Remarks on Ideals in Lower-Bounded Dually Residuated Lattice-Ordered Monoids

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Abstract

Lattice-ordered groups, as well as GMV-algebras (pseudo MV-algebras), are both particular cases of dually residuated lattice-ordered monoids (DRℓ-monoids for short). In the paper we study ideals of lower-bounded DRℓ-monoids including GMV-algebras. Especially, we deal with the connections between ideals of a DRℓ-monoid \( A \) and ideals of the lattice reduct of \( A \).

Key words: DRℓ-monoid, ideal, prime ideal.

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In 1965, K. L. N. Swamy [11] introduced the notion of a (commutative) dually residuated lattice-ordered semigroup in order to capture the common features of Abelian lattice-ordered groups and Brouwerian algebras. It turns out that well-known MV-algebras [1], an algebraic version of the Lukasiewicz infinite valued propositional logic, can be considered as certain bounded commutative DRℓ-monoids [7, 8]. The present concept of a (non-commutative) DRℓ-monoid is due to T. Kovář [3]:

Definition 1 An algebra \((A; +, 0, \lor, \land, \rightarrow, \leftarrow)\) of type \((2, 0, 2, 2, 2, 2)\) is said to be a dually residuated lattice ordered monoid (simply, a DRℓ-monoid) if