm{L}}e_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(d_{\mathrm{L}sa}Cu_{\mathrm{L}tb}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{d}^b_{\mathrm{R}r}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}sa}\right)\left(\overline{d}^b_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,|\,r}\right]\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(d_{\mathrm{L}sa}Cu_{\mathrm{L}tb}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{d}^b_{\mathrm{R}r}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,|\,r}\right]\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}sa}\right)\left(\overline{d}^b_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\end{array}\right.\tag{5.704}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\left(e_{\mathrm{L}s}Cu_{\mathrm{L}ta}\right)\left(\overline{d}^b_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}rb}\right)\\[4pt]\left(e_{\mathrm{L}s}Cu_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}ra}\right)\left(\overline{d}^c_{\mathrm{L}u}N_{\mathrm{R}v}\right)\\[4pt]\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}s}\right)\left(\overline{d}^b_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ta}\right)\\[4pt]\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}s}\right)\left(\overline{d}^c_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra}Cu_{\mathrm{L}tc}\right)\end{array}\right.\tag{5.705}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\left(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t}\right)\left(\overline{u}^b_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}rb}\right)\\[4pt]\left(u_{\mathrm{L}sc}C\nu_{\mathrm{L}t}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}ra}\right)\left(\overline{u}^c_{\mathrm{L}v}N_{\mathrm{R}u}\right)\\[4pt]\left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(\overline{d}^a_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\overline{u}^b_{\mathrm{L}v}N_{\mathrm{R}u}\right)\\[4pt]\left(d_{\mathrm{L}ra}C\nu_{\mathrm{L}t}\right)\left(\overline{u}^c_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p}u_{\mathrm{L}sc}\right)\end{array}\right.\tag{5.706}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}rb}\right)\left(\overline{u}^b_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p}d_{\mathrm{L}ra}\right)\left(\overline{u}^c_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}ta}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\overline{u}^b_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}\right)\\[4pt]\left(d_{\mathrm{L}ra}Cu_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\overline{u}^c_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.707}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}^2_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{u\,|\,v}\right]\left(\overline{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{u}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\boxed{u\,|\,v}\right]\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{u}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{u}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\overline{u}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\end{array}\right.\tag{5.708}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}^2_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{d}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{d}^b_{\mathrm{L}u}C\overline{u}^a_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\boxed{r\,|\,s}\right]\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{d}^a_{\mathrm{L}u}C\overline{u}^b_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\left[\boxed{r\,|\,s}\right]\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\overline{d}^b_{\mathrm{L}u}C\overline{u}^a_{\mathrm{L}v}\right)\end{array}\right.\tag{5.709}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}^2_{\mathrm{R}}d_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(e_{\mathrm{L}s}Cu_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{d}^b_{\mathrm{R}r}\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}s}\right)\left(\overline{d}^b_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,|\,r}\right]\left(e_{\mathrm{L}s}Cu_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}C\overline{d}^b_{\mathrm{R}r}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,|\,r}\right]\left(d_{\mathrm{R}ub}CN_{\mathrm{R}v}\right)\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}s}\right)\left(\overline{d}^b_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\end{array}\right.\tag{5.710}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e^2_{\mathrm{L}}\bar{e}_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(e_{\mathrm{L}s}Cu_{\mathrm{L}ta}\right)\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}r}\right)\\[4pt]\mathcal{Y}\left[\boxed{r\,|\,s}\right]\left(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(e_{\mathrm{L}s}Cu_{\mathrm{L}ta}\right)\left(\overline{d}^a_{\mathrm{R}p}e_{\mathrm{L}r}\right)\end{array}\right.\tag{5.711}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}(e_{\mathrm{R}u}CN_{\mathrm{R}v})\,(e_{\mathrm{L}s}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{e}_{\mathrm{R}r}\right)\\(e_{\mathrm{R}u}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}r}u_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}s}\right)\end{array}\right.\tag{5.712}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}r}\right)\\(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\,(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^{a}u_{\mathrm{L}sa}\right)\end{array}\right.\tag{5.713}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}^{2}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{u\,v}\right](\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}r}\right)\\\mathcal{Y}\left[\boxed{u\,v}\right](\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.714}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^{2}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{a}e_{\mathrm{L}r}\right)\\\mathcal{Y}\left[\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.715}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}(e_{\mathrm{R}u}CN_{\mathrm{R}v})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\\\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{a}u_{\mathrm{L}sa}\right)\end{array}\right.\tag{5.716}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{u}_{\mathrm{L}v}^{b}d_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^{c}d_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{u}_{\mathrm{L}v}^{b}d_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}v}^{c}d_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.717}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}e_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right](\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right](\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.718}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}^{2}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(e_{\mathrm{L}s}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{L}u}^{a}N_{\mathrm{R}v}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(e_{\mathrm{L}s}Cu_{\mathrm{L}ta})\left(\bar{d}_{\mathrm{L}u}^{a}N_{\mathrm{R}v}\right)\end{array}\right.\tag{5.719}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{u}_{\mathrm{L}v}^{a}N_{\mathrm{R}u}\right)\\(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\,(\bar{e}_{\mathrm{R}p}u_{\mathrm{L}sa})\left(\bar{u}_{\mathrm{L}v}^{a}N_{\mathrm{R}u}\right)\end{array}\right.\tag{5.720}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{u}_{\mathrm{L}u}^{a}C\bar{\nu}_{\mathrm{L}v}\right)\\\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(e_{\mathrm{L}r}Cu_{\mathrm{L}ta})\left(\bar{u}_{\mathrm{L}u}^{a}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.721}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{L}u}^{a}N_{\mathrm{R}v}\right)\\\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{L}p}Cu_{\mathrm{L}sa})\left(\bar{d}_{\mathrm{L}u}^{a}N_{\mathrm{R}v}\right)\end{array}\right.\tag{5.722}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{a}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{a}\right)\end{array}\right.\tag{5.723}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{L}u}^{a}C\bar{\nu}_{\mathrm{L}v}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{L}u}^{a}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.724}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^{2}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}v}^{a}e_{\mathrm{R}u}\right)\\\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}v}^{a}e_{\mathrm{R}u}\right)\end{array}\right.\tag{5.725}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}}^{2}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\right]\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)(u_{\mathrm{L}ra}C\nu_{\mathrm{L}t})\left(\bar{u}_{\mathrm{L}v}^{a}N_{\mathrm{R}u}\right)\\\mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(\bar{u}_{\mathrm{L}v}^{a}N_{\mathrm{R}u}\right)\end{array}\right.\tag{5.726}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}} e_{\mathrm{R}} \nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(0,2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right) \left(u_{\mathrm{L}ra} C \nu_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{L}u}^{a} e_{\mathrm{R}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right] \left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}ra}\right) \left(\bar{d}_{\mathrm{L}u}^{a} e_{\mathrm{R}v}\right) \end{array} \right. \tag{5.727}$$

$$\mathcal{O}^{(1,2)}_{\nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right) \left(\overline{N}_{\mathrm{R}p} u_{\mathrm{L}sa}\right) \left(\bar{u}_{\mathrm{L}u}^{a} C \bar{\nu}_{\mathrm{L}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \mid r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(u_{\mathrm{L}sa} C \nu_{\mathrm{L}t}\right) \left(\bar{u}_{\mathrm{L}u}^{a} C \bar{\nu}_{\mathrm{L}v}\right) \end{array} \right. \tag{5.728}$$

$$\mathcal{O}_{\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \mathcal{Y} \left[\begin{smallmatrix} p \mid r \\ \hline s \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{u}_{\mathrm{L}v}^{a} N_{\mathrm{R}u}\right) \right. \tag{5.729}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{L}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}}^3 u_{\mathrm{L}}}(0,-2) \left| \mathcal{Y} \left[\begin{smallmatrix} p \mid r \\ \hline s \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right) \left(\bar{d}_{\mathrm{L}u}^{a} e_{\mathrm{R}v}\right) \right. \tag{5.730}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{L}u} u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{b} C \bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{L}u} u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{b} d_{\mathrm{L}pa}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}\right) \left(\bar{e}_{\mathrm{L}u} u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{b} C \bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{L}u} u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{b} d_{\mathrm{L}pa}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{a}\right) \end{array} \right. \tag{5.731}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{R}} \bar{e}_{\mathrm{R}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(d_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{a} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \left(d_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{e}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^{a}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(d_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{a} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \mid t \end{smallmatrix}\right] \left(d_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{e}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^{a}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{b}\right) \end{array} \right. \tag{5.732}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{N}_{\mathrm{R}}^2 \bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix}, \begin{smallmatrix} u \mid v \end{smallmatrix}\right] \left(u_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^{a}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \mid t \end{smallmatrix}, \begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \left(u_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^{a}\right) \left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \mid r \end{smallmatrix}, \begin{smallmatrix} s \mid t \end{smallmatrix}, \begin{smallmatrix} u \mid v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(u_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{a} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \mid r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix}, \begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right) \left(u_{\mathrm{R}ua} C u_{\mathrm{R}vb}\right) \left(\bar{u}_{\mathrm{R}s}^{a} C \bar{u}_{\mathrm{R}t}^{b}\right) \end{array} \right. \tag{5.733}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right) \left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{a}\right) \left(\bar{d}_{\mathrm{L}u}^{b} C \bar{e}_{\mathrm{L}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{u}_{\mathrm{R}t}^{a} d_{\mathrm{L}rb}\right) \left(\bar{d}_{\mathrm{L}u}^{b} C \bar{e}_{\mathrm{L}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \mid r \end{smallmatrix}\right] \left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right) \left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{a}\right) \left(\bar{d}_{\mathrm{L}u}^{b} C \bar{e}_{\mathrm{L}v}\right) \\ \mathcal{Y} \left[\begin{smallmatrix} p \mid r \end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right) \left(\bar{u}_{\mathrm{R}t}^{a} d_{\mathrm{L}rb}\right) \left(\bar{d}_{\mathrm{L}u}^{b} C \bar{e}_{\mathrm{L}v}\right) \end{array} \right. \tag{5.734}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \left(N_{\mathrm{R}u} C u_{\mathrm{R}va}\right) \left(\bar{u}_{\mathrm{R}s}^{b} \nu_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}rb}\right) \\ \left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right) \left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}ra}\right) \left(\bar{u}_{\mathrm{R}s}^{c} \nu_{\mathrm{L}t}\right) \\ \left(N_{\mathrm{R}u} C u_{\mathrm{R}va}\right) \left(d_{\mathrm{L}rb} C \nu_{\mathrm{L}t}\right) \left(\bar{d}_{\mathrm{R}p}^{a} C \bar{u}_{\mathrm{R}s}^{b}\right) \\ \left(d_{\mathrm{L}ra} C \nu_{\mathrm{L}t}\right) \left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right) \left(\bar{d}_{\mathrm{R}p}^{a} C \bar{u}_{\mathrm{R}s}^{c}\right) \end{array} \right. \tag{5.735}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \left(\bar{\nu}_{\mathrm{L}v} u_{\mathrm{R}ua}\right) \left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}rb}\right) \left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{b}\right) \\ \left(\bar{\nu}_{\mathrm{L}v} u_{\mathrm{R}uc}\right) \left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}ra}\right) \left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{c}\right) \\ \left(\bar{\nu}_{\mathrm{L}v} u_{\mathrm{R}ua}\right) \left(\bar{u}_{\mathrm{R}t}^{b} d_{\mathrm{L}rb}\right) \left(\bar{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right) \\ \left(\bar{\nu}_{\mathrm{L}v} u_{\mathrm{R}uc}\right) \left(\bar{u}_{\mathrm{R}t}^{c} d_{\mathrm{L}ra}\right) \left(\bar{d}_{\mathrm{R}p}^{a} C \overline{N}_{\mathrm{R}s}\right) \end{array} \right. \tag{5.736}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^{a}d_{\mathrm{L}rb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ (\bar{e}_{\mathrm{L}v}d_{\mathrm{R}uc})\left(\bar{d}_{\mathrm{R}p}^{a}d_{\mathrm{L}ra}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{c}\right) \\ (\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{u}_{\mathrm{R}t}^{b}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right) \\ (\bar{e}_{\mathrm{L}v}d_{\mathrm{R}uc})\left(\bar{u}_{\mathrm{R}t}^{c}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\end{array}\right. \tag{5.737}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}^{2}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{u\,v}\,(\bar{e}_{\mathrm{L}u}C\bar{e}_{\mathrm{L}v})\,(d_{\mathrm{L}pa}Ce_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y}\,\boxed{u\,v}\,(\bar{e}_{\mathrm{L}u}C\bar{e}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{u}_{\mathrm{R}t}^{a}e_{\mathrm{L}r}\right)\end{array}\right. \tag{5.738}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}^{2}\bar{u}_{\mathrm{R}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{u\,v}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\,(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t}) \\ \mathcal{Y}\,\boxed{u\,v}\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t})\,(\bar{u}_{\mathrm{R}s}^{a}d_{\mathrm{L}pa})\end{array}\right. \tag{5.739}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\,(\bar{u}_{\mathrm{L}v}^{a}u_{\mathrm{R}ub})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ (\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\,(\bar{u}_{\mathrm{L}v}^{c}u_{\mathrm{R}uc})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\,(\bar{u}_{\mathrm{L}v}^{a}u_{\mathrm{R}ub})\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\,(\bar{u}_{\mathrm{L}v}^{c}u_{\mathrm{R}uc})\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.740}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{R}}d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{d}_{\mathrm{L}v}^{a}d_{\mathrm{R}ub}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ (\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\bar{d}_{\mathrm{L}v}^{c}d_{\mathrm{R}uc}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}v}^{a}d_{\mathrm{R}ub}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}v}^{c}d_{\mathrm{R}uc}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.741}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\,(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ (\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.742}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\,(\bar{e}_{\mathrm{R}r}d_{\mathrm{L}pa})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ (\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.743}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}^{2}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\,(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s})\,(\bar{u}_{\mathrm{R}r}^{a}\nu_{\mathrm{L}t}) \\ \mathcal{Y}\,\boxed{s\,t}\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\,(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\,(\bar{u}_{\mathrm{R}r}^{a}d_{\mathrm{L}pa})\end{array}\right. \tag{5.744}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\,(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t}) \\ \left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\,(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})\,(\bar{u}_{\mathrm{R}s}^{a}d_{\mathrm{L}pa})\end{array}\right. \tag{5.745}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}u}^{a}u_{\mathrm{R}vb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}u}^{c}u_{\mathrm{R}vc}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y}\,\boxed{r\,s}\,\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}u}^{a}u_{\mathrm{R}vb}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right) \\ \mathcal{Y}\,\boxed{r\,s}\,\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{d}_{\mathrm{L}u}^{c}u_{\mathrm{R}vc}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.746}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^{2}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right) \\ \mathcal{Y}\,\boxed{r\,s}\,(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right. \tag{5.747}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}d^2_\mathrm{R}\bar{e}_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}u|v\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}u|v\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{b}\right)\end{array}\right.\tag{5.748}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}d_\mathrm{R}\bar{N}^2_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,(d_{\mathrm{R}ub}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,(d_{\mathrm{R}ua}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,(d_{\mathrm{R}ub}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^{a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{b}\right)\end{array}\right.\tag{5.749}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\,(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t})\\[4pt](e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\,(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\,(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{a})\end{array}\right.\tag{5.750}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(\bar{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\\[4pt](\bar{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(\bar{u}_{\mathrm{R}t}^{a}e_{\mathrm{L}r})\end{array}\right.\tag{5.751}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}_\mathrm{R}e_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\,(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\\[4pt](\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(\bar{u}_{\mathrm{R}t}^{a}e_{\mathrm{L}r})\end{array}\right.\tag{5.752}$$

$$\mathcal{O}^{(1,2)}_{e_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}^2_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}u_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}u_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right.\tag{5.753}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}^2_\mathrm{R}e_\mathrm{R}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(d_{\mathrm{R}ua}Ce_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{a})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r}\right)(d_{\mathrm{R}ua}Ce_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right.\tag{5.754}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}_\mathrm{R}\nu^2_\mathrm{L}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,(\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s})\,(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\,(\bar{u}_{\mathrm{R}r}^{a}\nu_{\mathrm{L}t})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\,(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\,(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{a})\end{array}\right.\tag{5.755}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}_\mathrm{R}\nu_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t})\\[4pt]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\,(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{a})\end{array}\right.\tag{5.756}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}e_\mathrm{R}\bar{N}^2_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right.\tag{5.757}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}_\mathrm{R}\bar{N}^2_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\end{array}\right.\tag{5.758}$$

$$\mathcal{O}^{(1,2)}_{\nu^2_\mathrm{L}\bar{N}_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\,(\bar{u}_{\mathrm{R}r}^{a}\nu_{\mathrm{L}t})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\,(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{a}\right)\end{array}\right.\tag{5.759}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}^2_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{a}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\,(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t})\end{array}\right.\tag{5.760}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}\bar{e}_\mathrm{L}\nu_\mathrm{L}\bar{N}^2_\mathrm{R}\bar{u}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{a}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\,(\bar{u}_{\mathrm{R}s}^{a}\nu_{\mathrm{L}t})\end{array}\right.\tag{5.761}$$

$$\mathcal{O}_{\bar{N}^3_\mathrm{R}N_\mathrm{R}\bar{u}_\mathrm{R}u_\mathrm{R}}(0,-2)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{a}\right)\right.\tag{5.762}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{L}}^2 N_{\mathrm{R}}^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}, \begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}, \boxed{u\,v}\right] (N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(d_{\mathrm{L}sa}Cd_{\mathrm{L}tb})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}, \begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}, \boxed{u\,v}\right] (N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}d_{\mathrm{L}tb}\right) \\ \mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \boxed{u\,v}\right] (N_{\mathrm{R}u}CN_{\mathrm{R}v})\,(d_{\mathrm{L}sa}Cd_{\mathrm{L}tb})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \boxed{u\,v}\right] (N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}d_{\mathrm{L}tb}\right) \end{array} \right. \tag{5.763}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] (d_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] (d_{\mathrm{L}sc}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] (d_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{L}u}^{\,b}N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] (d_{\mathrm{L}sc}C\nu_{\mathrm{L}t})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right) \end{array} \right. \tag{5.764}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}}^2 \bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,c}) \\ \mathcal{Y}\left[\boxed{r\,s}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,c}) \end{array} \right. \tag{5.765}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{\nu}_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{r}\\\boxed{s}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{\nu}_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right) \end{array} \right. \tag{5.766}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] \left(\bar{e}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] (\bar{e}_{\mathrm{R}s}d_{\mathrm{L}pa})\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] \left(\bar{e}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] (\bar{e}_{\mathrm{R}s}d_{\mathrm{L}pa})\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{u}_{\mathrm{L}v}^{\,b}\right) \end{array} \right. \tag{5.767}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^2 \bar{d}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}, \begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}, \boxed{u\,v}\right] \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{d}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix}\boxed{s}\\\boxed{t}\end{smallmatrix}, \begin{smallmatrix}\boxed{u}\\\boxed{v}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{d}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}, \boxed{s\,t}, \boxed{u\,v}\right] \left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{d}_{\mathrm{L}v}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}, \boxed{s\,t}, \begin{smallmatrix}\boxed{u}\\\boxed{v}\end{smallmatrix}\right] \left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^{\,a}C\bar{d}_{\mathrm{L}v}^{\,b}\right) \end{array} \right. \tag{5.768}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{L}}e_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] (d_{\mathrm{L}sa}Ce_{\mathrm{L}t})\,(N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] (N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}e_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] (d_{\mathrm{L}sa}Ce_{\mathrm{L}t})\,(N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] (N_{\mathrm{R}u}Cu_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}e_{\mathrm{L}t}\right) \end{array} \right. \tag{5.769}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] (d_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\,(d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}\boxed{p}\\\boxed{r}\end{smallmatrix}\right] (d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] (d_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\,(d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right] (d_{\mathrm{R}ub}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^{\,a}d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right) \end{array} \right. \tag{5.770}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{R}} d_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C \overline{N}_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sa}\right)\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right]\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{R}r}^b C \overline{N}_{\mathrm{R}t}\right) \end{array}\right.$$

