Conformal Symmetry in the Weyl Theory.

Addendum:

Remark Concerning the Hamiltonian Operator for a Weyl Neutrino.

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Recently I developed a new teory of the Weyl neutrino based on position and momentum operators written in terms of Dirac matrices ⁽¹⁾. The purpose of this letter is to examine some properties of the Hamiltonian operator in such a theory with regard to self-consistency.

The Hamiltonian operator for the massless neutrino is given by SAKURAI ⁽²⁾

$$(1) \quad H = \frac{\gamma_0 \boldsymbol{\gamma} \cdot \nabla}{i}$$

in the notation of ref. ⁽¹⁾. Transforming to momentum space, we have

$$(2) \quad H := \gamma_0 \boldsymbol{\gamma} \cdot \boldsymbol{p}.$$

Substituting the expression for $\boldsymbol{p}$ in terms of Dirac matrices according to our previous work

$$(3) \quad \boldsymbol{p} = -\frac{1}{2} \gamma_0 \boldsymbol{\gamma} (1 - \gamma_5)(E),$$

where E = neutrino energy, we find

$$(4) \quad H = (E)(1 - \gamma_5).$$

The Hamiltonian operator in eq. (4) above commutes with all the angular-momentum operators given by $\boldsymbol{S}$ in ref. ⁽¹⁾.

⁽¹⁾ S. BERGER: *Lett. Nuovo Cimento*, **11**, 89 (1974).

⁽²⁾ J. J. SAKURAI: *Advanced Quantum Mechanics* (Reading, Mass., 1967).