Some Properties of Intuitionistic L-Fuzzy Subnearrings of a Nearring

B. Thenmozhi*
Department of Mathematics,
Syed ammal Engineering College
Ramanathapuram
Tamil Nadu, India.

S. Karthikeyan
Department of Mathematics
Velammal College of Engineering and Technology,
Madurai, Tamil Nadu, India.

S. Naganathan
Department of Mathematics,
Government Arts College Pollachi,
Udumalapet, Tamil Nadu, India.

***Abstract*—In this paper, we study some of the properties of intuitionistic L-fuzzy subnearring of a nearring and prove some results on these. With the expectations that these results may be applied in different fields.**

Keywords*—*L-fuzzy subset, intuitionistic L-fuzzy subset, intuitionistic L-fuzzy subnearring, intuitionistic L-fuzzy relation, Product of intuitionistic L-fuzzy subsets.

I. INTRODUCTION

After the introduction of fuzzy sets by L.A.Zadeh[15], several researchers explored on the generalization of the notion of fuzzy set. The concept of intuitionistic L-fuzzy subset was introduced by K.T.Atanassov[4,5], as a generalization of the notion of fuzzy set. Azriel Rosenfeld[6] defined a fuzzy groups. Asok Kumer Ray[3] defined a product of fuzzy subgroups. We introduce the concept of intuitionistic L-fuzzy subnearring of a nearring and established some results.

II. PRELIMINARIES

Definition 2.1. *Let X be a non-empty set and L = (L, ≤) be a lattice with least element 0 and greatest element 1. A L-fuzzy subset A of X is a function* $A : X \to L$.

Definition 2.2. *Let (L, ≤) be a complete lattice with an involutive order reversing operation* $N : L \to L$.
An intuitionistic L-fuzzy subset (ILFS) A in X is defined as an object of the form $A=\{< x, \mu_A(x), \nu_A(x) > / x \text{ in } X\}$, *where* $\mu_A : X \to L$ *and* $\nu_A : X \to L$ *define the degree of membership and the degree of non-membership of the element* $x \in X$ *respectively and for every* $x \in X$ *satisfying* $\mu_A(x) \le N(\nu_A(x))$.

Definition 2.3. *Let (R, +, •) be a nearring. A intuitionistic L-fuzzy subset A of R is said to be an intuitionistic L-fuzzy subnearring (ILFSNR) of R if it satisfies the following axioms:*

(i) $\mu_A(x-y) \ge \mu_A(x) \wedge \mu_A(y)$

(ii) $\mu_A(xy) \ge \mu_A(x) \wedge \mu_A(y)$

(iii) $\nu_A(x-y) \le \nu_A(x) \vee \nu_A(y)$

(iv) $\nu_A(xy) \le \nu_A(x) \vee \nu_A(y)$, *for all x and y in R.*

Definition 2.4. *Let A and B be any two intuitionistic L-fuzzy subnearrings of nearrings* R_1 *and* R_2 *respectively. The product of A and B denoted by AxB is defined as* $AxB=\{\langle (x, y),\mu_{AxB}(x, y), \nu_{AxB}(x, y)\rangle / \text{for all } x \text{ in } R_1 , y \text{ in } R_2\}$, *where* $\mu_{AxB}(x,y) =\mu_A(x)\wedge \mu_B(y)$ *and* $\nu_{AxB}(x, y) = \nu_A(x) \vee \nu_B(y)$.

Definition 2.5. *Let A be an intuitionistic L-fuzzy subset in a set S, the strongest intuitionistic L-fuzzy relation on S, that is an intuitionistic L-fuzzy relation on A is V given by* $\mu_V(x, y) = \mu_A(x) \wedge \mu_A(y)$ *and* $\nu_V(x, y) = \nu_A(x) \vee \nu_A(y)$, *for all x and y in S.*

Definition 2.6. *Let X and X′ be any two sets. Let* $f : X \to X'$ *be any function and A be a intuitionistic L-fuzzy subset in X, V be an intuitionistic L-fuzzy subset in f(X) = X′, defined by*

$$\mu_V(y) = \sup_{x\in f^{-1}(y)} \mu_A(x) \text{ and } \nu_V(y) = \inf_{x\in f^{-1}(y)} \nu_A(x), \text{ for all}$$

x in X and y in X′. A is called a pre image of V under f and is denoted by $f^{-1}(V)$.