(5.771)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{L}} N_{\mathrm{R}}^2}(0,2)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right]\left(N_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(\overline{e}_{\mathrm{R}s}e_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right]\left(N_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra}C e_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.772)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \nu_{\mathrm{L}} N_{\mathrm{R}}}(0,2)\left|\begin{array}{l} \left(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(e_{\mathrm{L}s}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \end{array}\right.$$

(5.773)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l} \left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)\left(\overline{e}_{\mathrm{L}u}C \overline{\nu}_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\overline{e}_{\mathrm{L}u}C \overline{\nu}_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right) \end{array}\right.$$

(5.774)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} \nu_{\mathrm{L}} N_{\mathrm{R}}}(0,2)\left|\begin{array}{l} \left(\overline{e}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(e_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(e_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.775)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l} \left(\overline{e}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right) \\ \left(\overline{e}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right) \\ \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \\ \left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.776)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l} \left(\overline{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{e}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \left(\overline{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{e}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.777)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}}^2 \bar{\nu}_{\mathrm{L}} N_{\mathrm{R}}}(0,2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}ra}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a \nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\nu_{\mathrm{L}s}C \nu_{\mathrm{L}t}\right)\left(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \end{array}\right.$$

(5.778)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{\nu}_{\mathrm{L}u}C \overline{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right]\left(\overline{\nu}_{\mathrm{L}u}C \overline{\nu}_{\mathrm{L}v}\right)\left(d_{\mathrm{L}ra}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.779)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}}^2}(0,2)\left|\begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right]\left(N_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right]\left(N_{\mathrm{R}u}C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}ra}C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \end{array}\right.$$

(5.780)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\overline{u}_{\mathrm{L}v}^b u_{\mathrm{R}ua}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{u}_{\mathrm{L}v}^c u_{\mathrm{R}uc}\right) \end{array}\right.$$

(5.781)

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{R}} d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2}(0,-2)\left|\begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}v}^b d_{\mathrm{R}ua}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C \overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{L}v}^c d_{\mathrm{R}uc}\right) \end{array}\right.$$

(5.782)

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{R}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\bar{e}_{\mathrm{L}v} e_{\mathrm{R}u}) (\overline{N}_{\mathrm{R}t} d_{\mathrm{L}ra}) (\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{e}_{\mathrm{L}v} e_{\mathrm{R}u}) (\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}) \end{array} \right. \tag{5.783}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\bar{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}) (\overline{N}_{\mathrm{R}t} d_{\mathrm{L}ra}) (\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}) (\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}) \end{array} \right. \tag{5.784}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{L}} \nu_{\mathrm{L}} N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} (e_{\mathrm{L}s} C \nu_{\mathrm{L}t}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}) \\ (\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}t}) (d_{\mathrm{L}pa} C e_{\mathrm{L}s}) (\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}) \end{array} \right. \tag{5.785}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} (\overline{N}_{\mathrm{R}t} e_{\mathrm{L}s}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \\ (\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}t}) (d_{\mathrm{L}pa} C e_{\mathrm{L}s}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \end{array} \right. \tag{5.786}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} (\overline{N}_{\mathrm{R}t} e_{\mathrm{L}s}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \\ (\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}t}) (d_{\mathrm{L}pa} C e_{\mathrm{L}s}) (\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \end{array} \right. \tag{5.787}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\overline{N}_{\mathrm{R}t} e_{\mathrm{L}r}) (\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a C \bar{e}_{\mathrm{L}v}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (d_{\mathrm{L}pa} C e_{\mathrm{L}r}) (\bar{d}_{\mathrm{L}u}^a C \bar{e}_{\mathrm{L}v}) \end{array} \right. \tag{5.788}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} r \\ s \end{smallmatrix}} (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{u}_{\mathrm{L}v}^a e_{\mathrm{R}u}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} r & s \end{smallmatrix}} (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{u}_{\mathrm{L}v}^a e_{\mathrm{R}u}) \end{array} \right. \tag{5.789}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} \nu_{\mathrm{L}}^2 N_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}t}) (d_{\mathrm{L}pa} C \nu_{\mathrm{L}s}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \end{array} \right. \tag{5.790}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} \nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} (\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{u}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \\ (\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}) (\bar{u}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \end{array} \right. \tag{5.791}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{R}} \bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}t}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}) \end{array} \right. \tag{5.792}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{R}r} C \overline{N}_{\mathrm{R}t}) (\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\bar{e}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a e_{\mathrm{R}v}) \end{array} \right. \tag{5.793}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} s \\ t \end{smallmatrix}} (\overline{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}) (d_{\mathrm{L}pa} C \nu_{\mathrm{L}s}) (\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} s & t \end{smallmatrix}} (\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}) \end{array} \right. \tag{5.794}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{e}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2 \bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} r \\ s \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \\ \mathcal{Y} \boxed{\begin{smallmatrix} r & s \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}v}^a) \end{array} \right. \tag{5.795}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \nu_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y} \boxed{\begin{smallmatrix} r \\ s \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \\ \mathcal{Y} \boxed{\begin{smallmatrix} r & s \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} \nu_{\mathrm{L}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a C \bar{\nu}_{\mathrm{L}v}) \end{array} \right. \tag{5.796}$$

$$\mathcal{O}_{d_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}}}(0,-2) \left| \mathcal{Y} \boxed{\begin{smallmatrix} r & s \\ t \end{smallmatrix}} (\overline{N}_{\mathrm{R}s} C \overline{N}_{\mathrm{R}t}) (\overline{N}_{\mathrm{R}r} d_{\mathrm{L}pa}) (\bar{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}) \right. \tag{5.797}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}^2 d_\mathrm{R}^2 \bar{N}_\mathrm{R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\boxed{u\,v}\right](d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix},\begin{smallmatrix}u\\v\end{smallmatrix}\right](d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^b C\overline{N}_{\mathrm{R}t}\right)\\[4pt]\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right)\\[4pt]\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t},\begin{smallmatrix}u\\v\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{R}ua}Cd_{\mathrm{R}vb})\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right)\end{array}\right.\tag{5.798}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}\bar{e}_\mathrm{R} e_\mathrm{L}^2 N_\mathrm{R} u_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right](\bar{e}_{\mathrm{R}r}e_{\mathrm{L}t})(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right](e_{\mathrm{L}s}Ce_{\mathrm{L}t})(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.799}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R}\bar{e}_\mathrm{R} e_\mathrm{L}\nu_\mathrm{L} N_\mathrm{R}}(0,2)\left|\begin{array}{l}(e_{\mathrm{L}s}C\nu_{\mathrm{L}t})(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\\[4pt](\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t})(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right)\end{array}\right.\tag{5.800}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R}\bar{e}_\mathrm{R} e_\mathrm{L}\bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\\[4pt](\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}s}\right)\end{array}\right.\tag{5.801}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{L}\nu_\mathrm{L}\bar{N}_\mathrm{R} N_\mathrm{R} u_\mathrm{R}}(0,2)\left|\begin{array}{l}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\\[4pt](e_{\mathrm{L}r}C\nu_{\mathrm{L}t})(N_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\end{array}\right.\tag{5.802}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}^2 u_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\end{array}\right.\tag{5.803}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R} e_\mathrm{L}\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right)\end{array}\right.\tag{5.804}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R}\bar{e}_\mathrm{R} e_\mathrm{R}\bar{N}_\mathrm{R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{R}ua}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{R}ua}Ce_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.805}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{R}\nu_\mathrm{L}^2\bar{N}_\mathrm{R} u_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a \nu_{\mathrm{L}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.806}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R}\nu_\mathrm{L}^2\bar{N}_\mathrm{R} N_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a \nu_{\mathrm{L}s}\right)\\[4pt]\mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.807}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} d_\mathrm{R}\nu_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}^2}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\\[4pt]\mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}ua})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\end{array}\right.\tag{5.808}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R} e_\mathrm{R}\bar{N}_\mathrm{R}^3 u_\mathrm{R}}(0,-2)\left|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(e_{\mathrm{R}u}Cu_{\mathrm{R}va})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\right.\tag{5.809}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R} d_\mathrm{R}\bar{N}_\mathrm{R}^3 N_\mathrm{R}}(0,-2)\left|\mathcal{Y}\left[\begin{smallmatrix}r\,s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(d_{\mathrm{R}ua}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^a C\overline{N}_{\mathrm{R}r}\right)\right.\tag{5.810}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R}^2 e_\mathrm{L}^2 N_\mathrm{R}^2}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix},\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}s})(\bar{e}_{\mathrm{R}r}e_{\mathrm{L}t})\\[4pt]\mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right](e_{\mathrm{L}s}Ce_{\mathrm{L}t})(N_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r})\end{array}\right.\tag{5.811}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L}^2\bar{e}_\mathrm{L}\nu_\mathrm{L} N_\mathrm{R}}(0,2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})(e_{\mathrm{L}s}C\nu_{\mathrm{L}t})\\[4pt]\mathcal{Y}\left[\boxed{r\,s}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})(e_{\mathrm{L}s}C\nu_{\mathrm{L}t})\end{array}\right.\tag{5.812}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{L}^2\bar{e}_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(0,-2)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}r\\s\end{smallmatrix}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)(\bar{e}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v})\\[4pt]\mathcal{Y}\left[\boxed{r\,s}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)(\bar{e}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v})\end{array}\right.\tag{5.813}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}^2 \bar{e}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r},\frac{s}{t},\boxed{u\,v}\right] (\bar{e}_{\mathrm{L}u}C\bar{e}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}s}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right) \\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right] (e_{\mathrm{L}p}Ce_{\mathrm{L}r})(\bar{e}_{\mathrm{L}u}C\bar{e}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right) \end{array}\right. \tag{5.814}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}s})(\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t})(e_{\mathrm{R}u}CN_{\mathrm{R}v}) \\ \mathcal{Y}\left[\boxed{p\,r}\right](\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r})(e_{\mathrm{L}s}C\nu_{\mathrm{L}t})(e_{\mathrm{R}u}CN_{\mathrm{R}v}) \end{array}\right. \tag{5.815}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}\bar{e}_{\mathrm{R}}^2 e_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}s})\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)(\bar{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \\ \mathcal{Y}\left[\boxed{p\,r}\right](\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)(\bar{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \end{array}\right. \tag{5.816}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r}\right](\bar{e}_{\mathrm{R}p}e_{\mathrm{L}s})(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r}\right](\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}s}\right)(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}) \end{array}\right. \tag{5.817}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}^2 \bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right](\bar{e}_{\mathrm{R}p}\nu_{\mathrm{L}s})(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})(e_{\mathrm{L}r}C\nu_{\mathrm{L}t}) \\ \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}) \end{array}\right. \tag{5.818}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right](\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right](\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v})(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.819}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \end{array}\right. \tag{5.820}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(\bar{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua}) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua}) \end{array}\right. \tag{5.821}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)(\bar{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \end{array}\right. \tag{5.822}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right](\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}) \end{array}\right. \tag{5.823}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}t}e_{\mathrm{L}r}\right)(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(\bar{e}_{\mathrm{R}p}e_{\mathrm{L}r})(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}) \end{array}\right. \tag{5.824}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}u_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right]\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{L}p}C\nu_{\mathrm{L}s})\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}va}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}va}\right) \end{array}\right. \tag{5.825}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}N_{\mathrm{R}}}(0,2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{s}{t}\right](\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{L}p}C\nu_{\mathrm{L}s}) \\ \mathcal{Y}\left[\boxed{s\,t}\right](\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}) \end{array}\right. \tag{5.826}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{r}{s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}) \\ \mathcal{Y}\left[\boxed{r\,s}\right]\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\bar{e}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}) \end{array}\right. \tag{5.827}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{L}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 u_{\mathrm{R}}}(0,-2) \left| \mathcal{Y}\left[\frac{r\,s}{t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\bar{d}_{\mathrm{L}u}^a u_{\mathrm{R}va}\right) \right. \tag{5.828}$$

$$\mathcal{O}_{e_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3 N_{\mathrm{R}}}(0,-2) \left| \mathcal{Y}\left[\frac{r\,s}{t}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}) \right. \tag{5.829}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2 e_{\mathrm{R}}^2 \bar{N}_{\mathrm{R}}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\left[\frac{p}{r},\frac{s}{t},\boxed{u\,v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right) \\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t},\boxed{u\,v}\right](e_{\mathrm{R}u}Ce_{\mathrm{R}v})(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r})\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right) \end{array}\right. \tag{5.830}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{R} \nu_\mathrm{L}^2 \bar{N}_\mathrm{R} N_\mathrm{R}}(0,2) \left| \begin{array}{l} \mathcal{Y}\,\young(s,t)\,(\overline{e}_{\mathrm{R}p}\nu_{\mathrm{L}s})\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)(e_{\mathrm{R}u}CN_{\mathrm{R}v}) \\ \mathcal{Y}\,\young(st)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.831}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} \bar{e}_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R}^2 \bar{u}_\mathrm{L}}(0,-2) \left| \begin{array}{l} \mathcal{Y}\,\young(r,s)\,\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\overline{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \\ \mathcal{Y}\,\young(rs)\,\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\overline{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua}) \end{array} \right. \tag{5.832}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_\mathrm{R} e_\mathrm{R} \nu_\mathrm{L} \bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\,\young(r,s)\,(\overline{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \\ \mathcal{Y}\,\young(rs)\,(\overline{\nu}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.833}$$

$$\mathcal{O}_{\bar{e}_\mathrm{R} e_\mathrm{R} \bar{N}_\mathrm{R}^3 N_\mathrm{R}}(0,-2)\left| \mathcal{Y}\,\young(rs,t)\,\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \right. \tag{5.834}$$

$$\mathcal{O}_{\nu_\mathrm{L}^3 \bar{N}_\mathrm{R} u_\mathrm{R} \bar{u}_\mathrm{L}}(0,2)\left| \mathcal{Y}\,\young(rs,t)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)(\overline{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua}) \right. \tag{5.835}$$

$$\mathcal{O}_{d_\mathrm{R} \bar{d}_\mathrm{L} \nu_\mathrm{L}^3 \bar{N}_\mathrm{R}}(0,2)\left| \mathcal{Y}\,\young(rs,t)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)\left(\overline{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right) \right. \tag{5.836}$$

$$\mathcal{O}_{e_\mathrm{R} \bar{e}_\mathrm{L} \nu_\mathrm{L}^3 \bar{N}_\mathrm{R}}(0,2)\left| \mathcal{Y}\,\young(rs,t)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(\overline{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \right. \tag{5.837}$$

$$\mathcal{O}_{\nu_\mathrm{L}^3 \bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R} N_\mathrm{R}}(0,2)\left| \mathcal{Y}\,\young(rs,t)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right)(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}) \right. \tag{5.838}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2 \bar{\nu}_\mathrm{L}^2 \bar{N}_\mathrm{R}^2}(0,-2) \left| \begin{array}{l} \mathcal{Y}\,\young(p,r)\,\young(s,t)\,\young(uv)\,(\overline{\nu}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\,\young(pr)\,,\young(st)\,,\young(uv)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\overline{\nu}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}) \end{array} \right. \tag{5.839}$$

