

Study of Certain Ternary Algebraic Structures

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Index No.: 152/18/MATHS/26

Abstract

This thesis deals with the study of ternary semigroups and ordered ternary semigroups. The thesis consists of 7 chapters. **Chapter 1** discusses the background and motivation of the study. Also it gives all the required definition and results from ternary semigroups and ordered ternary semigroups. In **Chapter 2**, our focus is to characterize various kind of regularities in ordered ternary semigroup by different ideals. We show the way to get into some results of ordered ternary semigroup based on quasi-ideals, bi-ideals and semiprime ideals. In **Chapter 3**, we mainly study the connection between a ternary semigroup S and the semigroup cover $Q(S)$ of the ternary semigroup S by using various ideals. We further introduce a partial order relation in $Q(S)$ and study various lattice structures. In **Chapter 4**, we consider a power ternary semigroup $P(S)$ associated with a ternary semigroup S and study some properties of $P(S)$. Also we study the notion of ordered power ternary semigroup $\mathcal{P}(S)$ and our main aim is to establish some interconnection between the properties of a ternary semigroup S and the associated ordered ternary semigroup $\mathcal{P}(S)$. In **Chapter 5**, our focus is to characterize the structures of lattices in special class of regular ternary semigroup, called ternary semigroup of mappings and denoted by $T[X, Y]$. Then we discuss the isomorphism problem. In **Chapter 6**, we introduce the concept of right chain ordered ternary semigroup. Our main aim to study right chain ordered ternary semigroup in terms of prime ideals, completely prime ideals and prime segment. **Chapter 7** is devoted to introduce the concept of (n, m, l) -ideal in ordered ternary semigroup. Also we characterize (n, m, l) -regular ordered ternary semigroups. We study the notion of quasi-prime, strongly quasi-prime, irreducible and strongly irreducible (n, m, l) -ideal in (n, m, l) -regular ordered ternary semigroup.

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18/10/2022

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18/10/2022
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