Behavior of Prime (Ideals)Filters of Hyperlattices under the Fundamental Relation

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Abstract

The purpose of this note is the study of some lattice properties such as distributivity and dual distributivity under the fundamental relation. Also, we investigate the behavior of prime (resp. ideals) filters under fundamental relation in hyperlattices. In particular, we construct a one to one correspondence between the prime (resp. ideals) of a hyperlattice L containing ω_ϕ, the heart of L, and the prime (resp. ideals) filters of the fundamental lattice $L\backslash\varepsilon^*$.

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1 Introduction

Hyperstructures theory was first introduced by F. Marty in the eighth congress of Scandinavians in 1934 [8]. This theory has been developed in various fields. R. Ameri and Zahedi in [1] introduced and studied hyperalgebraic systems as a general form of algebraic hyperstructures; R. Ameri and Nozari studied relationship between the categories of multialgebra and algebra [2]. Also, Ameri and Rosenberg studied congruences and strongly congruences of multialgebras [3]. The theory of hyperlattices, as a class of multialgebras, was introduced by Konstantinidou in [6]. Rahnemaei Barghi considered the prime ideal theorem for distributive hyperlattices in [9]. In [5], B. B. N. Koguep, C. Nkuimi, and C. Lele studied fuzzy ideals(filters) in hyperlattices. Rasouli and Davvaz in [10] introduced and studied fundamental relation on hyperlattices. In this note, we studied prime (resp. ideals) and filters. Also, we use the fundamental relation ϵ^* on a given hyperlattice L, as the smallest equivalence relation on L, such that the quotient $L\backslash\epsilon^*$ is a lattice, and study the behavior of (rep. dual)distributivity under this quotient. Also, we study the relationship prime filters and ideals of L and fundamental lattice $L\backslash\epsilon^*$.

Recall that for a nonempty set H, a *hyperoperation* on H is a mapping from $H \times H$ into $P^\star(H)$, where $P^\star(H)$ is the set of all nonempty subsets of H.

Definition 1.1. [6] Let L be a nonempty set, " $\wedge$ " be a binary operation, and " $\vee$ " be a hyperoperation on L. Then L is called a hyperlattice, if for all $a, b, c \in L$ the following conditions hold:

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