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2 \bar{N}_\mathrm{R}^2 N_\mathrm{R}^2}(0,2) \left| \begin{array}{l} \mathcal{Y}\,\young(p,r)\,\young(s,t)\,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}s}\right)\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right) \\ \mathcal{Y}\,\young(pr)\,,\young(st)\,,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \end{array} \right. \tag{5.840}$$

$$\mathcal{O}_{\nu_\mathrm{L} \bar{N}_\mathrm{R}^3 u_\mathrm{R} \bar{u}_\mathrm{L}}(0,-2)\left| \mathcal{Y}\,\young(pr,s)\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\overline{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua}) \right. \tag{5.841}$$

$$\mathcal{O}_{d_\mathrm{R} \bar{d}_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}^3}(0,-2)\left| \mathcal{Y}\,\young(pr,s)\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\overline{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right) \right. \tag{5.842}$$

$$\mathcal{O}_{e_\mathrm{R} \bar{e}_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}^3}(0,-2)\left| \mathcal{Y}\,\young(pr,s)\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\overline{e}_{\mathrm{L}v}e_{\mathrm{R}u})\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \right. \tag{5.843}$$

$$\mathcal{O}_{\nu_\mathrm{L} \bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R}^3 N_\mathrm{R}}(0,-2)\left| \mathcal{Y}\,\young(pr,s)\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)(\overline{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}) \right. \tag{5.844}$$

$$\mathcal{O}_{\bar{N}_\mathrm{R}^4 N_\mathrm{R}^2}(0,-2)\left| \mathcal{Y}\,\young(pr,st)\,,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right) \right. \tag{5.845}$$

$(\Delta B, \Delta L) = (0, \pm 4)$.

$$\mathcal{O}^{(1,2)}_{\nu_\mathrm{L}^2 N_\mathrm{R}^2 \bar{u}_\mathrm{R} u_\mathrm{L}}(0,4) \left| \begin{array}{l} \mathcal{Y}\,\young(s,t)\,,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}ra}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{R}p}^a\nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\,\young(st)\,,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})\left(\overline{u}_{\mathrm{R}p}^a u_{\mathrm{L}ra}\right) \end{array} \right. \tag{5.846}$$

$$\mathcal{O}^{(1,2)}_{\bar{\nu}_\mathrm{L}^2 \bar{N}_\mathrm{R}^2 \bar{u}_\mathrm{R} u_\mathrm{L}}(0,-4) \left| \begin{array}{l} \mathcal{Y}\,\young(p,r)\,,\young(uv)\,(\overline{\nu}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v})\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}s}^a\right) \\ \mathcal{Y}\,\young(pr)\,,\young(uv)\,\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)(\overline{\nu}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v})(\overline{u}_{\mathrm{R}s}^a u_{\mathrm{L}ta}) \end{array} \right. \tag{5.847}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{L} \nu_\mathrm{L} N_\mathrm{R}^2 u_\mathrm{L}}(0,4) \left| \begin{array}{l} \mathcal{Y}\,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t})\left(\overline{d}_{\mathrm{R}p}^a e_{\mathrm{L}r}\right) \\ \mathcal{Y}\,\young(uv)\,(N_{\mathrm{R}u}CN_{\mathrm{R}v})(e_{\mathrm{L}r}C\nu_{\mathrm{L}t})\left(\overline{d}_{\mathrm{R}p}^a u_{\mathrm{L}sa}\right) \end{array} \right. \tag{5.848}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R} e_\mathrm{R} \nu_\mathrm{L}^2 N_\mathrm{R} u_\mathrm{L}}(0,4) \left| \begin{array}{l} \mathcal{Y}\,\young(s,t)\,(e_{\mathrm{R}u}CN_{\mathrm{R}v})(u_{\mathrm{L}ra}C\nu_{\mathrm{L}t})\left(\overline{d}_{\mathrm{R}p}^a\nu_{\mathrm{L}s}\right) \\ \mathcal{Y}\,\young(st)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(e_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\overline{d}_{\mathrm{R}p}^a u_{\mathrm{L}ra}\right) \end{array} \right. \tag{5.849}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{L} e_\mathrm{L} \nu_\mathrm{L}^2 N_\mathrm{R} u_\mathrm{L}}(0,4) \left| \begin{array}{l} \mathcal{Y}\,\young(s,t)\,(e_{\mathrm{L}p}C\nu_{\mathrm{L}s})(u_{\mathrm{L}ra}C\nu_{\mathrm{L}t})\left(\overline{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}\right) \\ \mathcal{Y}\,\young(st)\,(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t})(e_{\mathrm{L}p}Cu_{\mathrm{L}ra})\left(\overline{d}_{\mathrm{L}u}^a N_{\mathrm{R}v}\right) \end{array} \right. \tag{5.850}$$

$$\mathcal{O}_{\nu_L^3 N_R u_L \bar{u}_L}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(u_{Lpa} C \nu_{Lr})(\overline{u}_{Lv}^a N_{Ru}) \tag{5.851}$$

$$\mathcal{O}_{\bar{\nu}_L \bar{N}_R^3 u_L \bar{u}_L}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_{Rp} C \overline{N}_{Rr}\right)\left(\overline{N}_{Rs} u_{Lta}\right)\left(\overline{u}_{Lu}^a C \overline{\nu}_{Lv}\right) \tag{5.852}$$

$$\mathcal{O}_{d_L \bar{e}_R \bar{\nu}_L^2 \bar{N}_R \bar{u}_R}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\boxed{u\,v}\right] (\overline{\nu}_{Lu} C \overline{\nu}_{Lv})\left(\overline{e}_{Rr} d_{Lpa}\right)\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \\ \mathcal{Y}\left[\boxed{u\,v}\right] (\overline{\nu}_{Lu} C \overline{\nu}_{Lv})\left(\overline{N}_{Rs} d_{Lpa}\right)\left(\overline{e}_{Rr} C \overline{u}_{Rt}^a\right) \end{matrix} \right. \tag{5.853}$$

$$\mathcal{O}_{d_L \bar{e}_L \bar{\nu}_L \bar{N}_R^2 \bar{u}_R}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \left(\overline{N}_{Rr} d_{Lpa}\right)(\overline{e}_{Lu} C \overline{\nu}_{Lv})\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] \left(\overline{N}_{Rr} d_{Lpa}\right)(\overline{e}_{Lu} C \overline{\nu}_{Lv})\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \end{matrix} \right. \tag{5.854}$$

$$\mathcal{O}_{d_R \bar{e}_R \bar{\nu}_L \bar{N}_R^2 \bar{u}_R}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] (\overline{\nu}_{Lv} d_{Rua})\left(\overline{e}_{Rp} C \overline{N}_{Rr}\right)\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \\ \mathcal{Y}\left[\boxed{r\,s}\right] (\overline{\nu}_{Lv} d_{Rua})\left(\overline{e}_{Rp} C \overline{N}_{Rr}\right)\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \end{matrix} \right. \tag{5.855}$$

$$\mathcal{O}_{\nu_L^3 N_R \bar{u}_R u_R}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(N_{Ru} C u_{Rva})\left(\overline{u}_{Rp}^a \nu_{Lr}\right) \tag{5.856}$$

$$\mathcal{O}_{\bar{\nu}_L \bar{N}_R^3 \bar{u}_R u_R}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_{Rp} C \overline{N}_{Rr}\right)(\overline{\nu}_{Lv} u_{Rua})\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \tag{5.857}$$

$$\mathcal{O}_{d_R \bar{e}_L \bar{N}_R^3 \bar{u}_R}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \left(\overline{N}_{Rp} C \overline{N}_{Rr}\right)(\overline{e}_{Lv} d_{Rua})\left(\overline{N}_{Rs} C \overline{u}_{Rt}^a\right) \tag{5.858}$$

$$\mathcal{O}_{\bar{d}_R d_L \nu_L^2 N_R^2}^{(1,2)}(0,4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \boxed{u\,v}\right] (N_{Ru} C N_{Rv})(d_{Lra} C \nu_{Lt})\left(\overline{d}_{Rp}^a \nu_{Ls}\right) \\ \mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right] (N_{Ru} C N_{Rv})(\nu_{Ls} C \nu_{Lt})\left(\overline{d}_{Rp}^a d_{Lra}\right) \end{matrix} \right. \tag{5.859}$$

$$\mathcal{O}_{\bar{d}_R d_L \bar{\nu}_L^2 \bar{N}_R^2}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \boxed{u\,v}\right] (\overline{\nu}_{Lu} C \overline{\nu}_{Lv})\left(\overline{N}_{Rt} d_{Lra}\right)\left(\overline{d}_{Rp}^a C \overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)(\overline{\nu}_{Lu} C \overline{\nu}_{Lv})\left(\overline{d}_{Rp}^a d_{Lra}\right) \end{matrix} \right. \tag{5.860}$$

$$\mathcal{O}_{d_L \bar{e}_R \bar{\nu}_L \bar{N}_R^2 \bar{u}_L}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rs} d_{Lpa}\right)\left(\overline{e}_{Rr} C \overline{N}_{Rt}\right)(\overline{u}_{Lu}^a C \overline{\nu}_{Lv}) \\ \mathcal{Y}\left[\boxed{s\,t}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)(\overline{e}_{Rr} d_{Lpa})(\overline{u}_{Lu}^a C \overline{\nu}_{Lv}) \end{matrix} \right. \tag{5.861}$$

$$\mathcal{O}_{d_L \bar{d}_L \nu_L^3 N_R}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(d_{Lpa} C \nu_{Lr})\left(\overline{d}_{Lu}^a N_{Rv}\right) \tag{5.862}$$

$$\mathcal{O}_{d_L \bar{e}_L \bar{N}_R^3 \bar{u}_L}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)\left(\overline{N}_{Rr} d_{Lpa}\right)(\overline{e}_{Lu} C \overline{u}_{Lv}^a) \tag{5.863}$$

$$\mathcal{O}_{d_L \bar{d}_L \bar{\nu}_L \bar{N}_R^3}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)\left(\overline{N}_{Rr} d_{Lpa}\right)\left(\overline{d}_{Lu}^a C \overline{\nu}_{Lv}\right) \tag{5.864}$$

$$\mathcal{O}_{\bar{d}_R e_L \nu_L^2 N_R u_R}^{(1,2)}(0,4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] (e_{Lr} C \nu_{Lt})(N_{Ru} C u_{Rva})\left(\overline{d}_{Rp}^a \nu_{Ls}\right) \\ \mathcal{Y}\left[\boxed{s\,t}\right] (\nu_{Ls} C \nu_{Lt})(N_{Ru} C u_{Rva})\left(\overline{d}_{Rp}^a e_{Lr}\right) \end{matrix} \right. \tag{5.865}$$

$$\mathcal{O}_{\bar{d}_R d_R \nu_L^3 N_R}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(d_{Rua} C N_{Rv})\left(\overline{d}_{Rp}^a \nu_{Lr}\right) \tag{5.866}$$

$$\mathcal{O}_{\bar{d}_R d_R \bar{\nu}_L \bar{N}_R^3}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)(\overline{\nu}_{Lv} d_{Rua})\left(\overline{d}_{Rp}^a C \overline{N}_{Rr}\right) \tag{5.867}$$

$$\mathcal{O}_{\bar{e}_R e_L \nu_L^2 N_R^2}^{(1,2)}(0,4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \boxed{u\,v}\right] (N_{Ru} C N_{Rv})(\overline{e}_{Rp} \nu_{Ls})(e_{Lr} C \nu_{Lt}) \\ \mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right] (N_{Ru} C N_{Rv})(\nu_{Ls} C \nu_{Lt})(\overline{e}_{Rp} e_{Lr}) \end{matrix} \right. \tag{5.868}$$

$$\mathcal{O}_{\bar{e}_R e_L \bar{\nu}_L^2 \bar{N}_R^2}^{(1,2)}(0,-4) \left| \begin{matrix} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \boxed{u\,v}\right] (\overline{\nu}_{Lu} C \overline{\nu}_{Lv})\left(\overline{N}_{Rt} e_{Lr}\right)\left(\overline{e}_{Rp} C \overline{N}_{Rs}\right) \\ \mathcal{Y}\left[\boxed{s\,t}, \boxed{u\,v}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)(\overline{\nu}_{Lu} C \overline{\nu}_{Lv})(\overline{e}_{Rp} e_{Lr}) \end{matrix} \right. \tag{5.869}$$

$$\mathcal{O}_{e_L \bar{e}_L \nu_L^3 N_R}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(\overline{e}_{Lu} N_{Rv})(e_{Lp} C \nu_{Lr}) \tag{5.870}$$

$$\mathcal{O}_{e_L \bar{e}_L \bar{\nu}_L \bar{N}_R^3}(0,-4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right)\left(\overline{N}_{Rr} e_{Lp}\right)(\overline{e}_{Lu} C \overline{\nu}_{Lv}) \tag{5.871}$$

$$\mathcal{O}_{\bar{e}_R e_R \nu_L^3 N_R}(0,4) \Big| \mathcal{Y}\left[\begin{smallmatrix} r & s \\ t \end{smallmatrix}\right] (\nu_{Ls} C \nu_{Lt})(\overline{e}_{Rp} \nu_{Lr})(e_{Ru} C N_{Rv}) \tag{5.872}$$

$$\mathcal{O}_{d_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}^3\bar{u}_{\mathrm{L}}}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right) \tag{5.873}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{R}}e_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right) \tag{5.874}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^4\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}}(0,4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix}\right]\left(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}\right)\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right) \tag{5.875}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}^3\bar{N}_{\mathrm{R}}N_{\mathrm{R}}^2}(0,4)\Big|\mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix},\boxed{u\,v}\right]\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}\nu_{\mathrm{L}r}\right) \tag{5.876}$$

$$\mathcal{O}_{\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^3}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right) \tag{5.877}$$

$$\mathcal{O}_{\bar{N}_{\mathrm{R}}^4 u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{u}_{\mathrm{L}v}^a u_{\mathrm{R}ua}\right) \tag{5.878}$$

$$\mathcal{O}_{d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^4}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{L}v}^a d_{\mathrm{R}ua}\right) \tag{5.879}$$

$$\mathcal{O}_{e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^4}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{e}_{\mathrm{L}v}e_{\mathrm{R}u}\right) \tag{5.880}$$

$$\mathcal{O}_{\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^4 N_{\mathrm{R}}}(0,-4)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right) \tag{5.881}$$

$(\Delta B,\Delta L)=(0,\pm6)$.

$$\mathcal{O}_{\nu_{\mathrm{L}}^4 N_{\mathrm{R}}^2}(0,6)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix},\boxed{u\,v}\right](N_{\mathrm{R}u}CN_{\mathrm{R}v})\left(\nu_{\mathrm{L}p}C\nu_{\mathrm{L}r}\right)\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right) \tag{5.882}$$

$$\mathcal{O}_{\bar{\nu}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^4}(0,-6)\Big|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s&t\end{smallmatrix},\boxed{u\,v}\right]\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right) \tag{5.883}$$

$(\Delta B,\Delta L)=(\pm1,\pm1)$.

$$\mathcal{O}_{e_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^3}(1,1)\Big|\mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix},\boxed{u\,v}\right]\epsilon^{abc}\left(e_{\mathrm{R}u}Ce_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right) \tag{5.884}$$

$$\mathcal{O}_{d_{\mathrm{R}}d_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}^2}^{(1\sim6)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{cde}\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}td}\right)\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}r}^a d_{\mathrm{L}pa}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ace}\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}r}^b d_{\mathrm{L}pa}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{ace}\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}r}^b u_{\mathrm{L}tb}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\\ \mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{ace}\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}r}^b d_{\mathrm{L}pa}\right)\\ \mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{cde}\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\left(\bar{u}_{\mathrm{R}r}^a u_{\mathrm{L}td}\right)\\ \mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{ace}\left(d_{\mathrm{R}ue}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}r}^b u_{\mathrm{L}tb}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\end{array}\right. \tag{5.885}$$

$$\mathcal{O}_{d_{\mathrm{L}}^2 N_{\mathrm{R}}u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}}^{(1\sim6)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right]\epsilon^{abd}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}td}\right)\left(\bar{u}_{\mathrm{L}v}^c N_{\mathrm{R}u}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\boxed{s\,t}\right]\epsilon^{bcd}\left(\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}td}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{bcd}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}td}\right)\left(\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abd}\left(\bar{u}_{\mathrm{L}v}^c N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}td}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right]\epsilon^{bcd}\left(\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}td}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix},\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{bcd}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}sc}Cu_{\mathrm{L}td}\right)\left(\bar{u}_{\mathrm{L}v}^a N_{\mathrm{R}u}\right)\end{array}\right. \tag{5.886}$$

$$\mathcal{O}_{d_{\mathrm{L}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}^2}^{(1,2)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}v}N_{\mathrm{R}u}\right)\left(d_{\mathrm{L}pa}Ce_{\mathrm{L}r}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\end{array}\right. \tag{5.887}$$

$$\mathcal{O}_{d_{\mathrm{L}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}^2}^{(1,2)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{abc}\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\end{array}\right. \tag{5.888}$$

