16. On Coaxial Filters of Almost Distributive Lattices

By

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In 1854, Boole's introduced two valued prepositional calculus, after that many generalisations of the class of Boolean algebras (rings) have come to light. Among them regular rings (Von Neumann (1936)), p-rings (McCoy and Montgomery (1937)) and associate rings (Sussman (1958)) are worth mentioning. Further in 1963, the class of triple systems has been introduced by Subrahmanyam as a lattice theoretic generalisation of p_1 rings. For most of the results that are valid in triple systems the additive semigroup structure in the triple system does not play any role. This was motivated Maddana Swamy and Rao to introduce the class of almost distributive lattices and the concept of an ideal in an ADL.

It is analogous to that in a distributive lattice and it was observed that the set *PI (L)* of all principal ideals of L forms a distributive lattice. This provided a path to extend many existing concepts of lattice theory to the class of ADLs. In 2018, Rafi and Ravi Kumar thoroughly investigated certain significant properties of dual annihilators, dual annihilator filters and μ-filters of almost distributive lattices.

The notions of coaxial filters and strongly coaxial filters are introduced in this paper in terms of dual annihilators of ADLs. Dual annihilators and maximum ideals of ADLs are utilized to characterize dually normal ADLs once more. For each ADL filter to become a coaxial filter, a set of equivalent conditions is derived. The concept of normal prime filters is presented and it can be seen that every normal prime filter is both a coaxial filter and a minimum prime filter. Some coaxial filter features are derived in terms of inverse homomorphic images and cartesian products. The concept of ADLs that are weakly dually normal is introduced. For every weakly dually normal ADL to become a dually normal ADL, some analogous requirements are derived. For each ADL filter to become a strongly coaxial filter, a set of equivalent conditions is derived. Finally, for the class of all strongly coaxial filters of an ADL to constitute a sublattice of the filter lattice, a set of analogous conditions is deduced.

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