Advances in Mathematics: Scientific Journal 8 (2019), no.3, 171–176
(Special issue on ICRAPAM)
ISSN 1857-8365 printed version
ISSN 1857-8438 electronic version

INTERVAL VALUED FUZZY IDEALS IN NEAR-SUBTRACTION SEMIGROUPS

[1]V. Mahalakshmi [2]J. Siva Ranjini[3] K. Mumtha

[1] Assistant Professor,P. G.& Research Department of Mathematics

A.P. C. Mahalaxmi College for Women ,Thoothukudi-628002, Tamilnadu, India.

mahalakshmi@apcmcollege.ac.in

[2,3]Research ScholarP. G.& Research Department of Mathematics

A.P. C. Mahalaxmi College for Women ,Thoothukudi-628002, Tamilnadu, India.

[2]Reg No:19222012092003 Email : [2]sivaranjini@apcmcollege.ac.in

[3]mamthakasi8696@gmail.com

Affliated to Manonmaniam Sundaranar University Tirunelveli-627012, Tamil nadu, India.

Abstract: The analysis of Interval valued Fuzzy Ideals in Near-Subtraction semigroup is the primary focus of our research. In this paper, we introduce the concept of interval valued fuzzy Ideals in Near Subtraction Semigroups which is a generalized concept of Fuzzy Ideals in Near Subtraction Semigroup. We also characterize some properties of Interval valued Fuzzy Ideals in Near- Subtraction Semigroups.

Keywords: Fuzzy Ideals, Interval valued Fuzzy Ideals, Subtraction Algebra, Near- Subtraction Semigroup.

1. Introduction

The concepts of fuzzy sets and fuzzy subsets, fuzzy logic finds roots in seminal work of L. A. Zadeh [11] in 1965. In this work, he introduced “Interval valued fuzzy subsets” which had membership functions of closed intervals numbers rather than single members. Fuzzy Logic and fuzzification is a transformative development in set theory, having bearing in many latest scientific applications. Ideal of subtraction semigroup is thoroughly examined by K. H. Kim et al [7]. Interval valued fuzzy ideals of near-ring researched and characterized by V. Thillaigovidan and Chinnadurai [10].

Our present study is inspired by the above study and we have examined the concept of Interval valued fuzzy ideals of near- subtraction semigroups and its characteristics.

2. Preliminaries

Definition 2.1:

Let X be a non-empty set together with a binary operation $'-'$ is said to be subtraction algebra if it satisfies the following conditions

(i) $x-(y-x)=x.$

(ii) $x-(x-y)=y-(y-x)$

(iii) $(x-y)-z=(x-z)-y$ for all x,y and $z\in X.$

Definition 2.2:

Let X be a non-empty set together with the binary operation $'-'$ and $'\cdot'$ is said to be a right near-subtraction semigroup if it satisfies the following conditions

(i) $(X,-)$ is a subtraction algebra

(ii) $(X,\cdot)$ is a semigroup

(iv) $(x-y)z=xz-yz$ for all $x,y,z\in X.$

It is clear that $0.x=0x=0$ for all $x\in X.$ Similarly we also define for left near-subtraction semigroup. Throughout this paper, we define a near- subtraction semi group refers to right near-subtraction semigroup, unless we mentioned otherwise.

Definition 2.3:

A near- subtraction semigroup X is said to be zero-symmetric if $x0=0$ for all $x\in X$.

Definition 2.4:

Let S be a non-empty subset of a subtraction algebra X is said to be a sub algebra of X, if $x-y\in S$.

Definition 2.5:

Let X be a near- subtraction semigroup. A non-empty subset I of X is called

(1) A left ideal if I is a subalgebra of $(X,-)$ and $xi-x(y-i)\in I$ for all $x,y\in X. and\ i\in I.$

(2) A right ideal if I is a subalgebra of $(X,-)$ and $IX\subseteq I.$

(3) An ideal if I is both a left and right ideal.