$$\mathcal{O}_{e_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{R}}u_{\mathrm{L}}^2}^{(1,2)}(1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{s\,t}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(e_{\mathrm{L}p}Cu_{\mathrm{L}sa}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.889}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}N_{\mathrm{R}}u_{\mathrm{L}}^2}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(st)}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)(e_{\mathrm{L}p}Cu_{\mathrm{L}sa})(d_{\mathrm{R}uc}CN_{\mathrm{R}v})\\[6pt]\mathcal{Y}\,{\small\young(s,t)}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb})(d_{\mathrm{R}uc}CN_{\mathrm{R}v})\end{array}\right.\tag{5.890}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}e_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^2}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(rs)}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t})(d_{\mathrm{R}uc}Ce_{\mathrm{R}v})\\[6pt]\mathcal{Y}\,{\small\young(r,s)}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}ra}\right)(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t})(d_{\mathrm{R}uc}Ce_{\mathrm{R}v})\end{array}\right.\tag{5.891}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2u_{\mathrm{L}}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(r,s),\young(u,v)}\,\epsilon_{bde}\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^e\right)\\[6pt]\mathcal{Y}\,{\small\young(r,s),\young(u,v)}\,\epsilon_{abd}\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^c\right)\\[6pt]\mathcal{Y}\,{\small\young(rs),\young(uv)}\,\epsilon_{abd}\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^c\right)\\[6pt]\mathcal{Y}\,{\small\young(rs),\young(u,v)}\,\epsilon_{bde}\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}ta}\right)\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^e\right)\\[6pt]\mathcal{Y}\,{\small\young(rs),\young(u,v)}\,\epsilon_{abd}\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^c\right)\\[6pt]\mathcal{Y}\,{\small\young(r,s),\young(uv)}\,\epsilon_{abd}\left(\overline{N}_{\mathrm{R}p}C\overline{u}_{\mathrm{R}r}^a\right)\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{L}u}^dC\bar{d}_{\mathrm{L}v}^c\right)\end{array}\right.\tag{5.892}$$

$$\mathcal{O}^{(1\sim6)}_{d_{\mathrm{L}}^2N_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}u_{\mathrm{L}}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(p,r)}\,\epsilon^{bde}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(\overline{u}_{\mathrm{R}s}^au_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(p,r)}\,\epsilon^{abe}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(\overline{u}_{\mathrm{R}s}^cu_{\mathrm{L}tc})\\[6pt]\mathcal{Y}\,{\small\young(p,r)}\,\epsilon^{bde}(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(\overline{u}_{\mathrm{R}s}^ad_{\mathrm{L}pa})(d_{\mathrm{L}rb}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(pr)}\,\epsilon^{bde}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(\overline{u}_{\mathrm{R}s}^au_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(pr)}\,\epsilon^{bde}(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(\overline{u}_{\mathrm{R}s}^ad_{\mathrm{L}pa})(d_{\mathrm{L}rb}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(pr)}\,\epsilon^{abe}(N_{\mathrm{R}u}Cu_{\mathrm{R}ve})(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc})(\overline{u}_{\mathrm{R}s}^cd_{\mathrm{L}pa})\end{array}\right.\tag{5.893}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{L}}\bar{u}_{\mathrm{L}}}(-1,-1)\left|\begin{array}{l}\epsilon_{bde}\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^dC\overline{u}_{\mathrm{L}v}^e\right)\\[6pt]\epsilon_{ade}\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^dC\overline{u}_{\mathrm{L}v}^e\right)\\[6pt]\epsilon_{abe}\left(\bar{d}_{\mathrm{R}p}^aC\overline{N}_{\mathrm{R}r}\right)\left(\overline{u}_{\mathrm{R}s}^bu_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{L}u}^cC\overline{u}_{\mathrm{L}v}^e\right)\\[6pt]\epsilon_{bde}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{u}_{\mathrm{R}s}^b\right)\left(\bar{d}_{\mathrm{L}u}^dC\overline{u}_{\mathrm{L}v}^e\right)\\[6pt]\epsilon_{ade}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{u}_{\mathrm{R}s}^b\right)\left(\bar{d}_{\mathrm{L}u}^dC\overline{u}_{\mathrm{L}v}^e\right)\\[6pt]\epsilon_{abe}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(\bar{d}_{\mathrm{R}p}^aC\overline{u}_{\mathrm{R}s}^b\right)\left(\bar{d}_{\mathrm{L}u}^cC\overline{u}_{\mathrm{L}v}^e\right)\end{array}\right.\tag{5.894}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\mathrm{L}}^3\bar{d}_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(prs)}\,\epsilon^{bcd}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^aN_{\mathrm{R}v}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(pr,s)}\,\epsilon^{bcd}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^aN_{\mathrm{R}v}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(pr,s)}\,\epsilon^{abd}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^cN_{\mathrm{R}v}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(p,r,s)}\,\epsilon^{bcd}(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})\left(\bar{d}_{\mathrm{L}u}^aN_{\mathrm{R}v}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\end{array}\right.\tag{5.895}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}}d_{\mathrm{R}}d_{\mathrm{L}}^2N_{\mathrm{R}}u_{\mathrm{L}}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(r,s)}\,\epsilon^{cde}(d_{\mathrm{R}ue}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}ra}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(r,s)}\,\epsilon^{bde}(d_{\mathrm{R}ue}CN_{\mathrm{R}v})(d_{\mathrm{L}sa}Cu_{\mathrm{L}td})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}rb}\right)\\[6pt]\mathcal{Y}\,{\small\young(r,s)}\,\epsilon^{bcd}(d_{\mathrm{R}ua}CN_{\mathrm{R}v})(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}rb}\right)\\[6pt]\mathcal{Y}\,{\small\young(rs)}\,\epsilon^{cde}(d_{\mathrm{R}ue}CN_{\mathrm{R}v})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}ra}\right)(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\\[6pt]\mathcal{Y}\,{\small\young(rs)}\,\epsilon^{bde}(d_{\mathrm{R}ue}CN_{\mathrm{R}v})(d_{\mathrm{L}sa}Cu_{\mathrm{L}td})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}rb}\right)\\[6pt]\mathcal{Y}\,{\small\young(rs)}\,\epsilon^{bcd}(d_{\mathrm{R}ua}CN_{\mathrm{R}v})(d_{\mathrm{L}sc}Cu_{\mathrm{L}td})\left(\bar{d}_{\mathrm{R}p}^ad_{\mathrm{L}rb}\right)\end{array}\right.\tag{5.896}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}^2e_{\mathrm{L}}\bar{e}_{\mathrm{L}}N_{\mathrm{R}}u_{\mathrm{L}}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,{\small\young(pr)}\,\epsilon^{abc}(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v})(d_{\mathrm{L}pa}Ce_{\mathrm{L}s})(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc})\\[6pt]\mathcal{Y}\,{\small\young(p,r)}\,\epsilon^{abc}(\overline{e}_{\mathrm{L}u}N_{\mathrm{R}v})(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb})(e_{\mathrm{L}s}Cu_{\mathrm{L}tc})\end{array}\right.\tag{5.897}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm L}^2 \bar{e}_{\rm R} e_{\rm R} N_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon^{abc}\,(e_{{\rm R}u}CN_{{\rm R}v})\,(\bar{e}_{{\rm R}s}d_{{\rm L}pa})\,(d_{{\rm L}rb}Cu_{{\rm L}tc})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon^{abc}\,(e_{{\rm R}u}CN_{{\rm R}v})\,(\bar{e}_{{\rm R}s}u_{{\rm L}tc})\,(d_{{\rm L}pa}Cd_{{\rm L}rb})\end{array}\right.\tag{5.898}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm L}^2 \nu_{\rm L} \bar{\nu}_{\rm L} N_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon^{abc}\,(\bar{\nu}_{{\rm L}v}N_{{\rm R}u})\,(d_{{\rm L}rb}C\nu_{{\rm L}t})\,(d_{{\rm L}pa}Cu_{{\rm L}sc})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\,\epsilon^{abc}\,(\bar{\nu}_{{\rm L}v}N_{{\rm R}u})\,(d_{{\rm L}pa}Cd_{{\rm L}rb})\,(u_{{\rm L}sc}C\nu_{{\rm L}t})\end{array}\right.\tag{5.899}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm L}^2 \bar{N}_{\rm R} N_{\rm R}^2 u_{\rm L}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{p|r},\boxed{u|v}\,\epsilon^{abc}\,(N_{{\rm R}u}CN_{{\rm R}v})\,\big(\overline{N}_{{\rm R}s}d_{{\rm L}pa}\big)\,(d_{{\rm L}rb}Cu_{{\rm L}tc})\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{u|v}\,\epsilon^{abc}\,(N_{{\rm R}u}CN_{{\rm R}v})\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}tc}\big)\,(d_{{\rm L}pa}Cd_{{\rm L}rb})\end{array}\right.\tag{5.900}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm R} d_{\rm L} \bar{e}_{\rm R} e_{\rm L} N_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\epsilon^{abc}\,(\bar{e}_{{\rm R}r}d_{{\rm L}pa})\,(e_{{\rm L}s}Cu_{{\rm L}tb})\,(d_{{\rm R}uc}CN_{{\rm R}v})\\[4pt]\epsilon^{abc}\,(\bar{e}_{{\rm R}r}u_{{\rm L}tb})\,(d_{{\rm L}pa}Ce_{{\rm L}s})\,(d_{{\rm R}uc}CN_{{\rm R}v})\end{array}\right.\tag{5.901}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm L} e_{\rm L} \bar{N}_{\rm R} N_{\rm R} u_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\epsilon^{abc}\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}tb}\big)\,(d_{{\rm L}pa}Ce_{{\rm L}r})\,(N_{{\rm R}u}Cu_{{\rm R}vc})\\[4pt]\epsilon^{abc}\,\big(\overline{N}_{{\rm R}s}d_{{\rm L}pa}\big)\,(e_{{\rm L}r}Cu_{{\rm L}tb})\,(N_{{\rm R}u}Cu_{{\rm R}vc})\end{array}\right.\tag{5.902}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm L} e_{\rm R} \nu_{\rm L} \bar{N}_{\rm R} u_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}d_{{\rm L}pa}\big)\,(u_{{\rm L}sb}C\nu_{{\rm L}t})\,(e_{{\rm R}u}Cu_{{\rm R}vc})\\[4pt]\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}\nu_{{\rm L}t}\big)\,(e_{{\rm R}u}Cu_{{\rm R}vc})\,(d_{{\rm L}pa}Cu_{{\rm L}sb})\end{array}\right.\tag{5.903}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm R} d_{\rm L} \nu_{\rm L} \bar{N}_{\rm R} N_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}d_{{\rm L}pa}\big)\,(u_{{\rm L}sb}C\nu_{{\rm L}t})\,(d_{{\rm R}uc}CN_{{\rm R}v})\\[4pt]\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}\nu_{{\rm L}t}\big)\,(d_{{\rm R}uc}CN_{{\rm R}v})\,(d_{{\rm L}pa}Cu_{{\rm L}sb})\end{array}\right.\tag{5.904}$$

$$\mathcal{O}^{(1\sim 6)}_{\bar{d}_{\rm R}^2 \bar{N}_{\rm R} u_{\rm L} \bar{u}_{\rm L}^2}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{bde}\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}ta}\big)\,\big(\bar{d}_{{\rm R}p}^a C\bar{d}_{{\rm R}r}^b\big)\,\big(\bar{u}_{{\rm L}u}^d C\bar{u}_{{\rm L}v}^e\big)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{bde}\,\big(\bar{d}_{{\rm R}r}^b u_{{\rm L}ta}\big)\,\big(\bar{d}_{{\rm R}p}^a C\overline{N}_{{\rm R}s}\big)\,\big(\bar{u}_{{\rm L}u}^d C\bar{u}_{{\rm L}v}^e\big)\\[4pt]\mathcal{Y}\,\boxed{p|r},\boxed{u|v}\,\epsilon_{abe}\,\big(\bar{d}_{{\rm R}p}^a C\overline{N}_{{\rm R}s}\big)\,\big(\bar{d}_{{\rm R}r}^b u_{{\rm L}tc}\big)\,\big(\bar{u}_{{\rm L}u}^c C\bar{u}_{{\rm L}v}^e\big)\\[4pt]\mathcal{Y}\,\boxed{p|r},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{bde}\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}ta}\big)\,\big(\bar{d}_{{\rm R}p}^a C\bar{d}_{{\rm R}r}^b\big)\,\big(\bar{u}_{{\rm L}u}^d C\bar{u}_{{\rm L}v}^e\big)\\[4pt]\mathcal{Y}\,\boxed{p|r},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{bde}\,\big(\bar{d}_{{\rm R}r}^b u_{{\rm L}ta}\big)\,\big(\bar{d}_{{\rm R}p}^a C\overline{N}_{{\rm R}s}\big)\,\big(\bar{u}_{{\rm L}u}^d C\bar{u}_{{\rm L}v}^e\big)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{u|v}\,\epsilon_{abe}\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}tc}\big)\,\big(\bar{d}_{{\rm R}p}^a C\bar{d}_{{\rm R}r}^b\big)\,\big(\bar{u}_{{\rm L}u}^c C\bar{u}_{{\rm L}v}^e\big)\end{array}\right.\tag{5.905}$$

$$\mathcal{O}^{(1,2)}_{e_{\rm L}^2 \bar{N}_{\rm R} u_{\rm R}^2 u_{\rm L}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\,\big(\overline{N}_{{\rm R}s}e_{{\rm L}p}\big)\,(e_{{\rm L}r}Cu_{{\rm L}ta})\,(u_{{\rm R}ub}Cu_{{\rm R}vc})\\[4pt]\mathcal{Y}\,\boxed{p|r},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\,(e_{{\rm L}p}Ce_{{\rm L}r})\,\big(\overline{N}_{{\rm R}s}u_{{\rm L}ta}\big)\,(u_{{\rm R}ub}Cu_{{\rm R}vc})\end{array}\right.\tag{5.906}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm R} e_{\rm L} \nu_{\rm L} \bar{N}_{\rm R} u_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}e_{{\rm L}p}\big)\,(u_{{\rm L}sa}C\nu_{{\rm L}t})\,(d_{{\rm R}ub}Cu_{{\rm R}vc})\\[4pt]\epsilon^{abc}\,\big(\overline{N}_{{\rm R}r}\nu_{{\rm L}t}\big)\,(e_{{\rm L}p}Cu_{{\rm L}sa})\,(d_{{\rm R}ub}Cu_{{\rm R}vc})\end{array}\right.\tag{5.907}$$

$$\mathcal{O}^{(1,2)}_{d_{\rm R}^2 \nu_{\rm L}^2 \bar{N}_{\rm R} u_{\rm L}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\,\big(\overline{N}_{{\rm R}p}\nu_{{\rm L}s}\big)\,(u_{{\rm L}ra}C\nu_{{\rm L}t})\,(d_{{\rm R}ub}Cd_{{\rm R}vc})\\[4pt]\mathcal{Y}\,\boxed{s|t},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\,(\nu_{{\rm L}s}C\nu_{{\rm L}t})\,\big(\overline{N}_{{\rm R}p}u_{{\rm L}ra}\big)\,(d_{{\rm R}ub}Cd_{{\rm R}vc})\end{array}\right.\tag{5.908}$$

