L-Vague Semirings of L-Semiring

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Abstract – *In this paper we introduce L-vague semirings of L-semirings, and stud-ied their properties. These concepts are used in the development of some important results and theorems about L-vague semirings of L-semiring. Also some of their important properties have been investigated.*

Keywords – *Vague set , L-vague set ,L-vague cut-set, Vague group,L-vague group, L-vague semiring, L-vague ideal.*

Mathematics Subject Classification (2000): 08A72

I. INTRODUCTION

The concept of Lattice was first defined by Dedekind in 1897 and then developed by Birkhoft.G,., imposed an operation an open problem "Is there a common abstraction which includes Boolean algebra, Boolean rings and lattice ordered group or L-group is an algebraic structure connecting lattic and group.To answer this problem many common abstractions, namely dually residuated lattice ordered semigroups,commutative lattice ordered groups. lattice ordered rings,latice ordered near rings and lattice ordered semirings are presented.Amoung them the algebraic structure lattice ordered semirings or L-semiring was introduced by Ranga Rao.P.,[13].Also the concept proposed by Zadeh.L.A.[16] defining a fuzzy subset A of a given universe X characterizing the membership of an element x of X belonging to A by means of a membership function $\mu_A(x)$ defined from X in to [0 1] has revolutionized the theory of Mathematical modeling. Decision making etc.,in handling the imprecise real life situations mathematically. Now several branches of fuzzy mathematics like fuzzy algebra,fuzzy topology ,fuzzy control theory ,fuzzy measure theory etc.,have emerged.But in the decision making, the fuzzy theory takes care of membership of an element x only, that is the evidence against x belonging to A .It is felt by several decision makers and researchers that in proper decision making, the evidence belongs to A and evidence not belongs to A are both necessary .and how much X belongs to A or how much x does not belongs to A are necessary.

Several generalizations of Zadeh's fuzzy set theory have been proposed, such as L-fuzzy sets [4]. Interval valued fuzzy sets ,Intuitionistic fuzzy sets by Atanassov.K.T [1] ,Vague sets [3] are mathematically equivalent. Any such set A of a given Universe X can be charactrierized by means of a pair of function (t_A , f_A) where $t_A : X \rightarrow [0\ \ 1]$ and $f_A : X \rightarrow [0\ \ 1]$ such that $0 \leq t_A(x) + f_A(x) \leq 1$ for all x in X.The set $t_A(x)$ is called the truth functionand the set $f_A(x)$ is called false function or non membership function and $t_A(x)$ gives the evidence of how much x belongs to A $f_A(x)$ gives the evidence of how much x does not A.These concepts are being applied in several areas like decision-making, fuzy control, knowledge discovery and fault diagonsis etc.It is believed the vague sets (or equivalently instuitionistic fuzzy sets) will more useful in decision making, and other areas of Mathematical modeling. Through Atanassov's instuitionistic fuzzysets,Gau and Buehrer and some other areas of Mathematical modeling.Since then the theory fuzzy sets developed extensively and embraced almost all subjects like engineering science and technology. But the membership function $\mu_{A(x)}$ gives only a approximation belong to A .To avid this and obtain a better estimation and analysis of data decision making.Gau.W.L and Bueher D.J. [3] have initiated the study ofvague sets with the hope that they form a better tool to understand, interpret and solve real life problems which are in general vague,than the theory of vague sets do. Ranjit Biswas[9]initiated the study of vague groups by Ramakrishna.N [6],[7],[8] and Eswarlal.T [2]are grate extended the study of vague algebra.The objective of this paper is to contribute further to the study of vague algebra by introducing the concepts of L-vague cut-set, L-vague semiring of a L-semirings respectively.

II. PRELIMINARIES

In this section we briefly present the necessary material on lattices, Boolean lattices Brouwerian lattices and illustrate with examples.

Definition 1.1 *[4]*
A poset (L, $\leq$) is called a lattice if sup{x, y}also denoted by (x v y) and inf {x, y} also denoted by (x $\wedge$ y) exists for every pair of elements x, y in L.

Definition 1.2
A lattice (L, $\leq$) in which every subset of L has g.l.b and l.u.b in it is called a complete lattice.

Definition 1.3[4] A lattice L is said to be distributive if it satisfies the
$x \wedge (y \vee z) = (x \wedge y)v(x \wedge z)$ and $x\, v(y \wedge z) = (xv\, y) \wedge (x\, v\, z)$ for all x, y in L.