Remark 2.6:

(i) Suppose, Let X be a subtraction semigroup and I is a left ideal of X, then for $i\in I$ and $x,y\in X,$ We have $xi-x(y-i)=xi-(xy-xi)=xi\in I$ by property (1) of subtraction algebra. Thus we have, $XI\subseteq I.$

(ii) Now, if X is a zero-symmetric near-subtraction semigroup, Then we have $xi-x(0-i)=xi-0=xi\in X$ for all $i\in I$ and $x\in X.$

Definition 2.7:

Define a mapping $\mu{:}X\longrightarrow[0,1]$ is called fuzzy set of X and its complement is denoted by μ' given by $\mu'(x)=1-\mu(x)$ for all $x\in X.$

Definition 2.8:

An interval valued number $\bar{a}$ on $[0,1]$ is a closed subinterval of $[0,1]$, i.e, $\bar{a}=[a^-,a^+]$ such that $0\le a^-\le a^+\le 1,$ where a^- and a^+ are the lower and upper limits of $\bar{a}$ respectively. In this notation, $\bar{0}=[0,0]$ and $\bar{1}=[1,1]$. For, any two interval number $\bar{a}=[a^-,a^+]$ and $\bar{b}=[b^-,b^+]$ on $[0,1]$. Define

(1) $\bar{a}\le\bar{b}\Leftrightarrow a^-\le b^-$ and $a^+\le b^+$

(2) $\bar{a} = \bar{b} \Leftrightarrow a^- = b^-$ and $a^+ = b^+$

Definition 2.9:

Let X be a non-empty set. Define a mapping $\mu : X \to D[0,1]$ is called an interval valued fuzzy subset (briefly i-v fuzzy subset) of X, where $D[0,1]$ denotes the family of all closed subintervals of $[0,1]$and $\bar{\mu}(x) = [\mu^-(x), \mu^+(x)]$, $\mu^-$and μ^+ are fuzzy subsets of X such that $\mu^-(x) \le \mu^+(x)$for all $x \in X$. Thus $\bar{\mu}(x)$is an interval (a closed subset of $[0,1]$) as in the case of a fuzzy set.

Definition 2.10:

A mappings $min^i : D[0,1] \times D[0,1] \to D[0,1]$ defined by $min^i(\bar{a},\bar{b}) = [\min(a^-, b^-), \min(a^+, b^+)]$ for all $\bar{a}, \bar{b} \in D[0,1]$is called an interval min-norm. A mapping $max^i : D[0,1] \times D[0,1] \to D[0,1]$ defined by $max^i(\bar{a},\bar{b}) = [\max(a^-, b^-), \max(a^+, b^+)]$ for all $\bar{a}, \bar{b} \in D[0,1]$is called an interval max-norm. Let min^i *and* max^i be the interval min-norm and interval max-norm on $D[0,1]$ respectively. Then the following are true.

(1) $min^i\{\bar{a}, \bar{a}\} = \bar{a}$ and $max^i\{\bar{a}, \bar{a}\} = \bar{a}$ for all $\bar{a} \in D[0,1]$.

(2) $min^i\{\bar{a}, \bar{b}\} = min^i\{\bar{b}, \bar{a}\}$ and $max^i\{\bar{a}, \bar{b}\} = max^i\{\bar{b}, \bar{a}\}$ for all $\bar{a}, \bar{b} \in D[0,1]$.

(3) If $\bar{a} \ge \bar{b} \in D[0,1]$, then $min^i\{\bar{a}, \bar{c}\} \ge min^i\{\bar{b}, \bar{c}\}$ and $min^i\{\bar{a}, \bar{c}\} \ge min^i\{\bar{b}, \bar{c}\}$ for all $\bar{c} \in D[0,1]$.

Definition 2.11:

If $\bar{\mu}$ is an i-v fuzzy subset of a set and $[t_1, t_2] \in D[0,1]$. Then the set $\bar{U}(\bar{\mu} : [t_1, t_2]) = \{x \in X / \bar{\mu}(x) \ge [t_1, t_2]\}$, is called the upper level set of $\bar{\mu}$.

Definition 2.12:

Let $\bar{\mu}, \bar{v}, \bar{\mu}_i (i \in \Omega)$be i-v fuzzy subsets of X. The following are defined by

(1) $\bar{\mu} \le \bar{v} \Leftrightarrow \bar{\mu}(x) \le \bar{v}(x)$

(2) $\bar{\mu} = \bar{v} \Leftrightarrow \bar{\mu}(x) = \bar{v}(x)$.

(3) $(\bar{\mu} \cup \bar{v})(x) = max^i\{\bar{\mu}(x), \bar{v}(x)\}$.