$$\mathcal{O}_{\bar{e}_{\rm R} \bar{e}_{\rm L} N_{\rm R} \bar{u}_{\rm R}^3}(-1,-1)\left|\mathcal{Y}\,\boxed{r|s}\,\epsilon_{abc}\,(\bar{e}_{{\rm L}u}N_{{\rm R}v})\,\big(\bar{e}_{{\rm R}p}C\bar{u}_{{\rm R}r}^a\big)\,\big(\bar{u}_{{\rm R}s}^b C\bar{u}_{{\rm R}t}^c\big)\right.\tag{5.909}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R} \bar{e}_{\rm R} \bar{\nu}_{\rm L} N_{\rm R} \bar{u}_{\rm R}^2}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\boxed{s|t}\,\epsilon_{abc}\,(\bar{\nu}_{{\rm L}v}N_{{\rm R}u})\,\big(\bar{e}_{{\rm R}r}C\bar{u}_{{\rm R}t}^c\big)\,\big(\bar{d}_{{\rm R}p}^a C\bar{u}_{{\rm R}s}^b\big)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,\epsilon_{abc}\,(\bar{\nu}_{{\rm L}v}N_{{\rm R}u})\,\big(\bar{d}_{{\rm R}p}^a C\bar{e}_{{\rm R}r}\big)\,\big(\bar{u}_{{\rm R}s}^b C\bar{u}_{{\rm R}t}^c\big)\end{array}\right.\tag{5.910}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{acd}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vd}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{acd}\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vb}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{u}_{\mathrm{R}s}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{acd}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vb}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{acd}\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vb}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{u}_{\mathrm{R}s}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{d}_{\mathrm{L}u}^d u_{\mathrm{R}vd}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{u}_{\mathrm{R}s}^b\right) \end{array} \right. \tag{5.911}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}} N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{u}_{\mathrm{R}s}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^b C \bar{u}_{\mathrm{R}t}^c\right) \end{array} \right. \tag{5.912}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2 N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2 \bar{u}_{\mathrm{L}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{u}_{\mathrm{L}v}^c N_{\mathrm{R}u}\right)\left(\bar{e}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^a\right)\left(\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{R}p} C \bar{e}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}v}^c N_{\mathrm{R}u}\right)\left(\bar{u}_{\mathrm{R}s}^a C \bar{u}_{\mathrm{R}t}^b\right) \end{array} \right. \tag{5.913}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}} N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{d}_{\mathrm{L}u}^c N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}s}^a\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^b\right) \\ \mathcal{Y}\left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^c N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^a C \bar{u}_{\mathrm{R}t}^b\right) \end{array} \right. \tag{5.914}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right)\left(\bar{d}_{\mathrm{L}u}^c C \bar{e}_{\mathrm{L}v}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ \hline s \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^b \nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^a\right)\left(\bar{d}_{\mathrm{L}u}^c C \bar{e}_{\mathrm{L}v}\right) \end{array} \right. \tag{5.915}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}} d_{\mathrm{L}}\bar{d}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^b C \bar{d}_{\mathrm{L}v}^e\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^b C \bar{d}_{\mathrm{L}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^b C \bar{d}_{\mathrm{L}v}^e\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \epsilon_{cde}\left(\bar{d}_{\mathrm{R}p}^a d_{\mathrm{L}ra}\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{L}u}^d C \bar{d}_{\mathrm{L}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^b C \bar{d}_{\mathrm{L}v}^e\right) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ \hline v \end{smallmatrix}\right] \epsilon_{cde}\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}ra}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}u}^d C \bar{d}_{\mathrm{L}v}^e\right) \end{array} \right. \tag{5.916}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}}^2 \bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}} u_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}ub}\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{abe}\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}uc}\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}ub}\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abe}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}v}^e u_{\mathrm{R}uc}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \end{array} \right. \tag{5.917}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}}^2 d_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{L}v}^e d_{\mathrm{R}ub}\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{d}_{\mathrm{L}v}^d d_{\mathrm{R}ud}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}v}^e d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{L}v}^e d_{\mathrm{R}ub}\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{L}v}^e d_{\mathrm{R}ub}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{d}_{\mathrm{L}v}^d d_{\mathrm{R}ud}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \end{array} \right. \tag{5.918}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 e_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^a C \overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^b C \bar{u}_{\mathrm{R}t}^c\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\overline{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^c\right) \end{array} \right. \tag{5.919}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}^2\bar{\nu}_{\mathrm L}\bar{N}_{\mathrm R}N_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,[\underline{p|r}]\,\epsilon_{abc}\,(\bar{\nu}_{\mathrm Lv}N_{\mathrm Ru})\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,s}\right)\left(\bar{d}_{\mathrm R\,r}^{b}C\bar{u}_{\mathrm R\,t}^{c}\right)\\ \mathcal{Y}\,\big[{\substack{p\\r}}\big]\,\epsilon_{abc}\,(\bar{\nu}_{\mathrm Lv}N_{\mathrm Ru})\left(\bar{d}_{\mathrm R\,p}^{a}C\bar{d}_{\mathrm R\,r}^{b}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{c}\right)\end{array}\right.\tag{5.920}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{d}_{\mathrm L}e_{\mathrm L}\bar{e}_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{d}_{\mathrm R\,p}^{a}e_{\mathrm L\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{b}\right)\left(\bar{d}_{\mathrm L\,u}^{c}C\bar{e}_{\mathrm L\,v}\right)\\ \epsilon_{abc}\left(\bar{u}_{\mathrm R\,t}^{b}e_{\mathrm L\,r}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,s}\right)\left(\bar{d}_{\mathrm L\,u}^{c}C\bar{e}_{\mathrm L\,v}\right)\end{array}\right.\tag{5.921}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{e}_{\mathrm R}\bar{N}_{\mathrm R}N_{\mathrm R}\bar{u}_{\mathrm R}\bar{u}_{\mathrm L}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{u}_{\mathrm L\,v}^{c}N_{\mathrm Ru}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\bar{e}_{\mathrm R\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{b}\right)\\ \epsilon_{abc}\left(\bar{u}_{\mathrm L\,v}^{c}N_{\mathrm Ru}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,s}\right)\left(\bar{e}_{\mathrm R\,r}C\bar{u}_{\mathrm R\,t}^{b}\right)\end{array}\right.\tag{5.922}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{d}_{\mathrm L}\bar{e}_{\mathrm R}e_{\mathrm R}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{d}_{\mathrm L\,u}^{c}e_{\mathrm Rv}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\bar{e}_{\mathrm R\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{b}\right)\\ \epsilon_{abc}\left(\bar{d}_{\mathrm L\,u}^{c}e_{\mathrm Rv}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,s}\right)\left(\bar{e}_{\mathrm R\,r}C\bar{u}_{\mathrm R\,t}^{b}\right)\end{array}\right.\tag{5.923}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{e}_{\mathrm L}\nu_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}\bar{u}_{\mathrm L}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{u}_{\mathrm R\,s}^{b}\nu_{\mathrm Lt}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,r}\right)\left(\bar{e}_{\mathrm L\,u}C\bar{u}_{\mathrm L\,v}^{c}\right)\\ \epsilon_{abc}\left(\overline{N}_{\mathrm R\,r}\nu_{\mathrm Lt}\right)\left(\bar{e}_{\mathrm L\,u}C\bar{u}_{\mathrm L\,v}^{c}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\bar{u}_{\mathrm R\,s}^{b}\right)\end{array}\right.\tag{5.924}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{d}_{\mathrm L}\nu_{\mathrm L}\bar{\nu}_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{u}_{\mathrm R\,s}^{b}\nu_{\mathrm Lt}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,r}\right)\left(\bar{d}_{\mathrm L\,u}^{c}C\bar{\nu}_{\mathrm L\,v}\right)\\ \epsilon_{abc}\left(\overline{N}_{\mathrm R\,r}\nu_{\mathrm Lt}\right)\left(\bar{d}_{\mathrm L\,u}^{c}C\bar{\nu}_{\mathrm L\,v}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\bar{u}_{\mathrm R\,s}^{b}\right)\end{array}\right.\tag{5.925}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm R}\bar{d}_{\mathrm L}\bar{N}_{\mathrm R}^2 N_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\big[{\substack{r\\s}}\big]\,\epsilon_{abc}\left(\bar{d}_{\mathrm L\,u}^{c}N_{\mathrm Rv}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{b}\right)\\ \mathcal{Y}\,[\underline{r\,s}]\,\epsilon_{abc}\left(\bar{d}_{\mathrm L\,u}^{c}N_{\mathrm Rv}\right)\left(\bar{d}_{\mathrm R\,p}^{a}C\overline{N}_{\mathrm R\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{b}\right)\end{array}\right.\tag{5.926}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm L}^2\bar{e}_{\mathrm R}e_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\big[{\substack{u\\v}}\big]\,\epsilon_{abc}\left(\bar{e}_{\mathrm R\,p}e_{\mathrm L\,r}\right)\left(\overline{N}_{\mathrm R\,s}C\bar{u}_{\mathrm R\,t}^{a}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{d}_{\mathrm L\,v}^{c}\right)\\ \mathcal{Y}\,\big[{\substack{u\\v}}\big]\,\epsilon_{abc}\left(\bar{e}_{\mathrm R\,p}C\overline{N}_{\mathrm R\,s}\right)\left(\bar{u}_{\mathrm R\,t}^{a}e_{\mathrm L\,r}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{d}_{\mathrm L\,v}^{c}\right)\end{array}\right.\tag{5.927}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm L}\bar{e}_{\mathrm R}\nu_{\mathrm L}\bar{N}_{\mathrm R}\bar{u}_{\mathrm R}\bar{u}_{\mathrm L}}(-1,-1)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{e}_{\mathrm R\,p}C\overline{N}_{\mathrm R\,r}\right)\left(\bar{u}_{\mathrm R\,s}^{a}\nu_{\mathrm Lt}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{u}_{\mathrm L\,v}^{c}\right)\\ \epsilon_{abc}\left(\overline{N}_{\mathrm R\,r}\nu_{\mathrm Lt}\right)\left(\bar{e}_{\mathrm R\,p}C\bar{u}_{\mathrm R\,s}^{a}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{u}_{\mathrm L\,v}^{c}\right)\end{array}\right.\tag{5.928}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm L}^2\nu_{\mathrm L}\bar{N}_{\mathrm R}^2\bar{u}_{\mathrm R}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\,\big[{\substack{p\\r}},{\substack{u\\v}}\big]\,\epsilon_{abc}\left(\overline{N}_{\mathrm R\,r}\nu_{\mathrm Lt}\right)\left(\overline{N}_{\mathrm R\,p}C\bar{u}_{\mathrm R\,s}^{a}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{d}_{\mathrm L\,v}^{c}\right)\\ \mathcal{Y}\,\big[\underline{p|r},{\substack{u\\v}}\big]\,\epsilon_{abc}\left(\overline{N}_{\mathrm R\,p}C\overline{N}_{\mathrm R\,r}\right)\left(\bar{u}_{\mathrm R\,s}^{a}\nu_{\mathrm Lt}\right)\left(\bar{d}_{\mathrm L\,u}^{b}C\bar{d}_{\mathrm L\,v}^{c}\right)\end{array}\right.\tag{5.929}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\mathrm R}d_{\mathrm L}^3 N_{\mathrm R}u_{\mathrm R}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,[\underline{r\,s\,t}]\,\epsilon^{bde}\,(d_{\mathrm Lsa}Cd_{\mathrm Ltd})\,(N_{\mathrm Ru}Cu_{\mathrm Rve})\left(\bar{d}_{\mathrm R\,p}^{a}d_{\mathrm Lrb}\right)\\ \mathcal{Y}\,\big[{\substack{r\,s\\t}}\big]\,\epsilon^{cde}\,(d_{\mathrm Lsc}Cd_{\mathrm Ltd})\,(N_{\mathrm Ru}Cu_{\mathrm Rve})\left(\bar{d}_{\mathrm R\,p}^{a}d_{\mathrm Lra}\right)\\ \mathcal{Y}\,\big[{\substack{r\,s\\t}}\big]\,\epsilon^{bcd}\,(N_{\mathrm Ru}Cu_{\mathrm Rva})\,(d_{\mathrm Lsc}Cd_{\mathrm Ltd})\left(\bar{d}_{\mathrm R\,p}^{a}d_{\mathrm Lrb}\right)\\ \mathcal{Y}\,\big[{\substack{r\\s\\t}}\big]\,\epsilon^{cde}\,(d_{\mathrm Lsc}Cd_{\mathrm Ltd})\,(N_{\mathrm Ru}Cu_{\mathrm Rve})\left(\bar{d}_{\mathrm R\,p}^{a}d_{\mathrm Lra}\right)\end{array}\right.\tag{5.930}$$

$$\mathcal{O}_{d_{\mathrm L}^3\bar{e}_{\mathrm R}N_{\mathrm R}^2}(1,1)\left|\mathcal{Y}\,\big[\underline{p|r}\,,\underline{u|v}\big]\,\epsilon^{abc}\,(N_{\mathrm Ru}CN_{\mathrm Rv})\,(\bar{e}_{\mathrm Rt}d_{\mathrm Lsc})\,(d_{\mathrm Lpa}Cd_{\mathrm Lrb})\right.\tag{5.931}$$

$$\mathcal{O}_{d_{\mathrm L}^3\bar{e}_{\mathrm L}\nu_{\mathrm L}N_{\mathrm R}}(1,1)\left|\mathcal{Y}\,\big[\underline{p|r}\big]\,\epsilon^{abc}\,(\bar{e}_{\mathrm Lu}N_{\mathrm Rv})\,(d_{\mathrm Lpa}Cd_{\mathrm Lrb})\,(d_{\mathrm Lsc}C\nu_{\mathrm Lt})\right.\tag{5.932}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L}^2\bar{e}_{\mathrm R}e_{\mathrm L}N_{\mathrm R}u_{\mathrm R}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,[\underline{p|r}]\,\epsilon^{abc}\,(\bar{e}_{\mathrm Rs}d_{\mathrm Lpa})\,(d_{\mathrm Lrb}Ce_{\mathrm Lt})\,(N_{\mathrm Ru}Cu_{\mathrm Rvc})\\ \mathcal{Y}\,\big[{\substack{p\\r}}\big]\,\epsilon^{abc}\,(\bar{e}_{\mathrm Rs}e_{\mathrm Lt})\,(d_{\mathrm Lpa}Cd_{\mathrm Lrb})\,(N_{\mathrm Ru}Cu_{\mathrm Rvc})\end{array}\right.\tag{5.933}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm R}d_{\mathrm L}^2\bar{e}_{\mathrm R}\nu_{\mathrm L}N_{\mathrm R}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,[\underline{p|r}]\,\epsilon^{abc}\,(\bar{e}_{\mathrm Rs}d_{\mathrm Lpa})\,(d_{\mathrm Lrb}C\nu_{\mathrm Lt})\,(d_{\mathrm Ruc}CN_{\mathrm Rv})\\ \mathcal{Y}\,\big[{\substack{p\\r}}\big]\,\epsilon^{abc}\,(\bar{e}_{\mathrm Rs}\nu_{\mathrm Lt})\,(d_{\mathrm Lpa}Cd_{\mathrm Lrb})\,(d_{\mathrm Ruc}CN_{\mathrm Rv})\end{array}\right.\tag{5.934}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm L}^2\nu_{\mathrm L}\bar{N}_{\mathrm R}N_{\mathrm R}u_{\mathrm R}}(1,1)\left|\begin{array}{l}\mathcal{Y}\,[\underline{p|r}]\,\epsilon^{abc}\,\left(\overline{N}_{\mathrm Rs}d_{\mathrm Lpa}\right)(d_{\mathrm Lrb}C\nu_{\mathrm Lt})\,(N_{\mathrm Ru}Cu_{\mathrm Rvc})\\ \mathcal{Y}\,\big[{\substack{p\\r}}\big]\,\epsilon^{abc}\,\left(\overline{N}_{\mathrm Rs}\nu_{\mathrm Lt}\right)(d_{\mathrm Lpa}Cd_{\mathrm Lrb})\,(N_{\mathrm Ru}Cu_{\mathrm Rvc})\end{array}\right.\tag{5.935}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_R^2 d_L \bar{d}_L \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{bde} \left(\overline{N}_{Rt} d_{Lsa}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{d}^d_{Lu} C \overline{u}^e_{Lv}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abe} \left(\overline{N}_{Rt} d_{Lsc}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{d}^c_{Lu} C \overline{u}^e_{Lv}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{bde} \left(\bar{d}^a_{Rp} d_{Lsa}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \left(\bar{d}^d_{Lu} C \overline{u}^e_{Lv}\right) \\
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{bde} \left(\overline{N}_{Rt} d_{Lsa}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{d}^d_{Lu} C \overline{u}^e_{Lv}\right) \\
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{bde} \left(\bar{d}^a_{Rp} d_{Lsa}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \left(\bar{d}^d_{Lu} C \overline{u}^e_{Lv}\right) \\
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abe} \left(\bar{d}^a_{Rp} d_{Lsc}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \left(\bar{d}^c_{Lu} C \overline{u}^e_{Lv}\right)
\end{array}\right. \tag{5.936}$$

$$\mathcal{O}^{(1,2)}_{d_L e_L \nu_L \bar{N}_R u_R^2}(1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc} \left(\overline{N}_{Rs} \nu_{Lt}\right) \left(d_{Lpa} C e_{Lr}\right) \left(u_{Rub} C u_{Rvc}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc} \left(e_{Lr} C \nu_{Lt}\right) \left(\overline{N}_{Rs} d_{Lpa}\right) \left(u_{Rub} C u_{Rvc}\right)
\end{array}\right. \tag{5.937}$$

$$\mathcal{O}^{(1,2)}_{d_R d_L \nu_L^2 \bar{N}_R u_R}(1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon^{abc} \left(\overline{N}_{Rr} \nu_{Lt}\right) \left(d_{Lpa} C \nu_{Ls}\right) \left(d_{Rub} C u_{Rvc}\right) \\
\mathcal{Y}\left[\boxed{s\,t}\right] \epsilon^{abc} \left(\nu_{Ls} C \nu_{Lt}\right) \left(\overline{N}_{Rr} d_{Lpa}\right) \left(d_{Rub} C u_{Rvc}\right)
\end{array}\right. \tag{5.938}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_R^3 d_R \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r\,s}\right] \epsilon_{ace} \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\overline{u}^e_{Lv} d_{Rub}\right) \left(\bar{d}^c_{Rs} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p\,r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\overline{u}^e_{Lv} d_{Rub}\right) \left(\bar{d}^c_{Rs} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p\,r \\ s \end{smallmatrix}\right] \epsilon_{bce} \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\overline{u}^e_{Lv} d_{Rua}\right) \left(\bar{d}^c_{Rs} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon_{ace} \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\overline{u}^e_{Lv} d_{Rub}\right) \left(\bar{d}^c_{Rs} C \overline{N}_{Rt}\right)
\end{array}\right. \tag{5.939}$$

$$\mathcal{O}^{}_{\bar{d}_R^3 e_R \bar{\nu}_L \bar{N}_R}(-1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix} p\,r \\ s \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{\nu}_{Lv} e_{Ru}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{d}^c_{Rs} C \overline{N}_{Rt}\right) \right. \tag{5.940}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 e_L \bar{e}_L \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abc} \left(\bar{d}^a_{Rp} e_{Ls}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \left(\bar{e}_{Lu} C \overline{u}^c_{Lv}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{Rt} e_{Ls}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{e}_{Lu} C \overline{u}^c_{Lv}\right)
\end{array}\right. \tag{5.941}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 \bar{d}_L e_L \bar{\nu}_L \bar{N}_R}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abc} \left(\bar{d}^a_{Rp} e_{Ls}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \left(\bar{d}^c_{Lu} C \overline{\nu}_{Lv}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{Rt} e_{Ls}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\bar{d}^c_{Lu} C \overline{\nu}_{Lv}\right)
\end{array}\right. \tag{5.942}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 \bar{e}_R e_R \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abc} \left(\overline{u}^c_{Lv} e_{Ru}\right) \left(\bar{d}^a_{Rp} C \bar{e}_{Rs}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{e}_{Rs} C \overline{N}_{Rt}\right) \left(\overline{u}^c_{Lv} e_{Ru}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right)
\end{array}\right. \tag{5.943}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 \nu_L \bar{\nu}_L \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}\right] \epsilon_{abc} \left(\bar{d}^b_{Rr} \nu_{Lt}\right) \left(\bar{d}^a_{Rp} C \overline{N}_{Rs}\right) \left(\overline{u}^c_{Lu} C \overline{\nu}_{Lv}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{Rs} \nu_{Lt}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right) \left(\overline{u}^c_{Lu} C \overline{\nu}_{Lv}\right)
\end{array}\right. \tag{5.944}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 \bar{N}_R^2 N_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{u}^c_{Lv} N_{Ru}\right) \left(\bar{d}^a_{Rp} C \overline{N}_{Rs}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{s\,t}\right] \epsilon_{abc} \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right) \left(\overline{u}^c_{Lv} N_{Ru}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right)
\end{array}\right. \tag{5.945}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R^2 \bar{d}_L e_R \bar{N}_R^2}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\boxed{p\,r}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon_{abc} \left(\bar{d}^c_{Lu} e_{Rv}\right) \left(\bar{d}^a_{Rp} C \overline{N}_{Rs}\right) \left(\bar{d}^b_{Rr} C \overline{N}_{Rt}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \boxed{s\,t}\right] \epsilon_{abc} \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right) \left(\bar{d}^c_{Lu} e_{Rv}\right) \left(\bar{d}^a_{Rp} C \bar{d}^b_{Rr}\right)
\end{array}\right. \tag{5.946}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R \bar{d}_L \bar{e}_R e_L \bar{N}_R \bar{u}_L}(-1,-1) \left|
\begin{array}{l}
\epsilon_{abc} \left(\overline{N}_{Rt} e_{Ls}\right) \left(\bar{d}^a_{Rp} C \bar{e}_{Rr}\right) \left(\bar{d}^b_{Lu} C \overline{u}^c_{Lv}\right) \\
\epsilon_{abc} \left(\bar{e}_{Rr} C \overline{N}_{Rt}\right) \left(\bar{d}^a_{Rp} e_{Ls}\right) \left(\bar{d}^b_{Lu} C \overline{u}^c_{Lv}\right)
\end{array}\right. \tag{5.947}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_R \bar{d}_L^2 e_L \bar{N}_R^2}(-1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{Rt} e_{Lr}\right) \left(\bar{d}^a_{Rp} C \overline{N}_{Rs}\right) \left(\bar{d}^b_{Lu} C \bar{d}^c_{Lv}\right) \\
\mathcal{Y}\left[\boxed{s\,t}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc} \left(\overline{N}_{Rs} C \overline{N}_{Rt}\right) \left(\bar{d}^a_{Rp} C e_{Lr}\right) \left(\bar{d}^b_{Lu} C \bar{d}^c_{Lv}\right)
\end{array}\right. \tag{5.948}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{L}}^2}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{e}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon_{abc}\left(\bar{e}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.949}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{L}}}(-1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\;\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\;\boxed{r\,s}\;\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.950}$$