Definition 1.4[4] A lattice L is said to be bounded if L has least element and greatest element .Usually least element of L is denoted by $\mathbf{0_L}$ and greatest element is denoted by $\mathbf{1_L}$

Definition 1.5[2] An L-vague set μ in X is a pair $\boldsymbol{\mu = (t_\mu , f_\mu)}$ where $t_\mu : X \to [0\ 1]$ and $f_\mu : X \to [0\ 1]$ such that $t_\mu \leq 1_L - f_\mu$ and $f_\mu \leq 1_L - t_\mu$ the mapping $t_\mu : X \to L$ is defined as the degree of membership function and $f_\mu : X \to L$ defined the degree of non membership function of the element $x \in X$ to $\mu \subseteq X$ of X respectively.

Definition 1.6[2] Let (G,*) be a group .An L-Vague set $A=(t_A , f_A)$ of G is said to be L-vague group of G if it satisfies the following conditions.

1. $V_A (x*y)= \vee \{ V_A (x), V_A (y) \}$ 2. $V_A (x^{-1})= V_A (x)$ for all x,y in $\in$ G.

i.e 1. $t_A (x*y) \geq \wedge \{ t_A (x), t_A (y) \}$ 2. $f_A (x*y) \geq \vee \{ f_A (x), f_A (y) \}$

3. $t_A (x^{-1})= t_A (x)$ 4. $f_A (x^{-1})= f_A (x)$ for all x,y in $\in$ G.

Definition 1.7[2] Let A be a vague group of a group G then the set A

$N(A)=\{ x \in G : V_A (axa^{-1})=V_A(x)$ for all $a \in G \}$ is called vague normal izer of A.

Definition 1.7[2] Let A be a vague group of a group G then the set A

$GV_A = \{ a \in G : V_A (x)=V_A(e)$ for all $a \in G \}$.Then the order of A is defined as the order of the crisp subgroup of GV_A and it is denoted by O(A).

Definition 1.8[2] Let A be L-vague set of a universe G with true membership function t_A ,and false membership function f_A for α ,β ∈ [0,1] with α ≤ β .the (α, β)cut or L-vague cut set is the crisp sub set of G is given by $A_{(\alpha\, \beta)} =\{ x \in G\ V_A (x) \geq [\alpha\ \beta] \}$. i.e $A_{(\alpha\, \beta)} =\{ x : x \in G, t_A (x) \geq \alpha$ and $1-f_A (x) \geq \beta \}$.

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Definition 1.9[2] A non-empty set R is called lattice ordered semi-ring or L-semiring if it has two binary operations + and '. ' in a binary relation < defined on it and satisfy the following conditions
(1) (R, +,) is a semiring
(2) (R, <) is a lattice
(3) $x < y \to a+x < a+y$, for all x,y in R
(4) x > 0,y> 0 imply xy > 0 for all x, y in R.

Examples 1.10

1. **(**2Z,**+, .,** v, ^) is a L-semiring, where Z is the set of all integers.
2. (3Z,**+, .,** v, ^) is a L-semiring, where Z is the set of all integers.
3.

Definition 1.11 Let R be a L-semiring, A fuzzy set A is said to be a fuzzy L-semiring of R if it satisfies the following conditions.

1. $t_A(x+y) \geq \wedge \{ t_A(x), t_A(y)\}$ 2. $t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\}$
3. $t_A(x \vee y) \geq \wedge \{ t_A(x), t_A(y)\}$ 4.$t_A(x \wedge y) \geq \wedge \{ t_A(x), t_A(y)\}$.

Definition 1.12 A vague set A of a semiring S is said to be L vague ideal if if it satisfies the following conditions.
1.$t_A(x-y) \geq \wedge \{ t_A(x), t_A(y)\}$ 2.$f_A(x-y) \geq \vee \{ f_A(x), f_A(y) \}$
3. $t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\}$ 4. $f_A(xy) \geq \wedge \{ f_A(x), f_A(y)\}$ for all x,y in S.

Definition 1.13 [10] The vague set A of a set X with $t_A(x)=0$ and $f_A(x)=1$,for x ∈,for all x∈ X is called the zero vague set of X.It is denoted by $\bar{0}=(0,1)$.

Definition 1.14 [10] The vague set A of a set X with $t_A(x)=1$ and $f_A(x)=0$,for x ∈,for all x∈ X is called the unit vague set of X. It is denoted by $\bar{1}=(1,0)$.

