

Abstract

Title :- A STUDY OF CONGRUENCES ON SEMINEARRINGS

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The present work is a study of congruences on different classes of seminearrings which, among others, comprises various characterization theorems. Firstly, near-ring congruences on additively regular seminearrings have been studied. In this study a lattice isomorphism has been obtained between the set of all normal full k -ideals and that of all near-ring congruences in distributively generated additively regular seminearrings. The lattice of near-ring congruences has subsequently been studied. Since the seminearring $M(S)$, one of the most naturally arising seminearrings, of self maps of an additive semigroup S is an additively regular seminearring if and only if S is a regular semigroup, a large class of seminearrings arises naturally to be non-additively regular. Propelled by this fact, near-ring and zero-symmetric near-ring congruences on seminearrings which need not be either additively regular or distributively generated have been studied by obtaining inclusion preserving bijective correspondences between the set of all zero-symmetric near-ring congruences (near-ring congruences) and the set of all generalised strong dense reflexive k -ideals (resp., right k -ideals). Further some sufficient conditions (*viz.*, existence of left local units, being E^+ -inversive) have been obtained imposition of which on the seminearrings under consideration ensures that the set of all zero-symmetric near-ring congruences (near-ring congruences) form lattices so that the above correspondences turn out to be lattice isomorphisms. A detailed study of these lattices has been accomplished alongside. Since E -inversive semigroup generalizes regular semigroup and the theory of seminearrings is greatly influenced by the development of semigroup theory, the structure theorem of full subdirect product of a semilattice and a group in terms of E -inversive semigroups motivates us to characterize full subdirect product of a bi-semilattice and a (zero-symmetric) near-ring and subdirect product of a distributive lattice and a (zero-symmetric) near-ring in terms of E^+ -inversive seminearrings. To conclude the work, the relationships among various classes of E^+ -inversive seminearrings have been discussed.

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