$(\Delta B,\Delta L)=(\pm 1,\mp 1).$

$$\mathcal{O}^{(1\sim 6)}_{d_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}\bar{u}_{\mathrm{L}}^2}(1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon^{cde}\left(u_{\mathrm{L}sa}Cu_{\mathrm{L}tc}\right)\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}ve}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{\,a}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon^{cde}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t},\boxed{u\,v}\;\epsilon^{bcd}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sb}\right)\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}va}\right)\left(\bar{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon^{cde}\left(u_{\mathrm{L}sa}Cu_{\mathrm{L}tc}\right)\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}ve}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{\,a}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\;\epsilon^{cde}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}r}^{\,a}u_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{u\,v}\;\epsilon^{bcd}\left(d_{\mathrm{R}ud}Cd_{\mathrm{R}va}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^{\,a}\right)\end{array}\right.\tag{5.951}$$

$$\mathcal{O}^{(1\sim 6)}_{d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^2\bar{u}_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{bcd}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\left(\bar{u}_{\mathrm{L}v}^{\,a}d_{\mathrm{R}ud}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{abd}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\left(\bar{u}_{\mathrm{L}v}^{\,c}d_{\mathrm{R}ud}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{abd}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\left(\bar{u}_{\mathrm{L}v}^{\,c}d_{\mathrm{R}ud}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t}\;\epsilon^{abd}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\left(\bar{u}_{\mathrm{L}v}^{\,c}d_{\mathrm{R}ud}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t}\;\epsilon^{bcd}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\left(\bar{u}_{\mathrm{L}v}^{\,a}d_{\mathrm{R}ud}\right)\\[4pt]\mathcal{Y}\;\boxed{s\,t}\;\epsilon^{abd}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\left(\bar{u}_{\mathrm{L}v}^{\,c}d_{\mathrm{R}ud}\right)\end{array}\right.\tag{5.952}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}e_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^2}(1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{s\,t}\;\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}v}e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{L}sb}Cu_{\mathrm{L}tc}\right)\end{array}\right.\tag{5.953}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}e_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}^2}(1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{s\,t}\;\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(e_{\mathrm{L}p}Cu_{\mathrm{L}sa}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb}\right)\end{array}\right.\tag{5.954}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2u_{\mathrm{L}}^2}(1,-1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{s\,t}\;\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc}Ce_{\mathrm{R}v}\right)\\[4pt]\mathcal{Y}\;\boxed{p\,r},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\;\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(u_{\mathrm{L}sa}Cu_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc}Ce_{\mathrm{R}v}\right)\end{array}\right.\tag{5.955}$$

$$\mathcal{O}^{(1\sim 6)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2u_{\mathrm{L}}}(-1,1)\left|\begin{array}{l}\mathcal{Y}\;\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\;\epsilon_{ace}\left(\bar{d}_{\mathrm{L}u}^{\,e}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\;\epsilon_{bce}\left(\bar{d}_{\mathrm{L}u}^{\,e}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]\mathcal{Y}\;\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\;\epsilon_{abc}\left(\bar{d}_{\mathrm{L}u}^{\,d}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}td}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]\mathcal{Y}\;\boxed{r\,s}\;\epsilon_{ace}\left(\bar{d}_{\mathrm{L}u}^{\,e}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}tb}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]\mathcal{Y}\;\boxed{r\,s}\;\epsilon_{bce}\left(\bar{d}_{\mathrm{L}u}^{\,e}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}ta}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\\[4pt]\mathcal{Y}\;\boxed{r\,s}\;\epsilon_{abc}\left(\bar{d}_{\mathrm{L}u}^{\,d}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}u_{\mathrm{L}td}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}r}^{\,b}\right)\end{array}\right.\tag{5.956}$$

$$\mathcal{O}^{(1\sim 6)}_{d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\epsilon^{cde}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}s}^{\,a}u_{\mathrm{L}tc}\right)\\[4pt]\epsilon^{ace}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{R}ub}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}s}^{\,b}u_{\mathrm{L}tc}\right)\\[4pt]\epsilon^{ade}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\bar{u}_{\mathrm{R}s}^{\,b}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\\[4pt]\epsilon^{cde}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(\bar{u}_{\mathrm{R}s}^{\,a}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\\[4pt]\epsilon^{ace}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{R}ub}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}s}^{\,b}d_{\mathrm{L}pa}\right)\\[4pt]\epsilon^{ade}\left(\overline{N}_{\mathrm{R}r}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}s}^{\,b}d_{\mathrm{L}pa}\right)\end{array}\right.\tag{5.957}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}^2_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{ace}\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{d}^b_{\mathrm{R}r}\right)\left(\overline{u}^c_{\mathrm{R}s} u_{\mathrm{L}tb}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abe}\left(\overline{u}^c_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{d}^b_{\mathrm{R}r}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{ace}\left(\overline{d}^b_{\mathrm{R}r} u_{\mathrm{L}tb}\right)\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{u}^c_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{d}^b_{\mathrm{R}r}\right)\left(\overline{u}^c_{\mathrm{R}s} u_{\mathrm{L}tb}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{ace}\left(\overline{d}^b_{\mathrm{R}r} u_{\mathrm{L}tb}\right)\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{u}^c_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abe}\left(\overline{u}^e_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{d}^b_{\mathrm{R}r} u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{u}^c_{\mathrm{R}s}\right)
\end{array}
\right. \tag{5.958}$$

$$\mathcal{O}^{(1\sim6)}_{d^2_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}} \bar{u}_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{u}^a_{\mathrm{L}v} u_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{u}^c_{\mathrm{L}v} u_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{u}^a_{\mathrm{L}v} u_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{u}^a_{\mathrm{L}v} u_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{u}^a_{\mathrm{L}v} u_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{u}^c_{\mathrm{L}v} u_{\mathrm{R}ud}\right)
\end{array}
\right. \tag{5.959}$$

$$\mathcal{O}^{(1\sim6)}_{d_{\mathrm{R}} d^2_{\mathrm{L}} \bar{d}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{d}^a_{\mathrm{L}v} d_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{d}^c_{\mathrm{L}v} d_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{L}v} d_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\overline{d}^a_{\mathrm{L}v} d_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{L}v} d_{\mathrm{R}ud}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abd}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{d}^c_{\mathrm{L}v} d_{\mathrm{R}ud}\right)
\end{array}
\right. \tag{5.960}$$

$$\mathcal{O}^{(1,2)}_{d^2_{\mathrm{L}} e_{\mathrm{R}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{e}_{\mathrm{L}v} e_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)
\end{array}
\right. \tag{5.961}$$

$$\mathcal{O}^{(1,2)}_{d^2_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)
\end{array}
\right. \tag{5.962}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\mathrm{R}} d^2_{\mathrm{R}} d_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{R}ud} C d_{\mathrm{R}va}\right)\left(\overline{d}^a_{\mathrm{R}p} d_{\mathrm{L}rb}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon^{bcd}\left(d_{\mathrm{R}ud} C d_{\mathrm{R}va}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tc}\right)\left(d_{\mathrm{R}ud} C d_{\mathrm{R}ve}\right)\left(\overline{d}^a_{\mathrm{R}p} d_{\mathrm{L}ra}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{bde}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ud} C d_{\mathrm{R}ve}\right)\left(\overline{d}^a_{\mathrm{R}p} d_{\mathrm{L}rb}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{cde}\left(d_{\mathrm{R}ud} C d_{\mathrm{R}ve}\right)\left(d_{\mathrm{L}ra} C u_{\mathrm{L}tc}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{bde}\left(d_{\mathrm{R}ud} C d_{\mathrm{R}ve}\right)\left(d_{\mathrm{L}rb} C u_{\mathrm{L}ta}\right)\left(\overline{d}^a_{\mathrm{R}p} C \overline{N}_{\mathrm{R}s}\right)
\end{array}
\right. \tag{5.963}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} e_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tb}\right)\left(\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}uc}\right)\left(d_{\mathrm{L}pa} C e_{\mathrm{L}r}\right) \\
\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(\overline{\nu}_{\mathrm{L}v} u_{\mathrm{R}uc}\right)\left(e_{\mathrm{L}r} C u_{\mathrm{L}tb}\right)
\end{array}
\right. \tag{5.964}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}} d_{\mathrm{L}} e_{\mathrm{L}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tb}\right)\left(\overline{e}_{\mathrm{L}v} d_{\mathrm{R}uc}\right)\left(d_{\mathrm{L}pa} C e_{\mathrm{L}r}\right) \\
\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{L}v} d_{\mathrm{R}uc}\right)\left(e_{\mathrm{L}r} C u_{\mathrm{L}tb}\right)
\end{array}
\right. \tag{5.965}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}} d_{\mathrm{L}} \bar{e}_{\mathrm{R}} e_{\mathrm{R}} \bar{N}_{\mathrm{R}} u_{\mathrm{L}}}(1,-1) \left|
\begin{array}{l}
\epsilon^{abc}\left(\overline{e}_{\mathrm{R}r} d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s} u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc} C e_{\mathrm{R}v}\right) \\
\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s} d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r} u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc} C e_{\mathrm{R}v}\right)
\end{array}
\right. \tag{5.966}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}d_{\mathrm{L}}\nu_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(u_{\mathrm{L}sb}C\nu_{\mathrm{L}t}\right)\\ \epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(d_{\mathrm{L}pa}Cu_{\mathrm{L}sb}\right)\end{array}\right. \tag{5.967}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}e_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\boxed{r\,s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(e_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.968}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}d_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 N_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc}CN_{\mathrm{R}v}\right)\\ \mathcal{Y}\left[\boxed{r\,s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(d_{\mathrm{R}uc}CN_{\mathrm{R}v}\right)\end{array}\right. \tag{5.969}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}^2\bar{e}_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{u}{v}\right]\epsilon^{abc}\left(\overline{e}_{\mathrm{R}p}e_{\mathrm{L}r}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\frac{u}{v}\right]\epsilon^{abc}\left(\overline{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(e_{\mathrm{L}r}Cu_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.970}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}e_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 u_{\mathrm{R}}u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{r}{s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}Cu_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\boxed{r\,s}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}e_{\mathrm{L}p}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}Cu_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.971}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}^2\nu_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2 u_{\mathrm{L}}}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{u}{v}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}\nu_{\mathrm{L}t}\right)\left(\overline{N}_{\mathrm{R}p}u_{\mathrm{L}sa}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\frac{u}{v}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(u_{\mathrm{L}sa}C\nu_{\mathrm{L}t}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.972}$$

$$\mathcal{O}^{(1\sim 6)}_{\bar{d}_{\mathrm{R}}^2 N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2 u_{\mathrm{R}}}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\boxed{s\,t}\right]\epsilon_{abd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_r^b\right)\left(\bar{u}_{\mathrm{R}s}^c C\bar{u}_{\mathrm{R}t}^d\right)\\ \mathcal{Y}\left[\frac{p}{r},\boxed{s\,t}\right]\epsilon_{bcd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^c\right)\left(\bar{d}_{\mathrm{R}r}^b C\bar{u}_{\mathrm{R}t}^d\right)\\ \mathcal{Y}\left[\boxed{p\,r},\frac{s}{t}\right]\epsilon_{bcd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right)\left(\bar{u}_{\mathrm{R}s}^c C\bar{u}_{\mathrm{R}t}^d\right)\\ \mathcal{Y}\left[\boxed{p\,r},\frac{s}{t}\right]\epsilon_{abd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^b\right)\left(\bar{d}_{\mathrm{R}r}^b C\bar{u}_{\mathrm{R}t}^d\right)\\ \mathcal{Y}\left[\boxed{p\,r},\boxed{s\,t}\right]\epsilon_{bcd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^c\right)\left(\bar{d}_{\mathrm{R}r}^b C\bar{u}_{\mathrm{R}t}^d\right)\\ \mathcal{Y}\left[\frac{p}{r},\frac{s}{t}\right]\epsilon_{bcd}\left(N_{\mathrm{R}u}Cu_{\mathrm{R}va}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{d}_{\mathrm{R}r}^b\right)\left(\bar{u}_{\mathrm{R}s}^c C\bar{u}_{\mathrm{R}t}^d\right)\end{array}\right. \tag{5.973}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}N_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}^2}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{s\,t},\boxed{u\,v}\right]\epsilon_{abc}\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^c\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}s}^b\right)\\ \mathcal{Y}\left[\frac{s}{t},\boxed{u\,v}\right]\epsilon_{abc}\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{e}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^b C\bar{u}_{\mathrm{R}t}^c\right)\end{array}\right. \tag{5.974}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{L}}\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{r\,s}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^c\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}r}^b\right)\\ \mathcal{Y}\left[\frac{r}{s}\right]\epsilon_{abc}\left(\bar{e}_{\mathrm{L}u}N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^c\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^a C\bar{u}_{\mathrm{R}r}^b\right)\end{array}\right. \tag{5.975}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\nu_{\mathrm{L}}N_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,1)\left|\begin{array}{l}\mathcal{Y}\left[\boxed{r\,s}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^b\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^c N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^a\right)\\ \mathcal{Y}\left[\frac{r}{s}\right]\epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^b\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^c N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}r}^a\right)\end{array}\right. \tag{5.976}$$

