ABSTRACT

"Some aspects of different types of centers of semirings"

Ph.D. Thesis submitted by
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Center plays an important role in the structure of group theory, algebraic geometry, structure of ring theory as well as the structure of semiring. There has been significant works on the center of semiring that had notable impact in derivation of semiring. In this thesis we survey and introduce some concepts of different types of centers of semirings. We aim to shed light on aspects of the structural properties of different class of centers of semirings. Here different characterizations for that centers of semirings have been done. Further some algebraic characterizations of certain classes of centers semirings are studied.
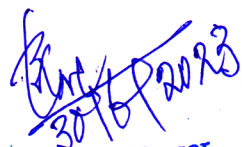
First, the concept of Birkhoff center of c-semiring is discussed. The concept of Birkhoff center of semigroup was intoduced by Swamy and Murti. In this thesis we have extended the Birkhoff center to a c-semiring S as the set of elements in S which are of the form $(1,0)$ under some factorisation of S as direct product of c-semiring S_1 with identity element 1 and a c-semiring S_2 with zero element 0 and study various properties of the Birkhoff center of c-semiring. We have also showed that Birkhoff center of c-semiring froms a distributive lattice.

Let S be a semiring. An element $e \in S$ is called an almost idempotent if $e + e^2 = e^2$. The set of all almost idempotents of a semiring S will be denoted by $E_c(S)$. This was introdced by M.K. Sen and A.K. Bhuniya. The impetus behind the formation of the proposed class of center of semiring called almost idempotent center of semiring, which is the generalization of the set of almost idempotents and the center of semiring. We have analyzed the center of the semiring and established that almost idempotent center of semiring forms a distributive lattice in a certain condition.

Also we have studied some special center-like subsets which we call h-center of semiring, k-center of semiring, generalized center of semiring and hypercenter of semiring. Besides we have characterized that centers of semirings. Also we have established relationship among the Birkhoff center of c-semiring, almost idempotent center of semiring, k-center of semiring, generalized center of semiring and hypercenter of semiring.

Let S be a semiring with center $Z(S)$. If S is commutative then $S = Z(S)$. This result have inspired us to develop a new type of semirings called almost idempotent central semiring, h-central semiring, k-central semiring, generalized central semiring and hypercentral semiring in which the whole semiring coincide with its corresponding center. Also we have studied some structural properties of those semirings. At long last, we have determined the connection between the almost idempotent central semiring, the h-central semiring and the k-central semiring.

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