Soft Hyper Filter In Join Hyper Lattices

Akshaya.G[1], Senthamil Selvi.V[2]
[1, 2] Dept of Mathematics
[1, 2]Thassim Beevi Abdul Kader College for Women, kilakarai

Abstract- *The main idea followed in this paper is soft hyper filter in join hyper lattices. In this we worked some theorem related to the concept and give some definition related to the concept.*

I. INTRODUCTION

In this paper we introduce soft hyper filter and join hyper filter, and study some properties of them. Some of the authors already proved definition of join hyper lattices and few theorems related to join hyper lattices; here we give some definition and theorem soft hyper filter in join hyper lattice.

Definition 1.1:

Let Z be a universe set and E be a set of parameters. Let P(Z) be the power set of Z and $S \subseteq E$. A pair (F, S) is called a soft set over X, where S is a subset of the set of parameters E and $F : S \to P(Z)$ is a set-valued mapping.

Example 1.2:

Let I = [0, 1] and E be all convenient parameter sets for the universe Z. Let Z denote the set of all fuzzy sets on Z and $S \subseteq E$.

Definition 1.3:

A pair (f, S) is called a fuzzy soft set over X, where A is a subset of the set of parameters E and $f : S \to I X$ is a mapping. That is, for all $a \in A$, $f(a) = fa : X \to I$ is a fuzzy set on X.

Definition 1.4:

Let $(L,\leq)$ be a non-empty partial ordered set and $\cup : L\times L \to \rho(L)*$ be a hyper operation, where $\rho(L)$ is a power set of L and $\rho(L)* = \rho(L)\backslash\{\emptyset\}$ and $\cap : L\times L \to L$ be an operation. Then $(L, \vee, \wedge)$ is a join hyperlattice if for all $a,b,c \in L$,

(i)$a\in a\cup a, a\cap a = a$;

(ii)$a\cup b = b\cup a, a\cap b = b\cap a$;

(iii)$(a\cup b) \cup c = a\cup (b\cup c); (a\cap b) \cap c = a\cap (b\cap c)$;

(iv) $a\in [a\cap (a\cup b)]\cap[a\cup (a\cap b)]$;

(v) $a\in a\cup b \Rightarrow a\wedge b = b$;

where for all non-empty subsets A and B of L, $A\wedge B = \{a\cap b \mid a \in A, b \in B\}$ and $A\vee B = \cup\{a\cup b \mid a \in A, b \in B\}$

Definition 1.5:

Let $(L,\vee,\wedge)$ is a join hyperlattice. A Partial ordering relation $\leq$ is defined on L by $x \leq y$ if and only if $x\cap y = x$ and $x \cup y = y$.

Definition 1.6:

A Nonempty subset F of a join hyperlattice L is called a Filter of L if

(i)$a\cap b \in F$ and $a\cup x \in F$
(ii)$a\in F$ and $a \leq b$ then $b \in F$

Properties of filters 1.7:

A Filter F of L is a subset $F \subseteq L$ with the following properties:
(i) $1 \in F$
(ii) $a\in F$ and $a \leq b$, $b \in L$ then $b \in F$
(iii)If a , $b \in F$ then $ab\in F$

Definition 1.8: Let $(L,\vee,\wedge)$ is a join hyperlattice. For any $x \in L$ the set $\{x\in L \mid a \leq x\}$ is a filter, which is called as a principal filter generated by a.

II. SOFT HYPERFILTERS IN JOIN HYPERLATTICES

In this section, we will introduce soft hyper filters in join hyperlattice and give several interesting examples of them.

Definition 2.1: Let L be a nonempty set and P∗(L) be the set of all nonempty subsets of L. A hyper operation on L is a map $\circ : L\times L \to P*(L)$, which associates a nonempty subset $a\circ b$ with any pair (a,b) of elements of $L\times L$. The couple $(L,\circ)$ is called a hyper groupoid.

DEFINITION2.2:

Let L be a non empty set endowed with two hyper operations "$\wedge$" and "$\oplus$". The triple (L, $\wedge$,$\vee$) is called a join hyper lattice if the following relation shold : for all a, b, c ∈ L,

(1) $a \in a \wedge a, a \in a \vee a$;

(2)$a \wedge b = b \wedge a, a \vee b = b \vee a$;

(3)$(a \wedge b) \wedge c = a \wedge (b \wedge c), (a \vee b) \vee c = a \vee (b \vee c)$

(4)$a \in a \wedge (a \vee b), a \in a \vee (a \wedge b)$.

Definition2.3:

Let(L, $\wedge$,$\vee$) be a join hyper lattice and A be a non-empty subset of L. A is called a $\vee$- hyper filter of L if for all a,b ∈ A and x ∈ L,

(i) $a \vee b \subseteq A$ and $a \wedge x \subseteq A$

(ii) $a \in A$ and $a \leq b$ then $b \in A$

Definition2.4:

Let(L, $\wedge$,$\vee$) be a join hyper lattice and A bean on-empty subset of L.A is called a $\wedge$-hyper filter of Liff or all a,b∈A and x∈L,

(i)$a \wedge b \subseteq A$ and $a \vee x \subseteq A$

(ii)$a \in A$ and $a \leq b$ then $b \in A$

We now introduce the or ems of hyper filters.