III. SOME PROPERTIES OF INTUITIONISTIC L- FUZZY SUBNEARRINGS OF A NEARRING

Theorem 3.1. *Intersection of any two intuitionistic L-fuzzy subnearrings of a nearring R is a intuitionistic L-fuzzy subnearring of R.*

Proof. Let A and B be any two intuitionistic L-fuzzy subnearrings of a nearring R and x and y in R. Let $A = \{(x,\mu_A(x),\nu_A(x))/x\in R\}$ and $B = \{ (x, \mu_B(x), \nu_B(x)) /$

ISSN: 2278-0181

$x \in R\}$ and also let $C = A \cap B = \{ (x, \mu_C(x), \nu_C(x)) / x \in R\}$, where $\mu_A(x) \wedge \mu_B(x) = \mu_C(x)$ and $\nu_A(x) \vee \nu_B(x) = \nu_C(x)$. Now, $\mu_C(x-y) \geq [\mu_A(x) \wedge \mu_A(y)] \wedge [\mu_B(x) \wedge \mu_B(y)] = [\mu_A(x) \wedge \mu_B(x)] \wedge [\mu_A(y) \wedge \mu_B(y)] = \mu_C(x) \wedge \mu_C(y)$. Therefore, $\mu_C(x - y) \geq \mu_C(x) \wedge \mu_C(y)$, for all x and y in R.

And, $\mu_C(xy) \geq [\mu_A(x) \wedge \mu_A(y)] \wedge [\mu_B(x) \wedge \mu_B(y)] = [\mu_A(x) \wedge \mu_B(x)] \wedge [\mu_A(y) \wedge \mu_B(y)] = \mu_C(x) \wedge \mu_C(y)$. Therefore, $\mu_C(xy) \geq \mu_C(x) \wedge \mu_C(y)$, for all x and y in R. Also, $\nu_C(x - y) \leq [\nu_A(x) \vee \nu_A(y)] \vee [\nu_B(x) \vee \nu_B(y)] = [\nu_A(x) \vee \nu_B(x)] \vee [\nu_A(y) \vee \nu_B(y)] = \nu_C(x) \vee \nu_C(y)$. Therefore, $\nu_C(x-y) \leq \nu_C(x) \vee \nu_C(y)$, for all x and y in R. And, $\nu_C(xy) \leq [\nu_A(x) \vee \nu_A(y)] \vee [\nu_B(x) \vee \nu_B(y)] = [\nu_A(x) \vee \nu_B(x)] \vee [\nu_A(y) \vee \nu_B(y)] = \nu_C(x) \vee \nu_C(y)$. Therefore, $\nu_C(xy) \leq \nu_C(x) \vee \nu_C(y)$, for all x and y in R. Therefore, C is an intuitionistic L-fuzzy subnearring of a nearring R.

Thorem 3.2. *Let (R, +, •) is a nearring. The intersection of a family of intuitionistic L-fuzzy subnearrings of R is an intuitionistic L-fuzzy subnearring of R.*

Proof. It is trivial.