III. L-VAGUE SEMIRINGS OF A L-SEMIRINGS

We now introduce the concept of L-vague semiring of L-semiring with suitable examples.

Definition 3.1 Let S be a L-vague semiring. A L-vague set A=($t_{A,}$ f_A) of S is said to be an L-vague semiring of S.If it satisfies the following conditions.
1.$t_A(x+y) \geq \wedge \{ t_A(x), t_A(y)\}$ 2.$f_A(x+y) \geq \vee \{ f_A(x), f_A(y) \}$
2.$t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\}$ 2.$f_A(xy) \geq \vee \{ f_A(x), f_A(y) \}$
3.$t_A(x\vee y) \geq \wedge \{ t_A(x), t_A(y)\}$ 2.$f_A(x\vee y) \geq \vee \{ f_A(x), f_A(y) \}$
4. $t_A(x\wedge y) \geq \wedge \{ t_A(x), t_A(y)\}$ 4. $f_A(xy) \geq \wedge \{ f_A(x), f_A(y)\}$ for all x,y in S.

Definition 3.2 Let A and B are any two L-vague semirings of L-semiring S.Then union of two L-vague semirings is defined by $C=(A \cup B)=\{ (x, t_C(x), f_C(x)) : x\in S \}$.
Where $t_C(x)= \wedge \{ t_A(x), t_B(x)\}$ and $f_C(x)= \vee \{ f_A(x), f_B(x) \}$.

Theorem 3.3 Intersection of any two L-vague semirings of L-semiring is a L-vague semiring of a L-semiring S.
Proof: Let A and B be any two L-vague semirings of L-semiring S and let A=($t_{A,}$ f_A)
B= ($t_{B,}$ f_B) be any two L-vague semirings of L-semiring S, x,y ∈ S.
(A∩B)=C= t(t_C f_C).Wher $t_C(x)_= \wedge \{ t_A(x), t_B(x)\}$ and $f_C(x)= \vee \{ f_A(x), f_B(x) \}$.

Now 1. 1.$t_C(x+y) = \wedge \{ t_A(x+y), t_B(x+y) \}$

=1. 1.$t_C(x+y) = \wedge \{ t_A(x+y), t_B(x+y) \}$

$= \wedge \{ \wedge \{ t_A(x), t_A(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \wedge \{ \wedge \{ t_A(x), t_B(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \{ \wedge \{ t_A(x), t_B(x)\}, \wedge \{ t_A(y), t_B(y)\} \}$
$= \wedge \{ t_C(x), t_C(y)\}$.

Therefore $t_C(x+y)= \wedge \{ t_C(x), t_C(y)\}$ for x,y ∈ S .

2. $f_C(x+y) = \vee \{ f_A(x+y), f_B(x+y) \}$

$= \vee \{ \vee \{ f_A(x), f_A(y)\}, \vee \{ f_B(x), f_B(y)\} \}$
$= \vee \{ \vee \{ f_A(x), f_B(y)\}, \vee \{ f_B(x), f_B(y)\} \}$

$= \{ \vee \{ f_A(x), f_B(x)\}, \vee \{ f_A(y), f_B(y)\} \}$
$= \vee \{ f_C(x), f_C(y)\}$.
Therefore $f_C(x+y) = \vee \{ f_C(x), f_C(y)\}$ for $x,y \in S$.

3.$t_C(xy) = \wedge \{ t_A(xy), t_B(xy) \}$

$=.t_C(xy) = \wedge \{ t_A(xy), t_B(xy) \}$

$= \wedge \{ \wedge \{ t_A(x), t_A(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \wedge \{ \wedge \{ t_A(x), t_B(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \{ \wedge \{ t_A(x), t_B(x)\}, \wedge \{ t_A(y), t_B(y)\} \}$
$= \wedge \{ t_C(x), t_C(y)\}$.
Therefore $t_C(xy) = \wedge \{ t_C(x), t_C(y)\}$ for $x,y \in S$.

4. $f_C(xy) = \vee \{ f_A(xy), f_B(xy) \}$

$= \vee \{ \vee \{ f_A(x), f_A(y)\}, \vee \{ f_B(x), f_B(y)\} \}$
$= \vee \{ \vee \{ f_A(x), f_B(y)\}, \vee \{ f_B(x), f_B(y)\} \}$
$= \{ \vee \{ f_A(x), f_B(x)\}, \vee \{ f_A(y), f_B(y)\} \}$
$= \vee \{ f_C(x), f_C(y)\}$.
Therefore $f_C(xy) = \vee \{ f_C(x), f_C(y)\}$ for $x,y \in S$.