(4) $(\bar{\mu} \cap \bar{v})(x) = min^i\{\bar{\mu}(x), \bar{v}(x)\}$

(5) $\bigcup_{i \in \Omega} \bar{\mu}_i(x) = sup^i\{\bar{\mu}_i(x) \backslash i \in \Omega\}$

(6) $\bigcap_{i \in \Omega} \bar{\mu}_i(x) = inf^{\,i}\{\bar{\mu}_i(x) \backslash i \in \Omega\}$.

where $inf^i\{\bar{\mu}_i(x) \backslash i \in \Omega\} = [inf\{\mu^-{}_i(x)\}, inf\{\mu^+{}_i(x)\}]$ is the i-v infimum norm and $sup^i\{\bar{\mu}_i(x) \backslash i \in \Omega\} = [sup\{\mu^-{}_i(x)\}, sup\{\mu^+{}_i(x)\}]$ is the i-v supremum norm

3. Interval valued fuzzy ideals of `Near-Subtraction semigroups

Here, we introduce the notion of interval valued fuzzy ideal of X.In this Session, X denote a near- subtraction semigroup.

Definition 3.1:

An interval valued fuzzy set $\bar{\mu}$ in X is called i-v fuzzy ideal of X if it satisfies the following conditions

(1) $\bar{\mu}(x - y) \ge \min\{\bar{\mu}(x), \bar{\mu}(y)\}$ for all $x, y \in X$

(2) $\bar{\mu}(ax - a(b - x)) \ge \bar{\mu}(x)$ for all $a, b, x \in X$

(3) $\bar{\mu}(xy) \ge \bar{\mu}(x)$ for all $x, y \in X$

Note,$\bar{\mu}$ is an interval valued fuzzy left ideal of X if it satisfies the condition (1) and (2) and $\bar{\mu}$ *is a i*nterval valued fuzzy right ideal of X if it satisfies the conditions (1) and (3).

Example 3.2:Let $X = \{0,a,b\}$ in which $'-'$and $'\cdot'$ are defined by

-	0	a	b
0	0	0	0
a	a	0	a
b	b	b	0

.	0	a	b
0	0	0	0
a	0	a	0
b	a	0	b

Then $(X, -, \cdot)$ is a near- subtraction semigroup. Let $\bar{\mu}$ be a interval valued fuzzy set on X defined by, $\bar{\mu}(0) = 0.8$, $\bar{\mu}(a) = 0.5$ and , $\bar{\mu}(b) = 0.3$. Then by the calculation, it can be easy to prove that, $\bar{\mu}$ is an interval valued fuzzy ideal of X.

Theorem 3.3:

If $\{\bar{\mu}_i / i \in \Omega\}$ is a family of i-v fuzzy ideals of a near-subtraction semigroup of X, then $\bigcap_{i\in\Omega}\bar{\mu}_i$ is also a i-v fuzzy ideal of X, where Ω is any index set.

Proof: Let $x, y, a, b \in X$. Then

$$\bigcap_{i\in\Omega}\bar{\mu}_i(x-y) = inf^{\,i}\{\bar{\mu}_i(x-y): i\in\Omega\}$$

$$\geq inf^i\{\, min^i\{\bar{\mu}_i(x),\bar{\mu}_i(y)\}: i\in\Omega\} = min^i\{\{\, inf^i\bar{\mu}_i(x): i\in\Omega\},\{\, inf^i\bar{\mu}_i(y): i\in\Omega\}\}$$

$$= min^i\{\cap_{i\in\Omega}\bar{\mu}_i(x),\cap_{i\in\Omega}\bar{\mu}_i(y)\}.$$

$$\bigcap_{i\in\Omega}\bar{\mu}_i(xy) = inf^{\,i}\{\bar{\mu}_i(xy): i\in\Omega\} \geq inf^i\{\, min^i\bar{\mu}_i(x): i\in\Omega\} = \{\bigcap_{i\in\Omega}\bar{\mu}_i(x)\}$$

$$\bigcap_{i\in\Omega}\bar{\mu}_i(ax-a(b-x)) = inf^i\{\bar{\mu}_i(ax-a(b-x)) i\in\Omega\} \geq inf^i\{\bar{\mu}_i(x): i\in\Omega\} = \{\bigcap_{i\in\Omega}\bar{\mu}_i(x)\}$$

Therefore, $\cap_{i\in\Omega}\bar{\mu}_i$ is an i-v fuzzy ideal of X.