Theorem 3.3. *If A and B are any two intuitionistic L-fuzzy subnearrings of the nearrings R_1 and R_2 respectively, then AxB is an intuitionistic L-fuzzy subnearring of R_1xR_2.*

Proof. Let A and B be two intuitionistic L-fuzzy subnearrings of the nearrings R_1 and R_2 respectively. Let x_1 and x_2 be in R_1 and y_1, y_2 be in R_2. Then (x_1, y_1) and (x_2, y_2) in R_1xR_2. Now, $\mu_{AxB}[(x_1, y_1) - (x_2, y_2)] = \mu_A(x_1-x_2) \wedge \mu_B(y_1-y_2) \geq [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_B(y_1) \wedge \mu_B(y_2)] = [\mu_A(x_1) \wedge \mu_B(y_1)] \wedge [\mu_A(x_2) \wedge \mu_B(y_2)] = \mu_{AxB}(x_1, y_1) \wedge \mu_{AxB}(x_2, y_2)$. Therefore,

$\mu_{AxB}[(x_1, y_1) - (x_2, y_2)] \geq \mu_{AxB}(x_1, y_1) \wedge \mu_{AxB}(x_2, y_2)$, for all

(x_1, y_1) and (x_2, y_2) in R_1xR_2. Also, $\mu_{AxB}[(x_1, y_1)(x_2, y_2)] = \mu_A(x_1x_2) \wedge \mu_B(y_1y_2) \geq [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_B(y_1) \wedge \mu_B(y_2)] = [\mu_A(x_1) \wedge \mu_B(y_1)] \wedge [\mu_A(x_2) \wedge \mu_B(y_2)] = \mu_{AxB}(x_1, y_1) \wedge \mu_{AxB}(x_2, y_2)$. Therefore, $\mu_{AxB}[(x_1, y_1)(x_2, y_2)] \geq \mu_{AxB}(x_1, y_1) \wedge \mu_{AxB}(x_2, y_2)$, for all (x_1, y_1), (x_2, y_2) in R_1xR_2. And, $\nu_{AxB}[(x_1, y_1) - (x_2, y_2)] =$

$\nu_A(x_1 - x_2) \vee \nu_B(y_1 - y_2) \leq [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_B(y_1) \vee \nu_B(y_2)] = [\nu_A(x_1) \vee \nu_B(y_1)] \vee [\nu_A(x_2) \vee \nu_B(y_2)] = \nu_{AxB}(x_1, y_1) \vee \nu_{AxB}(x_2, y_2)$. Therefore, $\nu_{AxB}[(x_1, y_1) - (x_2, y_2)] \leq \nu_{AxB}(x_1, y_1) \vee \nu_{AxB}(x_2, y_2)$, for all (x_1, y_1), (x_2, y_2) in R_1xR_2. Also, $\nu_{AxB}[(x_1, y_1)(x_2, y_2)] = \nu_A(x_1x_2) \vee \nu_B(y_1y_2) \leq [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_B(y_1) \vee \nu_B(y_2)] = [\nu_A(x_1) \vee \nu_B(y_1)] \vee [\nu_A(x_2) \vee \nu_B(y_2)] = \nu_{AxB}(x_1, y_1) \vee \nu_{AxB}(x_2, y_2)$. Therefore, $\nu_{AxB}[(x_1, y_1)(x_2, y_2)] \leq \nu_{AxB}(x_1, y_1) \vee \nu_{AxB}(x_2, y_2)$, for all (x_1, y_1), (x_2, y_2) in R_1xR_2. Hence AxB is an intuitionistic L-fuzzy subnearring of R_1xR_2.

Theorem 3.4. *Let A and B be intuitionistic L-fuzzy subnearrings of the nearrings R_1 and R_2 respectively. Suppose that e and e^{I} are the identity element of R_1 and R_2 respectively. If AxB is an intuitionistic L-fuzzy subnearring of R_1xR_2, then at least one of the following two statements must hold.*

(i) $\mu_B(e^{I}) \geq \mu_A(x)$ and $\nu_B(e^{I}) \leq \nu_A(x)$, for all x in R_1,

(ii) $\mu_A(e) \geq \mu_B(y)$ and $\nu_A(e) \leq \nu_B(y)$, for all y in R_2.

