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SYMBOL INDEX

$\ker f$	kernel of a linear map f , 3
$\text{Im } F$	image of f , 3
\cong	isomorphism (for algebras, modules), 3
\oplus	direct sum (for algebras, modules), 4
L_x	left multiplication by x , 4
R_x	right multiplication by x , 4
$\text{Hom}_F A$	algebra of linear transformations on A over F , 4
$M(A)$	multiplication algebra of an algebra A , 4
$R(A)$	radical of A , 6
$T(A)$	intersection of all maximal ideals of A , 7
$A^{(m)}$	derived series of A , 8
$\text{Rad } A$	solvable radical of A , 8
$\text{char } F$	characteristic of a field, 8
\otimes	tensor product, 9
A_K	scalar extension of A to K , 9
$[x, y]$	$xy - yx$, commutator in an algebra, 9
(x, y, z)	$(xy)z - x(yz)$, associator, 9
$N(A)$	nucleus of an algebra A , 9, 63
$Z(A)$	center of A , 9, 63
$\Gamma = \Gamma(A)$	centroid of A , 9
\mathbb{Z}	ring of integers, 9
$\text{Hom}_{\mathbb{Z}} A$	ring of additive maps on A , 9
A^K	scalar descent of A to K , 10
$\dim_F A$	dimension of A over F , 10
$n(x)$	norm of x in an algebra, 14
$t(x)$	trace of x in an algebra, 14
$x \rightarrow \bar{x}$	involution in an algebra, 14
$Q = Q(\alpha, \beta)$	generalized quaternion algebra, 16, 71
$C = C(\alpha, \beta, \gamma)$	Cayley-Dickson algebra over F , 16, 61
$C(F)$	split Cayley-Dickson algebra over F , 17, 98

- $M_n(F)$ algebra of $n \times n$ matrices over F , 17, 53
 \mathbb{R} field of real numbers, 18
 \mathbb{C} field of complex numbers, 18
 $J(x, y, z)$ Jacobian in an algebra, 21, 192
 A^- algebra with product $[x, y]$ in A , 21, 52, 93
 $S(x, y, z)$ cyclic associator sum, 21
 $\text{Der } A$ derivation algebra of A , 22, 137
 ad_x adjoint map by x in A , 22
 $\text{Hom}_L(U, V)$ space of L -module homomorphisms, 23, 24
 $sl(n, F)$ Lie algebra of $n \times n$ trace zero matrices, 25
 $x \# y$ symmetric product on $sl(n, F)$, 25
 $m(x, y, z, t)$ Malcev identity, 26
 $M(\alpha, \beta, \gamma)$ central simple Malcev algebra of dimension 7, 28
 $M(F)$ central simple split Malcev algebra, 29
 $\mathcal{L}(A)$ Lie multiplication algebra of an algebra A , 30
 $\text{IDer } A$ inner derivation algebra of A , 30, 165
 N J -nucleus of a Malcev algebra, 30
 $d(x, y)$ inner derivation of a Malcev algebra, 31
 G_2 central simple Lie algebra of type G_2 , 32, 114, 181
 $x \circ y$ $\frac{1}{2}(xy + yx)$, anticommutator, 32, 60, 93
 A^+ algebra with product $x \circ y$, 32, 52, 107
 $A(a)$ (left) a -homotope of A , 33, 52, 93
 $x * y$ $(xp)y - (yq)x$, left (p, q) -mutation product, 33, 52, 93
 $A(p, q)$ (left) (p, q) -mutation of A , 33
 A^{op} opposite algebra of A , 33
 $[x, y]^*$ commutator in $A(p, q)$, 34, 52, 93
 $(x, y, z)^*$ associator in $A(p, q)$, 35, 58, 104
 $\{x, y\}^*$ anticommutator in $A(p, q)$, 40, 52, 93
 SJ class of special Jordan algebras, 41, 187
 $\bar{X} = (\bar{x}_{ij})^t$ hermitian conjugate of a matrix X , 41
 $H_n(A)$ space of $n \times n$ hermitian matrices over A , 41
 $H_3(C)$ Albert algebra, 41
 $A(\lambda)$ $(\lambda, 1 - \lambda)$ -mutation of A , 45
 $P(A)$ prime radical of A , 52
 $J(A)$ Jacobson radical of A , 52, 94
 $\Lambda(p, q)$ $\{L_p R_p, L_p R_q, L_q R_p, L_q R_q\}$, 54, 95
 $R^0(p, q)$ $\{x \in A : \Lambda(p, q)x = 0\}$, 54, 95
 $J(p)$ $\{x \in A : x * A(p, p) \subseteq R^0(p, p)\}$, 54
 $R^0(p)$ $R^0(p, p) = R^0(p, 0)$, 54, 150
 $M_{r \times s}(D)$ space of $r \times s$ matrices over D , 54