Theorem 3.4:

Suppose $\bar{\mu}$ is an i-v fuzzy subset of X. $\bar{\mu} = [\mu^-, \mu^+]$is an i-v fuzzy left ideal of X if and only if μ^+, μ^- are fuzzy left ideals of X.

Proof: Now, Let us assume that $\bar{\mu}$ is an i-v fuzzy left ideal of X.For any $x,y,\epsilon X$. We have $[\mu^-(x-y), \mu^+(x-y)] = \bar{\mu}(x-y) \geq min^i\{\bar{\mu}(x),\bar{\mu}(y)\}$= $min^i\{[\mu^-(x), \mu^+(x)],[\mu^-(y), \mu^+(y)]\}$=[min$\{\mu^-(x), \mu^-(y)\}$, min $\{\mu^+(x), \mu^+(y)\}$].

It follows that $\mu^-(x-y) \geq min^i\{\mu^-(x),\mu^-(y)\}$ and $\mu^+(x-y) \geq \min\{\mu^+(x),\mu^+(y)\}$. Also, $[\mu^-(ax-a(b-x)),\ \mu^+(ax-a(b-x))] = \bar{\mu}(ax-a(b-x) \geq \bar{\mu}(x) = [\mu^-(x),\mu^+(x)]$. It follows that $\mu^-(ax-a(b-x)) \geq \mu^-(x) and \mu^+(ax-a(b-x)) \geq \mu^+(x)$.

Conversely, assume that μ^-, μ^+ are fuzzy left ideal of X.

Let $x,y,a,b\epsilon X$, then:

$\bar{\mu}(x-y) = [\mu^-(x-y),\mu^+(x-y)] \geq [\min\{\mu^-(x),\mu^-(y)\},\min\{\mu^+(x),\mu^+(y)\}]$=

$min^i\{[\mu^-(x),\mu^+(x)\},[\mu^-(y),\mu^+(y)]\}$ =

$min^i\{\bar{\mu}(x),\bar{\mu}(y)\mu^-(ax-a(b-x)),\ \mu^+(ax-a(b-x))] = \bar{\mu}(ax-a(b-x) \geq \bar{\mu}(x)$.

Hence, $\bar{\mu}$ is an i-v fuzzy left ideal of X.

Theorem 3.5:

$\bar{\mu}$ is an i-v fuzzy subset of X. $\bar{\mu} = [\mu^-, \mu^+]$is an i-v fuzzy right ideal of X if and only if μ^+, μ^- are fuzzy right ideals of X.

Proof: Let us, assume that $\bar{\mu}$ is an i-v fuzzy right ideal of X. We have: $[\mu^-(x-y), \mu^+(x-y)] = \bar{\mu}(x-y) \geq min^i\{\bar{\mu}(x), \bar{\mu}(y)\} = min^i\{[\mu^-(x), \mu^+(x)], [\mu^-(y), \mu^+(y)]\}$ $=[\min\{\mu^-(x), \mu^-(y)\}, \min\{\mu^+(x), \mu^+(y)\}]$ for any $x, y, \epsilon X$. From that, it follows that $\mu^-(x-y) \geq min^i\{\mu^-(x), \mu^-(y)\}$ and $\mu^+(x-y) \geq \min\{\mu^+(x), \mu^+(y)\}$. It follows that $\mu^-(xy) \geq min\{\mu^-(x), \mu^-(y)\}$ and $\mu^+(xy) \geq \min\{\mu^+(x), \mu^+(y)\}$.
Also, $[\mu^-(xy), \mu^+(xy)] = \bar{\mu}(xy) \geq \bar{\mu}(x) = [\mu^-(x), \mu^+(x)]$. It follows that $\mu^-(xy) \geq \mu^-(x)$ and $\mu^+(xy) \geq \mu^+(x)$.
Conversely, assume that μ^-, μ^+ are fuzzy right ideal of X. Let $x, y, a, b \epsilon X$. Then:
$\bar{\mu}(x-y) = [\mu^-(x-y), \mu^+(x-y)] \geq min^i\{[\mu^-(x), \mu^+(x)], [\mu^-(y), \mu^+(y)]\} =$
$min^i\{\bar{\mu}(x), \bar{\mu}(y)\} \bar{\mu}(xy) = [\mu^-(xy), \mu^+(xy)] \geq [min\{\mu^-(x), \mu^-(y)\}, \min\{\mu^+(x), \mu^+(y)\}] =$
$[min\{\mu^-(x), \mu^+(x)\}, \min\{\mu^-(y), \mu^+(y)\}] = \min\{\bar{\mu}(x), \bar{\mu}(y)\}$.
Hence, $\bar{\mu}$ is an i-v fuzzy right ideal of X.