Proof. Let AxB be an intuitionistic L-fuzzy subnearring of R_1xR_2. By contraposition, suppose that none of the statements (i) and (ii) holds. Then we can find a in R_1 and b in R_2 such that $\mu_A(a) > \mu_B(e^{I})$, $\nu_A(a) < \nu_B(e^{I})$ and $\mu_B(b) > \mu_A(e)$, $\nu_B(b) < \nu_A(e)$. We have, $\mu_{AxB}(a, b) > \mu_B(e^{I}) \wedge \mu_A(e) = \mu_A(e) \wedge \mu_B(e^{I}) = \mu_{AxB}(e, e^{I})$. And, $\nu_{AxB}(a, b) < \nu_B(e^{I}) \vee \nu_A(e) = \nu_A(e) \vee \nu_B(e^{I}) = \nu_{AxB}(e, e^{I})$. Thus AxB is not an intuitionistic L-fuzzy subnearring of R_1xR_2. Hence either $\mu_B(e^{I}) \geq \mu_A(x)$ and $\nu_B(e^{I}) \leq \nu_A(x)$, for all x in R_1 or $\mu_A(e) \geq \mu_B(y)$ and $\nu_A(e) \leq \nu_B(y)$, for all y in R_2.

Theorem 3.5. Let A and B be two intuitionistic L-fuzzy subsets of the nearrings R_1 and R_2 respectively and AxB is an intuitionistic L-fuzzy subnearring of R_1xR_2. Then the following are true:

if $\mu_A(x) \leq \mu_B(e^{I})$ and $\nu_A(x) \geq \nu_B(e^{I})$, then A is an intuitionistic L-fuzzy subnearring of R_1.

(i) if $\mu_A(x) \leq \mu_B(e^{I})$ and $\nu_A(x) \geq \nu_B(e^{I})$, then A is an intuitionistic L-fuzzy subnearring of R_1.

(ii) if $\mu_B(x) \leq \mu_A(e)$ and $\nu_B(x) \geq \nu_A(e)$, then B is an intuitionistic L-fuzzy subnearring of R_2.

(iii) either A is an intuitionistic L-fuzzy subnearring of R_1 or B is an intuitionistic L-fuzzy subnearring of R_2.

Proof. Let AxB be an intuitionistic L-fuzzy subnearring of R_1xR_2, x, y in $R_1$and e^{I} in R_2. Then (x, e^{I}) and (y, e^{I}) are in R_1xR_2. Now, using the property that $\mu_A(x) \leq \mu_B(e^{I})$ and $\nu_A(x) \geq \nu_B(e^{I})$, for all x in R_1, we get, $\mu_A(x-y) = \mu_{AxB}[(x-y), (e^{I}+e^{I})] \geq \mu_{AxB}(x, e^{I}) \wedge \mu_{AxB}(-y, e^{I}) = [\mu_A(x) \wedge \mu_B(e^{I})] \wedge$

$[\mu_A(-y) \wedge \mu_B(e^{I})] = \mu_A(x) \wedge \mu_A(-y) \geq \mu_A(x) \wedge \mu_A(y)$. Therefore, $\mu_A(x-y) \geq \mu_A(x) \wedge \mu_A(y)$, for all x and y in R_1. Also, $\mu_A(xy) = \mu_{AxB}[(xy), (e^{I}e^{I})] \geq \mu_{AxB}(x, e^{I}) \wedge \mu_{AxB}(y, e^{I}) = [\mu_A(x) \wedge \mu_B(e^{I})] \wedge [\mu_A(y) \wedge \mu_B(e^{I})] = \mu_A(x) \wedge \mu_A(y)$. Therefore, $\mu_A(xy) \geq$