5. $t_C(x \vee y) = \wedge \{ t_A(x \vee y), t_B(x \vee y) \}$

$=.t_C(xy) = \wedge \{ t_A(xy), t_B(xy) \}$

$= \wedge \{ \wedge \{ t_A(x), t_A(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \wedge \{ \wedge \{ t_A(x), t_B(y)\}, \wedge \{ t_B(x), t_B(y)\} \}$
$= \{ \wedge \{ t_A(x), t_B(x)\}, \wedge \{ t_A(y), t_B(y)\} \}$
$= \wedge \{ t_C(x), t_C(y)\}$.
Therefore $t_C(x \vee y) = \wedge \{ t_C(x), t_C(y)\}$ for $x,y \in S$.

6. $f_C(x \wedge y) = \vee \{ f_A(x \wedge y), f_B(x \wedge y) \}$

$= \vee \{ \vee \{ f_A(x), f_A(y)\}, \vee \{ f_B(x), f_B(y)\} \}$
$= \vee \{ \vee \{ f_A(x), f_B(y)\}, \vee \{ f_B(x), f_B(y)\} \}$
$= \{ \vee \{ f_A(x), f_B(x)\}, \vee \{ f_A(y), f_B(y)\} \}$
$= \vee \{ f_C(x), f_C(y)\}$.
Therefore $f_C(x \wedge y) = \vee \{ f_C(x), f_C(y)\}$ for $x,y \in S$.
C is a L-vague semirings of L-semiring S.
Hence the Intersection of any two L-vague semirings of L-semiring S is a L-vague semiring S.

Theorem 3.4 The arbitrary Intersection of a family L-vague semirings of L-semiring S is a L-vague semiring of a L-semiring S.
Proof: Let $\{ D_i : i \in I \}$ be a family of L-vague semirings of a L-semiring S
Let $A = \cap_i D_i \; i \in_I$ and let x,y in S then

1. 1. $t_A(x+y) = Л_{i \in I}\, t_{ADi}(x+y) \le Л_{i \in I} \{ f_{ADi}(x), f_{ADi}(y) \}$

$\ge Л_{i \in I} \{ Л \{ t_{ADi}(x)\}, Л \{ t_{ADi}(y) \} \}$
$\ge Л_{i \in I} \{ t_A(x)\; t_A(y) \}$
$\ge Л \{ t_A(x)\; t_A(y) \}$
Therefore $t_A(x+y) \ge Л \{ t_A(x)\; t_A(y) \}$

2. $f_A(x+y)= V_{i\in I}\ f_{ADi}(x+y) \leq\ V_{i\in I}\{\ f_{ADi}(x),\ f_{ADi}(y)\}$

$\leq\ V_{i\in I}\{ V\{ f_{ADi}(x)\},\ V\{ f_{ADi}(y)\}\}$
$\leq\ V_{i\in I}\{\ f_A(x)\ f_A(y)\ \}$
$\leq V\{\ f_A(x)\ f_A(y)\ \}$
Therefore $f_A(x+y) = V\{\ f_A(x)\ f_A(y)\ \}$

3. $t_A(xy)= \text{Л}_{i\in I}\ t_{ADi}(x\ y) \leq\ \text{Л}_{i\in I}\{\ f_{ADi}(x),\ f_{ADi}(y)\}$

$\geq \text{Л}_{i\in I}\{ \text{Л}\{ t_{ADi}(x)\},\ \text{Л}\{ t_{ADi}(y)\}\}$
$\geq \text{Л}_{i\in I}\{\ t_A(x)\ t_A(y)\ \}$
$\geq \text{Л}\{\ t_A(x)\ t_A(y)\ \}$
Therefore $t_A(xy) \geq \text{Л}\{\ t_A(x)\ t_A(y)\ \}$

4. $f_A(xy)= V_{i\in I}\ f_{ADi}(xy) \leq\ V_{i\in I}\{\ f_{ADi}(x),\ f_{ADi}(y)\}$

$\leq\ V_{i\in I}\{ V\{ f_{ADi}(x)\},\ V\{ f_{ADi}(y)\}\}$
$\leq\ V_{i\in I}\{\ f_A(x)\ f_A(y)\ \}$
$\leq V\{\ f_A(x)\ f_A(y)\ \}$
Therefore $f_A(xy) = V\{\ f_A(x)\ f_A(y)\ \}$