Theorem 3.6:

If $\bar{\mu}$ is an i-v fuzzy subset of subtraction semigroup X. $\bar{\mu} = [\mu^-, \mu^+]$ is an i-v fuzzy ideal of X if and only if μ^+, μ^- are fuzzy ideals of X.

Theorem 3.7:

If $\bar{\mu}$ is an i-v fuzzy subset of X. Also, $\bar{\mu}$ is an i-v fuzzy left ideal of X if and only if $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a left ideal of X, for all $[t_1, t_2] \in D[0,1]$.

Proof: Let us, assume that $\bar{\mu}$ is an i-v fuzzy left ideal of X. Let $[t_1, t_2] \in D[0,1]$ such that $x, y \in \bar{U}(\bar{\mu}: [t_1, t_2])$. Let $\bar{\mu}(x-y) \geq \min\{\bar{\mu}(x), \bar{\mu}(y)\} = \min\{[t_1, t_2], [t_1, t_2]\} = [t_1, t_2]$. Thus, $x - y \epsilon \bar{U}(\bar{\mu}: [t_1, t_2])$. Hence $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a subalgebra of X. Let $x \in \bar{U}(\bar{\mu}: [t_1, t_2])$ and $y \epsilon X$. Then, $\bar{\mu}(ax - a(b-x)) \geq \bar{\mu}(x) = [t_1, t_2]$. Therefore, $(ax - a(b-x)) \in \bar{U}(\bar{\mu}: [t_1, t_2])$. Let $a, b \in \bar{U}(\bar{\mu}: [t_1, t_2])$ and $x, y \epsilon X$. Then $\bar{\mu}(ax - a(b-x)) \geq \bar{\mu}(x) = [t_1, t_2]$. Therefore, $(ax - a(b-x)) \in \bar{U}(\bar{\mu}: [t_1, t_2])$. Hence $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a left ideal of X. Conversely, assume that $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a left ideal of X for all $[t_1, t_2] \in D[0,1]$. Let $x, y \epsilon X$. Suppose $\bar{\mu}(x-y) < \min\{\bar{\mu}(x), \bar{\mu}(y)\}$. Choose an interval $\bar{a} = [a_1, a_2] \in D[0,1]$ such that $\bar{\mu}(x-y) < [a_1, a_2] < \min\{\bar{\mu}(x), \bar{\mu}(y)\}$. This implies $\bar{\mu}(x) > [a_1, a_2]$ and $\bar{\mu}(y) > [a_1, a_2]$. Then we have $x, y \in \bar{U}(\bar{\mu}: [a_1, a_2])$ and since $\bar{U}(\bar{\mu}: [a_1, a_2])$ is a left ideal of X, $x - y \in \bar{U}(\bar{\mu}: [a_1, a_2])$. Hence $\bar{\mu}(x-y) \geq [a_1, a_2]$, a contradiction. Then, $\bar{\mu}(x-y) \geq \min\{\bar{\mu}(x), \bar{\mu}(y)\}$. Suppose $\bar{\mu}(ax - a(b-x)) < \bar{\mu}(x)$. Choose an interval $\bar{a} = [a_1, a_2] \in D[0,1]$ such that $\bar{\mu}(ax - a(b-x)) < [a_1, a_2] < \bar{\mu}(x)$. This implies that $\bar{\mu}(x) > [a_1, a_2]$. Then we have $x \in \bar{U}(\bar{\mu}: [a_1, a_2])$ and $ax - a(b-x) \in \bar{U}(\bar{\mu}: [a_1, a_2])$ Hence, $\bar{\mu}(ax - a(b-x)) \geq [a_1, a_2]$, a contradiction. Thus $\bar{\mu}(ax - a(b-x)) \geq \bar{\mu}(x)$. Therefore $\bar{\mu}$ is an i-v fuzzy left ideal of X.