$\mu_A(x) \wedge \mu_A(y)$, for all x and y in R_1. And, $\nu_A(x-y) = \nu_{AxB}[(x-y), (e^{I}+e^{I})] \leq \nu_{AxB}(x, e^{I}) \vee \nu_{AxB}(-y, e^{I}) = [\nu_A(x) \vee \nu_B(e^{I})] \vee [\nu_A(-y) \vee \nu_B(e^{I})] = \nu_A(x) \vee \nu_A(-y) \leq \nu_A(x) \vee \nu_A(y)$. Therefore, $\nu_A(x-y) \leq \nu_A(x) \vee \nu_A(y)$, for all x and y in R_1. Also, $\nu_A(xy) = \nu_{AxB}[(xy), (e^{I}e^{I})] \leq \nu_{AxB}(x, e^{I}) \vee \nu_{AxB}(y, e^{I}) = [\nu_A(x) \vee \nu_B(e^{I})] \vee [\nu_A(y) \vee \nu_B(e^{I})] = \nu_A(x) \vee \nu_A(y)$. Therefore, $\nu_A(xy) \leq \nu_A(x) \vee \nu_A(y)$, for all x and y in R_1. Hence A is an intuitionistic L-fuzzy subnearring of R_1. Thus (i) is proved. Now, using the property that $\mu_B(x) \leq \mu_A(e)$ and $\nu_B(x) \geq \nu_A(e)$, for all x in R_2. Let x and y in R_2 and e in R_1. Then (e, x) and (e, y) are in R_1xR_2. We get, $\mu_B(x-y) = \mu_{AxB}[(e+e), (x-y)] \geq \mu_{AxB}(e, x) \wedge \mu_{AxB}(e, -y) = [\mu_A(e) \wedge \mu_B(x)] \wedge [\mu_A(e) \wedge \mu_B(-y)] = \mu_B(x) \wedge \mu_B(-y) \geq \mu_B(x) \wedge \mu_B(y)$. Therefore, $\mu_B(x-y) \geq \mu_B(x) \wedge \mu_B(y)$, for all x and y in R_2. Also, $\mu_B(xy) = \mu_{AxB}[(ee), (xy)] \geq \mu_{AxB}(e, x) \wedge \mu_{AxB}(e, y) = [\mu_A(e) \wedge \mu_B(x)] \wedge [\mu_A(e) \wedge \mu_B(y)] = \mu_B(x) \wedge \mu_B(y)$. Therefore, $\mu_B(xy) \geq \mu_B(x) \wedge \mu_B(y)$, for all x and y in R_2. And, $\nu_B(x-y) = \nu_{AxB}[(e+e), (x-y)] \le \nu_{AxB}(e, x) \vee \nu_{AxB}(e, -y) = [\nu_A(e) \vee \nu_B(x)] \vee [\nu_A(e) \vee \nu_B(-y)] = \nu_B(x) \vee \nu_B(-y) \le \nu_B(x) \vee \nu_B(y)$. Therefore, $\nu_B(x-y) \le \nu_B(x) \vee \nu_B(y)$, for all x and y in R_2. Also, $\nu_B(xy) = \nu_{AxB}[(ee), (xy)] \le \nu_{AxB}(e, x) \vee \nu_{AxB}(e, y) = [\nu_A(e) \vee \nu_B(x)] \vee [\nu_A(e) \vee \nu_B(y)] = \nu_B(x) \vee \nu_B(y)$. Therefore, $\nu_B(xy) \le \nu_B(x) \vee \nu_B(y)$, for all x and y in R_2. Hence B is an intuitionistic L-fuzzy subnearring of a nearring R_2. Thus (ii) is proved. (iii) is clear.