- $M_{r \times s}(D)(u, v)$ twisted mutation algebra, 55, 79
 $R(p, q)$ $\{x \in A : \Lambda(p, q)x \subseteq R(A)\}$, 56, 95
 $J(p, q)$ $\{x \in A : x * y, y * x \in R(p, q) \text{ for all } y \in A\}$, 56, 95
 \subset proper containment, 58, 98, 198
 x^{*k} k th power of x in the product $*$, 59
 $K(B)$ commutative center, 63
 $K_2(B)$ double commutative center, 63
 L_x^*, R_x^* left, right multiplication in $A(p, q)$ by x , 72
 $\Gamma_{p, q}$ centroid of $A(p, q)$, 72, 129
 $l(H), r(H)$ left, right annihilator of H , 76
 D^r vector space of r -tuples over D , 79
 A_{ij} Peirce space, 96, 204
 $su(3)$ compact special unitary algebra, 114, 181
 $\text{Aut } B$ automorphism group of an algebra B , 137
 A^\times group of invertible elements in A , 138, 158
 $\text{Aut}_S B$ $\{\varphi \in \text{Aut } B : \varphi(x) = x \text{ for all } x \in B\}$, 141
 $\text{Der}_S B$ $\{d \in \text{Der } B : d(S) = 0\}$, 141
 $\{abc\}$ $abc + cba$, 143
 id identity map, 159
 \mathbb{Z}_2 cyclic group of order 2, 164
 $Z_A(S)$ centralizer of S in A , 165
 i_a inner automorphism, $i_a(x) = axa^{-1}$, 165
 $\text{IAut } A$ inner automorphism group of A , 165
 \mathbb{H} division algebra of real quaternions, 172
 $O(V)$ orthogonal group, 174
 $o(V)$ orthogonal algebra, 174
 $SU(3, K)$ special unitary group, 178
 $SL(3, F)$ special linear group, 178
 $su(3, K)$ special unitary algebra, 180
 $SU(3)$ compact special unitary group, 181
 $F[X]$ free nonassociative algebra on a set X , 183
 $I(U)$ set of identities satisfied by a class U of algebras, 183
 $V(S)$ variety defined by a set S of identities, 184
 $\langle U \rangle$ variety generated by U , 184
 Mut class of all mutations of associative algebras, 184
 $[S]$ T -ideal generated by S , 184
 \mathbb{Z}^+ set of nonnegative integers, 185
 $F^{[n_1, \dots, n_m]}[X]$ space of elements in $F[X]$ of degree $[n_1, \dots, n_m]$, 185
 $F_{(r, s)}^{[n_1, \dots, n_m]}[X]$ space of elements of type $\binom{[n_1, \dots, n_m]}{(r, s)}$, 186
 Ass variety of associative algebras, 187

LIE	variety of Lie algebras, 187
Ass^+	$\{A^+ : A \in Ass\}$, 187
Ass^-	$\{A^- : A \in Ass\}$, 187
$Ass[X]$	free associative algebra on X , 187
$Mut[X]$	mutation algebra generated by X , 187
ψ	canonical homomorphism : $F[X] \rightarrow Mut[X]$, 187
$\Psi_{(r,s)}^{[n_1, \dots, n_m]}$	gradation component of $\ker \psi$, 187
$F_+[X]$	free commutative algebra on X , 192
$F_-[X]$	free anticommutative algebra on X , 192
$j(x, y)$	Jordan identity, 193
\mathcal{M}	variety defined by four identities, 198, 205
LJ	variety of Lie- and Jordan-admissible algebras, 198
(V, λ, ρ)	module for an algebra, 201
$\tilde{A}_{ij}(e) = \tilde{A}_{ij}$	Peirce space in $A(p - q)$, 204

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