$$\mathcal{O}^{(1\sim 6)}_{d_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}u_{\mathrm{R}}^2}(1,-1)\left|\begin{array}{l}\mathcal{Y}\left[\frac{p}{r},\frac{u}{v}\right]\epsilon^{bde}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\ \mathcal{Y}\left[\frac{p}{r},\frac{u}{v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\boxed{u\,v}\right]\epsilon^{abe}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{R}uc}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}t}^c d_{\mathrm{L}rb}\right)\\ \mathcal{Y}\left[\boxed{p\,r},\frac{u}{v}\right]\epsilon^{bde}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^a\right)\\ \mathcal{Y}\left[\boxed{p\,r},\frac{u}{v}\right]\epsilon^{bde}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(u_{\mathrm{R}ud}Cu_{\mathrm{R}ve}\right)\left(\bar{u}_{\mathrm{R}t}^a d_{\mathrm{L}rb}\right)\\ \mathcal{Y}\left[\frac{p}{r},\boxed{u\,v}\right]\epsilon^{abe}\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(u_{\mathrm{R}uc}Cu_{\mathrm{R}ve}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^c\right)\end{array}\right. \tag{5.977}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_{\rm R}^2 d_{\rm L} \bar{d}_{\rm L} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{bde}\left(\bar{d}_{\mathrm{L}u}^{e} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{u}_{\mathrm{R}t}^{d} d_{\mathrm{L}sa}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abd}\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{u}_{\mathrm{R}t}^{d} d_{\mathrm{L}sc}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{bde}\left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{L}u}^{e} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{d}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{bde}\left(\bar{d}_{\mathrm{L}u}^{e} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{u}_{\mathrm{R}t}^{d} d_{\mathrm{L}sa}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{bde}\left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}sa}\right)\left(\bar{d}_{\mathrm{L}u}^{e} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{d}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abd}\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} d_{\mathrm{L}sc}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{d}\right)
\end{array}\right. \tag{5.978}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_{\rm R}^3 d_{\rm R} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{bcd}\left(d_{\mathrm{R}ua} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{d}_{\mathrm{R}s}^{c} C \bar{u}_{\mathrm{R}t}^{d}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{bcd}\left(d_{\mathrm{R}ua} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{d}_{\mathrm{R}s}^{c} C \bar{u}_{\mathrm{R}t}^{d}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{abd}\left(d_{\mathrm{R}uc} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{d}_{\mathrm{R}s}^{c} C \bar{u}_{\mathrm{R}t}^{d}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon_{bcd}\left(d_{\mathrm{R}ua} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{d}_{\mathrm{R}s}^{c} C \bar{u}_{\mathrm{R}t}^{d}\right)
\end{array}\right. \tag{5.979}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}^2 e_{\rm L} \bar{e}_{\rm L} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{c}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}t}^{c} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)
\end{array}\right. \tag{5.980}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}^2 \bar{e}_{\rm R} e_{\rm R} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc}\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{e}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{c}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc}\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{e}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{c}\right)
\end{array}\right. \tag{5.981}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}^2 \nu_{\rm L} \bar{\nu}_{\rm L} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}r}^{b} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{u}_{\mathrm{R}s}^{c}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\bar{u}_{\mathrm{R}s}^{c} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)
\end{array}\right. \tag{5.982}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R}^2 \bar{N}_{\rm R} N_{\rm R}^2 \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{b} C \bar{u}_{\mathrm{R}t}^{c}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} u & v \end{smallmatrix}\right] \epsilon_{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{d}_{\mathrm{R}r}^{b}\right)\left(\bar{N}_{\mathrm{R}s} C \bar{u}_{\mathrm{R}t}^{c}\right)
\end{array}\right. \tag{5.983}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R} \bar{d}_{\rm L} \bar{e}_{\rm R} e_{\rm L} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\epsilon_{abc}\left(\bar{u}_{\mathrm{R}t}^{b} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{e}_{\mathrm{R}r}\right) \\
\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{a} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{e}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}t}^{b}\right)
\end{array}\right. \tag{5.984}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R} \bar{e}_{\rm R} \nu_{\rm L} N_{\rm R} \bar{u}_{\rm R} \bar{u}_{\rm L}}(-1,1) \left|
\begin{array}{l}
\epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^{b} \nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}v}^{c} N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{e}_{\mathrm{R}r}\right) \\
\epsilon_{abc}\left(\bar{e}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}v}^{c} N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{u}_{\mathrm{R}s}^{b}\right)
\end{array}\right. \tag{5.985}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm R} \bar{d}_{\rm L} \nu_{\rm L} \bar{N}_{\rm R} N_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\epsilon_{abc}\left(\bar{u}_{\mathrm{R}s}^{b} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{N}_{\mathrm{R}r}\right) \\
\epsilon_{abc}\left(\bar{N}_{\mathrm{R}r} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{c} N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{a} C \bar{u}_{\mathrm{R}s}^{b}\right)
\end{array}\right. \tag{5.986}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\rm L}^2 \nu_{\rm L}^2 \bar{N}_{\rm R} \bar{u}_{\rm R}}(-1,1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{N}_{\mathrm{R}p} \nu_{\mathrm{L}s}\right)\left(\bar{u}_{\mathrm{R}t}^{a} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{b} C \bar{d}_{\mathrm{L}v}^{c}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon_{abc}\left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right)\left(\bar{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}r}^{a}\right)\left(\bar{d}_{\mathrm{L}u}^{b} C \bar{d}_{\mathrm{L}v}^{c}\right)
\end{array}\right. \tag{5.987}$$

$$\mathcal{O}_{d_{\rm L}^3 \bar{e}_{\rm R} \bar{\nu}_{\rm L} N_{\rm R}}(1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}v} N_{\mathrm{R}u}\right)\left(\bar{e}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right) \right. \tag{5.988}$$

$$\mathcal{O}^{(1\sim4)}_{d_{\rm L}^3 \bar{d}_{\rm L} \bar{N}_{\rm R} u_{\rm R}}(1,-1) \left|
\begin{array}{l}
\mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon^{bce}\left(\bar{N}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{a} u_{\mathrm{R}ve}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon^{bce}\left(\bar{N}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{a} u_{\mathrm{R}ve}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon^{abe}\left(\bar{N}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{c} u_{\mathrm{R}ve}\right) \\
\mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon^{bce}\left(\bar{N}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(\bar{d}_{\mathrm{L}u}^{a} u_{\mathrm{R}ve}\right)
\end{array}\right. \tag{5.989}$$

$$\mathcal{O}_{d_{\rm L}^3 \bar{e}_{\rm L} \bar{N}_{\rm R} N_{\rm R}}(1,-1) \left| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_{\mathrm{L}u} N_{\mathrm{R}v}\right)\left(\bar{N}_{\mathrm{R}t} d_{\mathrm{L}sc}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right) \right. \tag{5.990}$$

$$\mathcal{O}^{(1\sim6)}_{\bar{d}_\mathrm{R} d_\mathrm{R} d_\mathrm{L}^2 \bar{N}_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sc\right)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} ra\right)(d_\mathrm{R} ud C u_\mathrm{R} ve) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \epsilon^{bde}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sa\right)(d_\mathrm{R} ud C u_\mathrm{R} ve)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} rb\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sc\right)(d_\mathrm{R} ud C u_\mathrm{R} va)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} rb\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon^{cde}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sc\right)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} ra\right)(d_\mathrm{R} ud C u_\mathrm{R} ve) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon^{bde}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sa\right)(d_\mathrm{R} ud C u_\mathrm{R} ve)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} rb\right) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon^{bcd}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} sc\right)(d_\mathrm{R} ud C u_\mathrm{R} va)\left(\bar{d}_{\mathrm{R}p}^a d_\mathrm{L} rb\right) \end{array} \right. \tag{5.991}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 e_\mathrm{L} \bar{e}_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} t d_\mathrm{L} rb\right)(\bar{e}_\mathrm{L} u u_\mathrm{R} vc)(d_\mathrm{L} pa C e_\mathrm{L} s) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} t e_\mathrm{L} s\right)(\bar{e}_\mathrm{L} u u_\mathrm{R} vc)(d_\mathrm{L} pa C d_\mathrm{L} rb) \end{array} \right. \tag{5.992}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 \bar{e}_\mathrm{R} e_\mathrm{R} \bar{N}_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_\mathrm{R} s d_\mathrm{L} pa\right)\left(\overline{N}_\mathrm{R} t d_\mathrm{L} rb\right)(e_\mathrm{R} u C u_\mathrm{R} vc) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_\mathrm{R} s C \overline{N}_\mathrm{R} t\right)(d_\mathrm{L} pa C d_\mathrm{L} rb)(e_\mathrm{R} u C u_\mathrm{R} vc) \end{array} \right. \tag{5.993}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} d_\mathrm{L}^2 \bar{e}_\mathrm{R} \bar{N}_\mathrm{R} N_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_\mathrm{R} s d_\mathrm{L} pa\right)\left(\overline{N}_\mathrm{R} t d_\mathrm{L} rb\right)(d_\mathrm{R} uc C N_\mathrm{R} v) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_\mathrm{R} s C \overline{N}_\mathrm{R} t\right)(d_\mathrm{L} pa C d_\mathrm{L} rb)(d_\mathrm{R} uc C N_\mathrm{R} v) \end{array} \right. \tag{5.994}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 \nu_\mathrm{L} \bar{\nu}_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s d_\mathrm{L} pa\right)(\bar{\nu}_\mathrm{L} v u_\mathrm{R} uc)(d_\mathrm{L} rb C \nu_\mathrm{L} t) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s \nu_\mathrm{L} t\right)(\bar{\nu}_\mathrm{L} v u_\mathrm{R} uc)(d_\mathrm{L} pa C d_\mathrm{L} rb) \end{array} \right. \tag{5.995}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} d_\mathrm{L}^2 \bar{e}_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s d_\mathrm{L} pa\right)(\bar{e}_\mathrm{L} v d_\mathrm{R} uc)(d_\mathrm{L} rb C \nu_\mathrm{L} t) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s \nu_\mathrm{L} t\right)(\bar{e}_\mathrm{L} v d_\mathrm{R} uc)(d_\mathrm{L} pa C d_\mathrm{L} rb) \end{array} \right. \tag{5.996}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2 \bar{N}_\mathrm{R}^2 N_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s d_\mathrm{L} pa\right)\left(\overline{N}_\mathrm{R} t d_\mathrm{L} rb\right)(N_\mathrm{R} u C u_\mathrm{R} vc) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s & t \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s C \overline{N}_\mathrm{R} t\right)(d_\mathrm{L} pa C d_\mathrm{L} rb)(N_\mathrm{R} u C u_\mathrm{R} vc) \end{array} \right. \tag{5.997}$$

$$\mathcal{O}^{(1\sim4)}_{\bar{d}_\mathrm{R}^3 d_\mathrm{L} N_\mathrm{R} \bar{u}_\mathrm{L}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} p & r & s \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{u}_\mathrm{L} {}_v^e N_\mathrm{R} u\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{R}s}^c d_\mathrm{L} tb\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{u}_\mathrm{L} {}_v^e N_\mathrm{R} u\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{R}s}^c d_\mathrm{L} tb\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{bce}\left(\bar{u}_\mathrm{L} {}_v^e N_\mathrm{R} u\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{R}s}^c d_\mathrm{L} ta\right) \\ \mathcal{Y}\left[\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}\right] \epsilon_{ace}\left(\bar{u}_\mathrm{L} {}_v^e N_\mathrm{R} u\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{R}s}^c d_\mathrm{L} tb\right) \end{array} \right. \tag{5.998}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} d_\mathrm{L} \bar{e}_\mathrm{R} e_\mathrm{L} \bar{N}_\mathrm{R} u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \epsilon^{abc}\left(\overline{N}_\mathrm{R} t e_\mathrm{L} s\right)(\bar{e}_\mathrm{R} r d_\mathrm{L} pa)(d_\mathrm{R} ub C u_\mathrm{R} vc) \\ \epsilon^{abc}\left(\bar{e}_\mathrm{R} r C \overline{N}_\mathrm{R} t\right)(d_\mathrm{L} pa C e_\mathrm{L} s)(d_\mathrm{R} ub C u_\mathrm{R} vc) \end{array} \right. \tag{5.999}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L} e_\mathrm{L} \bar{N}_\mathrm{R}^2 u_\mathrm{R}^2}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} s \\ t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} t e_\mathrm{L} r\right)\left(\overline{N}_\mathrm{R} s d_\mathrm{L} pa\right)(u_\mathrm{R} ub C u_\mathrm{R} vc) \\ \mathcal{Y}\left[\begin{smallmatrix} s & t \end{smallmatrix}, \begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s C \overline{N}_\mathrm{R} t\right)(d_\mathrm{L} pa C e_\mathrm{L} r)(u_\mathrm{R} ub C u_\mathrm{R} vc) \end{array} \right. \tag{5.1000}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}^2 d_\mathrm{L} \bar{e}_\mathrm{R} \nu_\mathrm{L} \bar{N}_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s \nu_\mathrm{L} t\right)(\bar{e}_\mathrm{R} r d_\mathrm{L} pa)(d_\mathrm{R} ub C d_\mathrm{R} vc) \\ \mathcal{Y}\left[\begin{smallmatrix} u \\ v \end{smallmatrix}\right] \epsilon^{abc}\left(\bar{e}_\mathrm{R} r \nu_\mathrm{L} t\right)\left(\overline{N}_\mathrm{R} s d_\mathrm{L} pa\right)(d_\mathrm{R} ub C d_\mathrm{R} vc) \end{array} \right. \tag{5.1001}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R} d_\mathrm{L} \nu_\mathrm{L} \bar{N}_\mathrm{R}^2 u_\mathrm{R}}(1,-1) \left| \begin{array}{l} \mathcal{Y}\left[\begin{smallmatrix} r \\ s \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s \nu_\mathrm{L} t\right)\left(\overline{N}_\mathrm{R} r d_\mathrm{L} pa\right)(d_\mathrm{R} ub C u_\mathrm{R} vc) \\ \mathcal{Y}\left[\begin{smallmatrix} r & s \end{smallmatrix}\right] \epsilon^{abc}\left(\overline{N}_\mathrm{R} s \nu_\mathrm{L} t\right)\left(\overline{N}_\mathrm{R} r d_\mathrm{L} pa\right)(d_\mathrm{R} ub C u_\mathrm{R} vc) \end{array} \right. \tag{5.1002}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R}^3 e_\mathrm{L} \bar{\nu}_\mathrm{L} N_\mathrm{R}}(-1,1) \left| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{abc}\left(\bar{\nu}_\mathrm{L} v N_\mathrm{R} u\right)\left(\bar{d}_{\mathrm{R}s}^c e_\mathrm{L} t\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right) \right. \tag{5.1003}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R}^3 e_\mathrm{R} \bar{N}_\mathrm{R} N_\mathrm{R}}(-1,1) \left| \mathcal{Y}\left[\begin{smallmatrix} p & r \\ s \end{smallmatrix}\right] \epsilon_{abc}\left(e_\mathrm{R} u C N_\mathrm{R} v\right)\left(\bar{d}_{\mathrm{R}p}^a C \bar{d}_{\mathrm{R}r}^b\right)\left(\bar{d}_{\mathrm{R}s}^c C \overline{N}_\mathrm{R} t\right) \right. \tag{5.1004}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 \bar{e}_{\mathrm{R}} e_{\mathrm{L}} N_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{p\,|\,r}\ \epsilon_{abc}\left(\bar{d}_{\mathrm{R}\,r}^{b} e_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}\,v}^{c} N_{\mathrm{R}\,u}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{e}_{\mathrm{R}\,s}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{R}\,s} e_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}\,v}^{c} N_{\mathrm{R}\,u}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{d}_{\mathrm{R}\,r}^{b}\right) \end{array} \right. \tag{5.1005}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 \bar{d}_{\mathrm{L}} e_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{p\,|\,r}\ \epsilon_{abc}\left(\bar{d}_{\mathrm{R}\,p}^{a} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}\,u}^{c} N_{\mathrm{R}\,v}\right)\left(\bar{d}_{\mathrm{R}\,r}^{b} C \overline{N}_{\mathrm{R}\,t}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\ \epsilon_{abc}\left(\overline{N}_{\mathrm{R}\,t} e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}\,u}^{c} N_{\mathrm{R}\,v}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{d}_{\mathrm{R}\,r}^{b}\right) \end{array} \right. \tag{5.1006}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}} N_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{p\,|\,r}\ \epsilon_{abc}\left(\bar{d}_{\mathrm{R}\,r}^{b} \nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}\,v}^{c} N_{\mathrm{R}\,u}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \overline{N}_{\mathrm{R}\,s}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\ \epsilon_{abc}\left(\overline{N}_{\mathrm{R}\,s} \nu_{\mathrm{L}t}\right)\left(\bar{u}_{\mathrm{L}\,v}^{c} N_{\mathrm{R}\,u}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{d}_{\mathrm{R}\,r}^{b}\right) \end{array} \right. \tag{5.1007}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2 \bar{d}_{\mathrm{L}} e_{\mathrm{R}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{p\,|\,r}\ \epsilon_{abc}\left(\bar{d}_{\mathrm{R}\,r}^{b} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}\,u}^{c} e_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \overline{N}_{\mathrm{R}\,s}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}}\ \epsilon_{abc}\left(\overline{N}_{\mathrm{R}\,s} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}\,u}^{c} e_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{d}_{\mathrm{R}\,r}^{b}\right) \end{array} \right. \tag{5.1008}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} \bar{d}_{\mathrm{L}}^2 e_{\mathrm{L}} \nu_{\mathrm{L}} \bar{N}_{\mathrm{R}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\ \epsilon_{abc}\left(\overline{N}_{\mathrm{R}\,s} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} e_{\mathrm{L}r}\right)\left(\bar{d}_{\mathrm{L}\,u}^{b} C \bar{d}_{\mathrm{L}\,v}^{c}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\ \epsilon_{abc}\left(e_{\mathrm{L}r} C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \overline{N}_{\mathrm{R}\,s}\right)\left(\bar{d}_{\mathrm{L}\,u}^{b} C \bar{d}_{\mathrm{L}\,v}^{c}\right) \end{array} \right. \tag{5.1009}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} \bar{d}_{\mathrm{L}} \nu_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{L}}}(-1,1) \left| \begin{array}{l} \mathcal{Y}\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\ \epsilon_{abc}\left(\overline{N}_{\mathrm{R}\,r} \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} \nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{L}\,u}^{b} C \bar{u}_{\mathrm{L}\,v}^{c}\right) \\ \mathcal{Y}\ \boxed{s\,|\,t}\ \epsilon_{abc}\left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \overline{N}_{\mathrm{R}\,r}\right)\left(\bar{d}_{\mathrm{L}\,u}^{b} C \bar{u}_{\mathrm{L}\,v}^{c}\right) \end{array} \right. \tag{5.1010}$$

$(\Delta B, \Delta L) = (\pm 1, \pm 3)$.