5 $t_A(xVy)= \text{Л}_{i\in I}\ t_{ADi}(x\ Vy) \leq\ \text{Л}_{i\in I}\{\ f_{ADi}(x),\ f_{ADi}(y)\}$

$\geq \text{Л}_{i\in I}\{ \text{Л}\{ t_{ADi}(x)\},\ \text{Л}\{ t_{ADi}(y)\}\}$
$\geq \text{Л}_{i\in I}\{\ t_A(x)\ t_A(y)\ \}$
$\geq \text{Л}\{\ t_A(x)\ t_A(y)\ \}$
Therefore $t_A(xVy) \geq \text{Л}\{\ t_A(x)\ t_A(y)\ \}$

6. $f_A(x\text{Л}y)= V_{i\in I}\ f_{ADi}(x\ \text{Л}\ y) \leq\ V_{i\in I}\{\ f_{ADi}(x),\ f_{ADi}(y)\}$

$\leq\ V_{i\in I}\{ V\{ f_{ADi}(x)\},\ V\{ f_{ADi}(y)\}\}$
$\leq\ V_{i\in I}\{\ f_A(x)\ f_A(y)\ \}$
$\leq V\{\ f_A(x)\ f_A(y)\ \}$
Therefore $f_A(x\text{Л}y) = V\{\ f_A(x)\ f_A(y)\ \}$

Hence arbitrary Intersection of a family L-vague semirings of L-semiring S is a L-vague semiring of a L-semiring S.

Theorem 3.5 If A is an L-vague semiring of L-semiring of S ,then $\bar{0}=(0,1) =\{x \in S : t_A(x)=0, f_A(x)=1\}$ is an empty or is a L-semiring of S.
Proof: If no element satisfies this condition, then K is empty.
If x and y in H then

1. $t_A(x+y) \geq \wedge\ \{t_A(x), t_A(y)\}= \wedge\ \{1, 1\}=1$
   $\Rightarrow\ t_A(x+y) \geq \wedge\ \{t_A(x), t_A(y)\}$
2. $f_A(x+y) \geq V\{f_A(x), f_A(y)\}= V\{0, 0\}=1$
   $\Rightarrow\ f_A(x+y) \geq V\{f_A(x), f_A(y)\}$
3. $t_A(xy) \geq \wedge\ \{t_A(x), t_A(y)\}= \wedge\ \{1, 1\}=1$
   $\Rightarrow\ t_A(xy) \geq \wedge\ \{t_A(x), t_A(y)\}$
4. $f_A(xy) \geq V\{f_A(x), f_A(y)\}= V\{0, 0\}=1$
   $\Rightarrow\ f_A(xy) \geq V\{f_A(x), f_A(y)\}$

5. $t_A(x\ V\ y) \geq \wedge\ \{t_A(x), t_A(y)\}= \wedge\ \{1, 1\}=1$

⇒ $t_A(xVy) \geq \wedge \{ t_A(x), t_A(y)\}$

6. $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\}$.

Therefore

$\bar{0}$ =(0,1) ={x ∈ S : $t_A(x)=0$, $f_A(x)=1$ } is an empty or is a L- vague semiring of S.

Theorem 3.6 If A is an L-vague semiring of L-semiring of S ,then $\bar{1}$=(0,1) ={x ∈ S : $t_A(x)=1$, $f_A(x)=0$ } is an empty or is a L-semiring of S.

Proof: If no element satisfies this condition, then K is empty.

If x and y in H then

1. $t_A(x+y) \geq \wedge \{ t_A(x), t_A(y)\} = \wedge \{ 1, 1\} = 1$

⇒ $t_A(x+y) \geq \wedge \{ t_A(x), t_A(y)\}$

2 $f_A(x+y) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(x+y) \geq V \{ f_A(x), f_A(y)\}$

3. $tA(xy) \geq \wedge \{ tA(x), tA(y)\} = \wedge \{ 1, 1\} = 1$

⇒ $t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\}$

4. $f_A(xy) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(xy) \geq V \{ f_A(x), f_A(y)\}$

5. $t_A(x V y) \geq \wedge \{ t_A(x), t_A(y)\} = \wedge \{ 1, 1\} = 1$

⇒ $t_A(xVy) \geq \wedge \{ t_A(x), t_A(y)\}$

6. $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\}$.