THEOREM2.5:

Any$\vee$hyper filter A of a join hyperlattice L satisfies, If a$a \in A$ and $a \leq b$ then $b \in A$.

Proof:

Given (L,$\wedge$,$\vee$) be a join hyperlattice and A is a $\vee$ hyperfilter of L .

Assume that for all $a \in A$ and $a \leq b$.

Take (ab) = 1$\in$A imples ab $\in$A so that b$\in$A when a$\in$A.

Hence proved.

Theorem2.6:

In a join hyper lattice (L, $\wedge$,$\vee$),every filter is a$\vee$ hyper filter

Proof:

Given, (L,$\wedge$,$\vee$) be a join hyperlattice and A be any filter of L. Let a,b$\in$A.

Take $b(a \vee b) = ba \vee bb = ba \vee 1 = ba \geq a$ implies that $b(a \vee b) \geq a$ and $b(a \vee b) \in A$ implies that $a \vee b \in A$;

Similarly when x$\in$ implies that a$\vee$ x$\subseteq$A(By the previous theorem) For all a$\in$A and a$\leq$b implies that b$\in$A

From the above two result A is a$\vee$ hyperfilter.

Hence proved.

Definition2.7:

Let (L,$\wedge$,$\vee$) be a hyper filter and (F,A) be a soft set over L,(F,A) is called a $\vee$ soft hyper filter over L, if F(x) is $\vee$ hyper filter of L for all x$\in$ sup(F,A)

Definition2.8:

Let (L,$\wedge$,$\vee$) be a hyper filter and (F,A) be a soft set over L,(F,A) is called a soft $\wedge$ hyper filter over L, if F(x) is $\wedge$ hyper filter of L for all x$\in$sup (F,A)

Example2.9:

Let μ be a fuzzy $\vee$ hyper filter of a join hyperlattice (L,$\vee$,$\wedge$) the fuzzy set of μ satisfies the following condition:

Forallx,y$\in L$(i)$\bigcup$μ(z)≥μ(x)$\cap$ μ(y)

(ii)$\bigcup$μ(z)≥μ(x)$\cap$μ(y)

Clearly μ is a fuzzy $\vee$ hyper filter of L. if and only if for all t[0,1] with ≠ 0.

Let, μ_t={x$\in$L|μ(x)≥t} is a $\vee$ hyper filter of L. and F(t)={x$\in$L|μ(x)≥t} for all t$\in$ [0,1] and F(t) Is a $\vee$ hyper filter of L.

Note:

Every fuzzy $\vee$ hyperfilter ($\wedge$ hyperfilter) can be intrepretd as soft $\vee$ hyperfilter($\wedge$ hyperfilter)

Theorem2.10:

If (L,$\wedge$,$\vee$) is a join hyperlattice and (F,L) denote a soft set over L, then the following conditions hold:

(i) (F,L) is a soft $\vee$ hyper filter of L

(ii)(F',L) is a soft $\wedge$ hyper filter of L

Proof:

(i) By hypothesis, $(L,\wedge,\vee)$ be a join hyperlattice .so clearly $(L,\wedge,\vee)$be a lattice.Now define two hyperoperations on L .For all a , b $\in$L therefore, $a\wedge b = \{ x\in L \mid a\cup x = b\cup x = a\cup b \}$ and $a\vee b = \{ x\in L \mid x \leq a \cap b \}$

For all $a\in L$, define a principal filter generated by a ,$I(a) = \{ x\in L \mid x \leq a \} = a$.

Hence I(a) is a $\vee$ hyperfilter of the join hyperlattice L. Now define a map F: $L\longrightarrow P(L)$ by , $F(a) = I(a) = \downarrow a$ for all $a\in L$(By definition of Softset)then (F,L) becomes a soft $\vee$ hyperfilter over L.

(ii) By hypothesis, $(L,\wedge,\vee)$ be a join hyperlattice .so clearly $(L,\wedge,\vee)$be a lattice. Now define two hyperoperations on L .

For all a , $b\in L$, $a\wedge b = \{ x \quad L \mid a\cup b \leq x \}$ and $a\vee b = \{ x\in L \mid a\cap x= b\cap x=a\cap b\}$

For all $a\in L$, define a principal filter generated by a ,$F(a) = \{ x\in L \mid x \geq a \} =\uparrow a$.

Hence F(a) is a $\wedge$ hyperfilter of the join hyperlattice L. Now define a map F': $L\longrightarrow P(L)$ by ,$F'(a) = F(a) =\uparrow a$ for all $a\in L$(By definition of Softset)then (F',L) becomes a $\wedge$ soft hyperfilter over L.

Hence proved.

REFERENCES

[1] J. Jantosciak, Transposition hypergroups: noncommutative join spaces, Journal of Algebra, 187 (1977) 97-119.

[2] S.Nanda, fuzzy Lattice,Bull.cal. Math.soc.,81(1989).

[3] H.Aktas,N.cagman,soft sets and soft groups,Information science,177(2007), No.13,2726-2735.