Theorem 3.6. *Let A be an intuitionistic L-fuzzy subset of a nearring R and V be the strongest intuitionistic L-fuzzy relation of R. Then A is an intuitionistic L-fuzzy subnearring of R if and only if V is an intuitionistic L-fuzzy subnearring of of RxR.*

Proof. Suppose that A is an intuitionistic L-fuzzy subnearring of a nearring R. Then for any x = (x_1, x_2) and y = (y_1, y_2) are in RxR. We have, $\mu_V(x-y) = \mu_V[(x_1-y_1, x_2-y_2)] \ge [\mu_A(x_1) \wedge \mu_A(y_1)] \wedge [\mu_A(x_2) \wedge \mu_A(y_2)] = [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_A(y_1) \wedge \mu_A(y_2)] = \mu_V(x_1, x_2) \wedge \mu_V(y_1, y_2) = \mu_V(x) \wedge \mu_V(y)$. Therefore, $\mu_V(x-y) \ge \mu_V(x) \wedge \mu_V(y)$, for all x and y in RxR. And, $\mu_V(xy) = \mu_V[(x_1y_1, x_2y_2)] \ge [\mu_A(x_1) \wedge \mu_A(y_1)] \wedge [\mu_A(x_2) \wedge \mu_A(y_2)] = [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_A(y_1) \wedge \mu_A(y_2)] = \mu_V(x_1, x_2) \wedge \mu_V(y_1, y_2) = \mu_V(x) \wedge \mu_V(y)$. Therefore, $\mu_V(xy) \ge \mu_V(x) \wedge \mu_V(y)$, for all x and y in RxR. Also we have, $\nu_V(x-y) = \nu_V[(x_1-y_1, x_2-y_2)] \le [\nu_A(x_1) \vee \nu_A(y_1)] \vee [\nu_A(x_2) \vee \nu_A(y_2)] = [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_A(y_1) \vee \nu_A(y_2)] = \nu_V(x_1, x_2) \vee \nu_V(y_1, y_2) = \nu_V(x) \vee \nu_V(y)$. Therefore, $\nu_V(x-y) \le \nu_V(x) \vee \nu_V(y)$, for all x and y in RxR. And, $\nu_V(xy) = \nu_V(x_1y_1, x_2y_2) \le [\nu_A(x_1) \vee \nu_A(y_1)] \vee [\nu_A(x_2) \vee \nu_A(y_2)] = [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_A(y_1) \vee \nu_A(y_2)] = \nu_V(x_1, x_2) \vee \nu_V(y_1, y_2) = \nu_V(x) \vee \nu_V(y)$. Therefore, $\nu_V(xy) \le \nu_V(x) \vee \nu_V(y)$, for all x and y in RxR. This proves that V is an intuitionistic L-fuzzy subnearring of RxR. Conversely assume that V is an intuitionistic L-fuzzy subnearring of RxR, then for any $x=(x_1, x_2)$ and $y=(y_1, y_2)$ are in RxR, we have $\mu_A(x_1-y_1) \wedge \mu_A(x_2-y_2) = \mu_V[(x_1, x_2)-(y_1, y_2)] = \mu_V(x-y) \ge \mu_V(x) \wedge \mu_V(y) = \mu_V(x_1, x_2) \wedge \mu_V(y_1, y_2) = [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_A(y_1) \wedge \mu_A(y_2)]$. If we put $x_2 = y_2 = 0$, we get, $\mu_A(x_1 - y_1) \ge \mu_A(x_1) \wedge \mu_A(y_1)$, for all x_1 and y_1 in R. And, $\mu_A(x_1y_1) \wedge \mu_A(x_2y_2) = \mu_V[(x_1, x_2)(y_1, y_2)] = \mu_V(xy) \ge \mu_V(x) \wedge \mu_V(y) = \mu_V(x_1, x_2) \wedge \mu_V(y_1, y_2) = [\mu_A(x_1) \wedge \mu_A(x_2)] \wedge [\mu_A(y_1) \wedge \mu_A(y_2)]$. If we put $x_2=y_2=0$, we get, $\mu_A(x_1y_1) \ge \mu_A(x_1) \wedge \mu_A(y_1)$, for all x_1, y_1 in R. Also we have,
$\nu_A(x_1-y_1) \vee \nu_A(x_2-y_2) = \nu_V[(x_1, x_2) - (y_1, y_2)] = \nu_V(x-y) \le \nu_V(x) \vee \nu_V(y) = \nu_V(x_1, x_2) \vee \nu_V(y_1, y_2) = [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_A(y_1) \vee \nu_A(y_2)]$. If we put $x_2 = y_2 = 0$, we get, $\nu_A(x_1-y_1) \le \nu_A(x_1) \vee \nu_A(y_1)$, for all x_1 and y_1 in R. And, $\nu_A(x_1y_1) \vee \nu_A(x_2y_2) = \nu_V[(x_1, x_2)\ (y_1, y_2)] = \nu_V(x\,y) \le \nu_V(x) \vee \nu_V(y) = \nu_V(x_1,x_2) \vee \nu_V(y_1, y_2) = [\nu_A(x_1) \vee \nu_A(x_2)] \vee [\nu_A(y_1) \vee \nu_A(y_2)]$. If we put $x_2 = y_2 = 0$, we get, $\nu_A(x_1y_1) \le \nu_A(x_1) \vee \nu_A(y_1)$, for all x_1 and y_1 in R. Hence A is a A is an intuitionistic L-fuzzy subnearring of a nearring R.