Therefore

$\bar{1}$=(0,0) ={x ∈ S : $t_A(x)=0$, $f_A(x)=1$ } is an empty or is a L- vague semiring of S.

Theorem 3.7 Let A be a L- vague semiring of a L- semiring S,then L-vague cut -set $\mathbf{A_{(\alpha\ \ \beta)}}$ for α β ∈ [0 1] is a L- vague semiring of a L- semiring S.

Proof: For every x in L-vague cut set t $\mathbf{A_{(\alpha\ \ \beta)}}$.

We have $t_A(x) \geq \alpha$ and $f_A(x) \leq \beta$. Now x,y ∈S

1. $t_A(x+y) \geq \wedge \{ t_A(x), t_A(y)\} = \wedge \{ \alpha, \alpha\} = \alpha$

⇒ $t_A(x+y) \geq \alpha$

2 $f_A(x+y) \geq V \{ f_A(x), f_A(y)\} = V \{ \beta, \beta\} = \beta$

⇒ $f_A(x+y) \leq \beta$

3 $t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\} = \wedge \{ 1, 1\} = 1$

⇒ $t_A(xy) \geq \wedge \{ t_A(x), t_A(y)\}$

4 $f_A(xy) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(xy) \geq V \{ f_A(x), f_A(y)\}$

5 $t_A(x V y) \geq \wedge \{ t_A(x), t_A(y)\} = \wedge \{ 1, 1\} = 1$

⇒ $t_A(x V y) \geq \wedge \{ t_A(x), t_A(y)\}$

6 $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\} = V \{ 0, 0\} = 1$

⇒ $f_A(x \wedge y) \geq V \{ f_A(x), f_A(y)\}$

Hence L-vague cut -set $\mathbf{A_{(\alpha\ \ \beta)}}$ for α ,β ∈ [0 1] is a L- vague semiring of a L- semiring S.

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REFERENCES

[1] Atanassov.K.T,More on Intuitionistic fuzzy sets,Fuzzy sets and systems,\\33(1989),37-45.
[2] Eswarlal.T L-Vague sets and L-Vague relations,Internationaljournal of computional conginator ,Vol and No.1 March 2010.
[3] Gahu.w.L.Buehrer.D.J.,vague sets IEEE Transactions on systems,Man and cybernetics vol.23(1993),610-614.
[4] Goguen.,A,L-Fuzzy sets ,J.Math.Anal.,Applic.,18(1967),145-174.

[5] Mukharjee.p.N, Fuzzy normal subgroups and fuzzy cosets, information sciences 34, 225-239(1984).

[6] Ramakrishana.N,Nageswararao.B Eswarlal.T and satyanarayana.ch,Anti-homomorphisms in vague groups(IJMSEA)ISSN 0973-9424,vol.6,No.2.(March,2012),PP.449-459.

[7] Ramakrishana.N,Satyanarayana.CH and Nageswararao.B some characterizationsvague groups. vague normal groups (IJMSEA),Vol.6,No:3(May,2012), pp.387-397.

[8] Palanjappan.N and mathuraju.R,The homomorphisim,Anti-homomorphisim of fuzzy and an anti fuzzy groups,Varahmir Journal of m.s,vol.4,no.2,(2004),387-399.

[9] Ranjit Biswas, Vague Groups,Int.journal of computational cognition ,Vol.4 No.2,June 2006.

[10] Ramakrishana.N ,Eswarlal.T,Boolean Vague sets, Int.Journal of Computional congnition, Vol.5,No.4 (2007),50-53.

[11] Ramakrishna.N,A Chatracterization of cyclic in terms of vague groups,Int.journal of Computational congnition,Vol.6 No.2(2008),17-20.

[12] Ramakrishna.N,Vague groups and vague weights, Int.journal of computational congnition, Vol.66 No.1 (2009),913-916.

[13] Ranga Rao.p., "Latice ordered semirings" Mathematics seminar notes, Kob univ,vol.9,No.1(1981,119-149.

[14] Rosenfeld A. Fuzzy groups.Jon.Maths.Anal.Appli.35(1971)512-517.

[15] vasantha Kandaswamy,W.V.,"On Fuzzy Semirings', Octa Cienca indica,vol.25M,No.4(1999),361-362.

[16] Zadeh,L.A., Fuzzy Sets, Infor and Control,volume 8 (1965) 338-353.