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Associative and Lie algebras of quotients. (English)

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In 2001 *C. Martínez* gave a necessary and sufficient Ore-like conditions for the existence of algebras of fractions of linear Jordan algebras, see [J. Algebra 237, 798–812 (2001; Zbl 1006.17024)]. Following theses ideas, several authors began to study rings or algebras of quotients in the nonassociative setting. Among others, *M. Siles Molina* introduced a notion of algebras of quotients in the Lie setting [J. Pure Appl. Algebra 188, 175–188 (2004; Zbl 1036.17006)], *E. García* and *M. Gómez-Lozano* defined a notion of Martindale-like quotients in the Jordan setting [J. Pure Appl. Algebra 194, 127–145 (2004; Zbl 1127.17027)], and *J. Bowling* and *K. McCrimmon* gave a quadratic extension of Martínez' paper in [J. Algebra 312, 56–63 (2007; Zbl pre05166668)]. In this paper, the authors relate the notion of Lie algebra of quotients with certain associative quotients:
(1) When the Lie algebra is the symmetrization of an associative algebra R (if R is associative, R^- with product $[x, y] := xy - yx$ is a Lie algebra) and $R \subset Q \subset Q_s(R)$ where $Q_s(R)$ denotes the Martindale symmetric ring of quotients of R, the authors prove that $Q^-/Z(Q)$ is a Lie algebra of quotients of $R^-/Z(R)$ (where $Z(\ )$ denotes the center).
(2) If L is a Lie algebra with $Z(L) = 0$, L can be considered as a subalgebra of $\mathrm{End}(L)^-$ via the adjoint representation. If Q is a Lie algebra of quotients of L, they show that the associative subalgebra $A(Q)$ of $\mathrm{End}(Q)^-$ generated by Q is a left quotient algebra of $A_0 = \{\mu \in A(Q) \mid \mu(L) \subset L\}$ which contains all the elements ad_x, $x \in L$.

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16U20 Rings of quotients (assoc. rings and algebras)