IV. CONCLUSION

We tried to prove some results to use in the field of Intuitionistic L fuzzy subnearring of a nearing

REFERENCES

[1] Ajmal.N and Thomas.K.V., Fuzzy lattices, Information sciences 79 (1994), 271-291.
[2] Akram.M and Dar.K.H, On fuzzy d-algebras, Punjab university journal of mathematics, 37(2005), 61-76.
[3] Asok Kumer Ray, On product of fuzzy subgroups, fuzzy sets and systems, 105, 181-183 (1999).
[4] Atanassov.K., Intuitionistic fuzzy sets, fuzzy sets and systems, 20(1), 87-96 (1986).
[5] Atanassov.K., Stoeva.S., Intuitionistic L-fuzzy sets, Cybernetics and systems research 2 (Elsevier Sci. Publ., Amsterdam, 1984), 539-540.
[6] Azriel Rosenfeld, Fuzzy Groups, Journal of mathematical analysis and applications 35, 512-517 (1971).
[7] Chakrabarty, K., Biswas, R., Nanda, A note on union and intersection of intuitionistic fuzzy sets , Notes on intuitionistic fuzzy sets , 3(4), (1997).
[8] Davvaz.B and Wieslaw.A.Dudek, Fuzzy n-ary groups as a generalization of rosenfeld fuzzy groups, ARXIV-0710.3884VI(MATH.RA)20 OCT 2007,1-16.
[9] Goran Trajkovski, An approach towards defining L-fuzzy lattices, IEEE, 7(1998), 221-225.
[10] Mohammad M. Atallah, On the L-fuzzy prime ideal theorem of distributive lattices, The journal of fuzzy mathematics, Vol.9, No.4, 2001.
[11] Palaniappan.N and Arjunan.K, The homomorphism, anti-homomorphism of a fuzzy and anti fuzzy ideals, Varahmihir journal of mathematical sciences, Vol.6 No.1 (2006), 181-188.
[12] Palaniappan. N & K. Arjunan, Operation on fuzzy and anti fuzzy ideals , Antartica J. Math ., 4(1); 59-64, 2007.
[13] Palaniappan. N & K.Arjunan, Some properties of intuitionistic fuzzy subgroups, Acta Ciencia Indica, Vol.XXXIII (2); 321-328, 2007.
[14] B.Thenmozhi,S.Naganathan,Some properties of Anti L Fuzzy Subnearring of a nearing, International Journal of Applied Research,38-39.
[15] B.Thenmozhi,S.Naganathan,Propertie on Anti L fuzzy Subnearring of a nearing in Homomorphism,National Conference in Fuzzy Algebra, Paramakudi.
[16] Rajesh Kumar, Fuzzy Algebra, Volume 1, University of Delhi Publication Division, July -1993.
[17] Zadeh.L.A., Fuzzy sets , Information and control ,Vol.8, 338-353 (1965).