$$\mathcal{O}_{e_{\mathrm{R}} e_{\mathrm{L}} N_{\mathrm{R}} u_{\mathrm{L}}^3}(1,3) \left| \mathcal{Y}\ \boxed{\begin{smallmatrix}r\,|\,s\\t\end{smallmatrix}}\ \epsilon^{abc}\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(e_{\mathrm{L}p} C u_{\mathrm{L}ra}\right)\left(u_{\mathrm{L}sb} C u_{\mathrm{L}tc}\right) \right. \tag{5.1011}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} e_{\mathrm{L}} N_{\mathrm{R}}^2 u_{\mathrm{L}}^2}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{s\,|\,t},\ \boxed{u\,|\,v}\ \epsilon^{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(e_{\mathrm{L}r} C u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}sb}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\ \boxed{u\,|\,v}\ \epsilon^{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}pa} C e_{\mathrm{L}r}\right)\left(u_{\mathrm{L}sb} C u_{\mathrm{L}tc}\right) \end{array} \right. \tag{5.1012}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} e_{\mathrm{R}} \nu_{\mathrm{L}} N_{\mathrm{R}} u_{\mathrm{L}}^2}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{r\,|\,s}\ \epsilon^{abc}\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(u_{\mathrm{L}sc} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}rb}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\ \epsilon^{abc}\left(e_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(u_{\mathrm{L}sc} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}rb}\right) \end{array} \right. \tag{5.1013}$$

$$\mathcal{O}^{(1,2)}_{e_{\mathrm{L}}^2 N_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}}^2}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\ \boxed{s\,|\,t}\ \epsilon^{abc}\left(e_{\mathrm{L}p} C u_{\mathrm{L}sa}\right)\left(e_{\mathrm{L}r} C u_{\mathrm{L}tb}\right)\left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right) \\ \mathcal{Y}\ \boxed{p\,|\,r},\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\ \epsilon^{abc}\left(e_{\mathrm{L}p} C e_{\mathrm{L}r}\right)\left(u_{\mathrm{L}sa} C u_{\mathrm{L}tb}\right)\left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right) \end{array} \right. \tag{5.1014}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}} e_{\mathrm{L}} \nu_{\mathrm{L}} N_{\mathrm{R}} u_{\mathrm{L}}^2}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{r\,|\,s}\ \epsilon^{abc}\left(e_{\mathrm{L}p} C u_{\mathrm{L}ra}\right)\left(u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{R}uc} C N_{\mathrm{R}v}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\ \epsilon^{abc}\left(e_{\mathrm{L}p} C u_{\mathrm{L}ra}\right)\left(u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{R}uc} C N_{\mathrm{R}v}\right) \end{array} \right. \tag{5.1015}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}^2 \nu_{\mathrm{L}} N_{\mathrm{R}}^2 u_{\mathrm{L}}}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{p\,|\,r},\ \boxed{u\,|\,v}\ \epsilon^{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}rb} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}sc}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\ \boxed{u\,|\,v}\ \epsilon^{abc}\left(N_{\mathrm{R}u} C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}pa} C d_{\mathrm{L}rb}\right)\left(u_{\mathrm{L}sc} C \nu_{\mathrm{L}t}\right) \end{array} \right. \tag{5.1016}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}} e_{\mathrm{L}} \nu_{\mathrm{L}} N_{\mathrm{R}} u_{\mathrm{R}} u_{\mathrm{L}}}(1,3) \left| \begin{array}{l} \epsilon^{abc}\left(d_{\mathrm{L}pa} C e_{\mathrm{L}r}\right)\left(u_{\mathrm{L}sb} C \nu_{\mathrm{L}t}\right)\left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right) \\ \epsilon^{abc}\left(e_{\mathrm{L}r} C \nu_{\mathrm{L}t}\right)\left(N_{\mathrm{R}u} C u_{\mathrm{R}vc}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}sb}\right) \end{array} \right. \tag{5.1017}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}} d_{\mathrm{L}} \nu_{\mathrm{L}}^2 N_{\mathrm{R}} u_{\mathrm{L}}}(1,3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\ \epsilon^{abc}\left(d_{\mathrm{L}pa} C \nu_{\mathrm{L}s}\right)\left(u_{\mathrm{L}rb} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{R}uc} C N_{\mathrm{R}v}\right) \\ \mathcal{Y}\ \boxed{s\,|\,t}\ \epsilon^{abc}\left(\nu_{\mathrm{L}s} C \nu_{\mathrm{L}t}\right)\left(d_{\mathrm{R}uc} C N_{\mathrm{R}v}\right)\left(d_{\mathrm{L}pa} C u_{\mathrm{L}rb}\right) \end{array} \right. \tag{5.1018}$$

$$\mathcal{O}_{\bar{e}_{\mathrm{L}}^2 \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^3}(-1,-3) \left| \mathcal{Y}\ \boxed{\begin{smallmatrix}r\,|\,s\\t\end{smallmatrix}},\ \boxed{u\,|\,v}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} C \bar{e}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}\,r}^{a}\right)\left(\bar{u}_{\mathrm{R}\,s}^{b} C \bar{u}_{\mathrm{R}\,t}^{c}\right) \right. \tag{5.1019}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}} \bar{e}_{\mathrm{L}} \bar{\nu}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2}(-1,-3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{s\,|\,t}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} C \bar{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}\,t}^{c}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \bar{u}_{\mathrm{R}\,s}^{b}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{L}u} C \bar{\nu}_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}\,p}^{a} C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}\,s}^{b} C \bar{u}_{\mathrm{R}\,t}^{c}\right) \end{array} \right. \tag{5.1020}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}} \bar{e}_{\mathrm{L}} \bar{N}_{\mathrm{R}} \bar{u}_{\mathrm{R}}^2 \bar{u}_{\mathrm{L}}}(-1,-3) \left| \begin{array}{l} \mathcal{Y}\ \boxed{s\,|\,t}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{R}p} C \bar{u}_{\mathrm{R}\,s}^{a}\right)\left(\overline{N}_{\mathrm{R}r} C \bar{u}_{\mathrm{R}\,t}^{b}\right)\left(\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}\,v}^{c}\right) \\ \mathcal{Y}\ \boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\ \epsilon_{abc}\left(\bar{e}_{\mathrm{R}p} C \overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}\,s}^{a} C \bar{u}_{\mathrm{R}\,t}^{b}\right)\left(\bar{e}_{\mathrm{L}u} C \bar{u}_{\mathrm{L}\,v}^{c}\right) \end{array} \right. \tag{5.1021}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}^2}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{\,a}\right)\left(\overline{N}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^{\,a}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.1022}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}^2}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}p}C\bar{u}_{\mathrm{R}s}^{\,a}\right)\left(\overline{N}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{e}_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{R}s}^{\,a}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{e}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.1023}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2\bar{\nu}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}C\bar{u}_{\mathrm{R}t}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,c}\right)\end{array}\right.\tag{5.1024}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(-1,-3)\left|\begin{array}{l}\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{u}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\\[4pt]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{u}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.1025}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{e}_{\mathrm{L}u}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.1026}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,b}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.1027}$$

$$\mathcal{O}^{(1,2)}_{\bar{e}_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}\bar{u}_{\mathrm{R}}\bar{u}_{\mathrm{L}}^2}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{e}_{\mathrm{R}r}C\bar{u}_{\mathrm{R}t}^{\,a}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\bar{e}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,a}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.1028}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{L}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}\bar{u}_{\mathrm{L}}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,a}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,a}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.1029}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}^3\bar{u}_{\mathrm{R}}}(-1,-3)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}C\bar{u}_{\mathrm{R}t}^{\,a}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{d}_{\mathrm{L}v}^{\,c}\right)\right.\tag{5.1030}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}^2\nu_{\mathrm{L}}^2N_{\mathrm{R}}u_{\mathrm{R}}}(1,3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,\epsilon^{abc}\left(d_{\mathrm{L}pa}C\nu_{\mathrm{L}s}\right)\left(d_{\mathrm{L}rb}C\nu_{\mathrm{L}t}\right)\left(N_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,\epsilon^{abc}\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\left(N_{\mathrm{R}u}Cu_{\mathrm{R}vc}\right)\end{array}\right.\tag{5.1031}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{L}}}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{u}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\left(\bar{u}_{\mathrm{L}u}^{\,c}C\bar{\nu}_{\mathrm{L}v}\right)\end{array}\right.\tag{5.1032}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}\bar{e}_{\mathrm{R}}\bar{N}_{\mathrm{R}}^2\bar{u}_{\mathrm{L}}^2}(-1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}s\\t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\bar{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}s}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}s\,t\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{e}_{\mathrm{R}r}\right)\left(\bar{u}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\end{array}\right.\tag{5.1033}$$

$$\mathcal{O}_{\bar{d}_{\mathrm{R}}\bar{d}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^3\bar{u}_{\mathrm{L}}}(-1,-3)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\\t\end{smallmatrix}}\,\epsilon_{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{N}_{\mathrm{R}r}\right)\left(\bar{d}_{\mathrm{L}u}^{\,b}C\bar{u}_{\mathrm{L}v}^{\,c}\right)\right.\tag{5.1034}$$

$(\Delta B,\Delta L)=(\pm 1,\mp 3).$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{L}}^2\bar{\nu}_{\mathrm{L}}^2\bar{N}_{\mathrm{R}}u_{\mathrm{L}}}(1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{L}rb}Cu_{\mathrm{L}tc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon^{abc}\left(\bar{\nu}_{\mathrm{L}u}C\bar{\nu}_{\mathrm{L}v}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tc}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\end{array}\right.\tag{5.1035}$$

$$\mathcal{O}^{(1,2)}_{d_{\mathrm{R}}d_{\mathrm{L}}\bar{\nu}_{\mathrm{L}}\bar{N}_{\mathrm{R}}^2u_{\mathrm{L}}}(1,-3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}r\\s\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}r\,s\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}tb}\right)\left(\bar{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\end{array}\right.\tag{5.1036}$$

$$\mathcal{O}_{d_{\mathrm{R}}^2\bar{N}_{\mathrm{R}}^3u_{\mathrm{L}}}(1,-3)\left|\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\\s\end{smallmatrix}},\boxed{\begin{smallmatrix}u\\v\end{smallmatrix}}\,\epsilon^{abc}\left(\overline{N}_{\mathrm{R}p}C\overline{N}_{\mathrm{R}r}\right)\left(\overline{N}_{\mathrm{R}s}u_{\mathrm{L}ta}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\right.\tag{5.1037}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_{\mathrm{R}}^2\nu_{\mathrm{L}}N_{\mathrm{R}}^2\bar{u}_{\mathrm{R}}}(-1,3)\left|\begin{array}{l}\mathcal{Y}\,\boxed{\begin{smallmatrix}p\,r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon_{abc}\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{u}_{\mathrm{R}s}^{\,c}\right)\\[4pt]\mathcal{Y}\,\boxed{\begin{smallmatrix}p\\r\end{smallmatrix}},\boxed{\begin{smallmatrix}u\,v\end{smallmatrix}}\,\epsilon_{abc}\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{u}_{\mathrm{R}s}^{\,c}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\end{array}\right.\tag{5.1038}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}\bar{d}_\mathrm{L}\nu_\mathrm{L}^2 N_\mathrm{R}\bar{u}_\mathrm{R}}(-1,3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}\nu_{\mathrm{L}s}\right)\left(\overline{u}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\epsilon_{abc}\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\overline{u}_{\mathrm{R}r}^{\,b}\right)\end{array}\right. \tag{5.1039}$$

$$\mathcal{O}_{d_\mathrm{L}^3\bar{e}_\mathrm{L}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(1,-3)\left|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}sc}\right)\left(\overline{e}_{\mathrm{L}u}C\overline{\nu}_{\mathrm{L}v}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\right. \tag{5.1040}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}d_\mathrm{L}^2\bar{e}_\mathrm{R}\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}}(1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{e}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{\nu}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(\overline{e}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\end{array}\right. \tag{5.1041}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{L}^2\bar{\nu}_\mathrm{L}\bar{N}_\mathrm{R}^2 u_\mathrm{R}}(1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right],\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}uc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right],\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{\nu}_{\mathrm{L}v}u_{\mathrm{R}uc}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\end{array}\right. \tag{5.1042}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}d_\mathrm{L}^2\bar{e}_\mathrm{L}\bar{N}_\mathrm{R}^2}(1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right],\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{N}_{\mathrm{R}t}d_{\mathrm{L}rb}\right)\left(\overline{e}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right],\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{e}_{\mathrm{L}v}d_{\mathrm{R}uc}\right)\left(d_{\mathrm{L}pa}Cd_{\mathrm{L}rb}\right)\end{array}\right. \tag{5.1043}$$

$$\mathcal{O}^{(1,2)}_{d_\mathrm{R}^2 d_\mathrm{L}\bar{e}_\mathrm{R}\bar{N}_\mathrm{R}^2}(1,-3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right],\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}d_{\mathrm{L}pa}\right)\left(\overline{e}_{\mathrm{R}r}C\overline{N}_{\mathrm{R}t}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}s&t\end{smallmatrix}\right],\left[\begin{smallmatrix}u\\v\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{e}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{R}ub}Cd_{\mathrm{R}vc}\right)\end{array}\right. \tag{5.1044}$$

$$\mathcal{O}_{d_\mathrm{R}d_\mathrm{L}\bar{N}_\mathrm{R}^3 u_\mathrm{R}}(1,-3)\left|\mathcal{Y}\left[\begin{smallmatrix}r&s\\t\end{smallmatrix}\right]\epsilon^{abc}\left(\overline{N}_{\mathrm{R}s}C\overline{N}_{\mathrm{R}t}\right)\left(\overline{N}_{\mathrm{R}r}d_{\mathrm{L}pa}\right)\left(d_{\mathrm{R}ub}Cu_{\mathrm{R}vc}\right)\right. \tag{5.1045}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R}^3 e_\mathrm{L}N_\mathrm{R}^2}(-1,3)\left|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right],\left[\begin{smallmatrix}u&v\end{smallmatrix}\right]\epsilon_{abc}\left(N_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}s}^{\,c}e_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\right. \tag{5.1046}$$

$$\mathcal{O}_{\bar{d}_\mathrm{R}^3 e_\mathrm{R}\nu_\mathrm{L}N_\mathrm{R}}(-1,3)\left|\mathcal{Y}\left[\begin{smallmatrix}p&r\\s\end{smallmatrix}\right]\epsilon_{abc}\left(e_{\mathrm{R}u}CN_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}s}^{\,c}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\right. \tag{5.1047}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}^2\bar{d}_\mathrm{L}e_\mathrm{L}\nu_\mathrm{L}N_\mathrm{R}}(-1,3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}e_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right]\epsilon_{abc}\left(e_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\bar{d}_{\mathrm{L}u}^{\,c}N_{\mathrm{R}v}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\end{array}\right. \tag{5.1048}$$

$$\mathcal{O}^{(1,2)}_{\bar{d}_\mathrm{R}^2\nu_\mathrm{L}^2 N_\mathrm{R}\bar{u}_\mathrm{L}}(-1,3)\left|\begin{array}{l}\mathcal{Y}\left[\begin{smallmatrix}p&r\end{smallmatrix}\right],\left[\begin{smallmatrix}s\\t\end{smallmatrix}\right]\epsilon_{abc}\left(\bar{d}_{\mathrm{R}p}^{\,a}\nu_{\mathrm{L}s}\right)\left(\bar{d}_{\mathrm{R}r}^{\,b}\nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{\,c}N_{\mathrm{R}u}\right)\\ \mathcal{Y}\left[\begin{smallmatrix}p\\r\end{smallmatrix}\right],\left[\begin{smallmatrix}s&t\end{smallmatrix}\right]\epsilon_{abc}\left(\nu_{\mathrm{L}s}C\nu_{\mathrm{L}t}\right)\left(\overline{u}_{\mathrm{L}v}^{\,c}N_{\mathrm{R}u}\right)\left(\bar{d}_{\mathrm{R}p}^{\,a}C\bar{d}_{\mathrm{R}r}^{\,b}\right)\end{array}\right. \tag{5.1049}$$

6 Conclusion

In this paper, we investigated the operator basis in the νSMEFT and νLEFT frameworks, in which the SMEFT is extended with light sterile right-handed neutrinos, its mass ranging from KeV to tens of GeV. Of course, it is also valid for the right-handed neutrinos with mass of $\mathcal{O}(1)$ TeV if other new particles are much above $\mathcal{O}(1)$ TeV. We briefly review the Young tensor method introduced in a series of our work [5, 7, 12]: starting from the spinor-helicity formalism and the amplitude-operator correspondence, and then exhibiting the Lorentz and gauge structure construction of operators using Young tableaux. We utilize this method to obtain the complete and independent operator basis in νSMEFT and νLEFT up to dimension 9, and illustrate the whole procedure with a specific example of a dimension 9 operator type $LN_\mathbb{C}^3 HD^2$. Following the same procedure, we listed all the explicit operators in section 4 and section 5. We also discussed the differences between the Dirac neutrinos and the Majorana neutrinos, which directly relates to the lepton number U(1)$_L$. If the lepton number U(1)$_L$ violating operators are turned on in the νSMEFT and νLEFT, the neutrinos should be recognized as Majorana neutrinos, otherwise the neutrinos are Dirac.

At the mass dimension 5, 6, 7, 8, 9 in the νSMEFT, we found that there are 2, 29, 80, 323, 1358 independent operators involving the right-handed neutrino for one generation of

fermions, and 18, 1614, 4206, 20400, 243944 flavor-specified independent operators involving the right-handed neutrinos for three generation of fermions, as shown in table 3, 4 and 5. In the νLEFT with the top quark integrated out, at the mass dimension 5, 6, 7, 8, 9, we found that there are 24, 5223, 3966, 25425, 789426 independent operators involving the right-handed neutrinos for two generations of up-type quarks and three generations of all other fermions, as shown in table 6 and 7.

The operator bases in the νSMEFT and νLEFT can be applied to various physical processes and give rise to new contributions in addition to those of SMEFT and LEFT. The νSMEFT and νLEFT have been applied to study various processes involving light sterile neutrinos at the future colliders and various precision experiments. With the complete operator bases written down, more physical processes are expected to be explored within the framework of νSMEFT and νLEFT, such as various lepton and baryon number violating processes with sterile neutrinos. Furthermore, the renormalization group (RG) running equations in the νSMEFT and νLEFT [41–43], and the matching between the νSMEFT and the νLEFT [19, 20] has been investigated up to the dimension 6, although the full RG running equations are still under construction. After all the above theoretical setup equipped, it would be ready to explore light sterile neutrino related processes involving several scales in the EFT framework.

Acknowledgments

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