Theorem 3.8:

If $\bar{\mu}$ is an i-v fuzzy subset of X. $\bar{\mu}$ is an i-v fuzzy right ideal of X if and only if $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a right ideal of X, for all $[t_1, t_2] \in D[0,1]$.

Proof: First we, assume that $\bar{\mu}$ is an i-v fuzzy right ideal of X. Let $[t_1, t_2] \in D[0,1]$ such that $x, y \in \bar{U}(\bar{\mu}: [t_1, t_2])$. Let $\bar{\mu}(x-y) \geq \min\{\bar{\mu}(x), \bar{\mu}(y)\} = \min\{[t_1, t_2], [t_1, t_2]\} = [t_1, t_2]$. Thus, we have $x - y \epsilon \bar{U}(\bar{\mu}: [t_1, t_2])$. Hence $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a subalgebra of X. Let $y \in \bar{U}(\bar{\mu}: [t_1, t_2])$ and $x \epsilon X$. Then, $\bar{\mu}(xy) \geq \bar{\mu}(x) = [t_1, t_2]$. Therefore, $xy \in \bar{U}(\bar{\mu}: [t_1, t_2])$. Hence $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a right ideal of X. Conversely, we assume that $\bar{U}(\bar{\mu}: [t_1, t_2])$ is a left ideal of X for all $[t_1, t_2] \in D[0,1]$. Let $x, y \epsilon X$. Suppose that $\bar{\mu}(x-y) < \min\{\bar{\mu}(x), \bar{\mu}(y)\}$. Now, Choose an interval $\bar{a} = [a_1, a_2] \in D[0,1]$ such that $\bar{\mu}(x-y) < [a_1, a_2] < \min\{\bar{\mu}(x), \bar{\mu}(y)\}$. This implies that $\bar{\mu}(x) > [a_1, a_2]$ and $\bar{\mu}(y) > [a_1, a_2]$.

Then, $x,y \in \overline{U}(\bar{\mu}: [a_1,a_2])$ and since $\overline{U}(\bar{\mu}: [a_1,a_2])$ is a right ideal of X, $x - y \in \overline{U}(\bar{\mu}: [a_1,a_2])$. Hence, We have $\bar{\mu}(x-y) \geq [a_1,a_2]$, a contradiction. Then, $\bar{\mu}(x-y) \geq \min\{\bar{\mu}(x),\bar{\mu}(y)\}$. Suppose that $\bar{\mu}(xy) < \bar{\mu}(x)$. Choose an interval $\bar{a} = [a_1,a_2] \in D[0,1]$ such that $\bar{\mu}(xy) < [a_1,a_2] < \bar{\mu}(x)$. This implies that $\bar{\mu}(x) > [a_1,a_2]$. Then $y \in \overline{U}(\bar{\mu}: [a_1,a_2])$ and since $\overline{U}(\bar{\mu}: [a_1,a_2])$ is a right ideal of X, $xy \in \overline{U}(\bar{\mu}: [a_1,a_2])$. Hence $\bar{\mu}(xy) \geq [a_1,a_2]$, a contradiction. Thus, $\overline{\mu}(xy) \geq \bar{\mu}(x)$.
Therefore $\bar{\mu}$ is an i-v fuzzy right ideal of X.

Theorem 3.9:

Suppose $\bar{\mu}$ is an i-v fuzzy subset of X.Let $\bar{\mu}$ be an i-v fuzzy ideal of X if and only if $\overline{U}(\bar{\mu}: [t_1,t_2])$ is a ideal of X, for all $[t_1,t_2] \in D[0,1]$.

Theorem 3.10:

If $\bar{\mu}$ is an i-v fuzzy left ideal of X. Then the set $X_{\bar{\mu}} = \{x \in X \mid \bar{\mu}(x) = \bar{\mu}(0)\}$ is a left ideal of X.

Proof: Let x, $y \in X_{\bar{\mu}}$. Suppose that, $\bar{\mu}$ is a i-v fuzzy left ideal of X. Then, $\overline{\mu}(x-y) \geq \min\{\bar{\mu}(x), \bar{\mu}(y)\} = \bar{\mu}(0)$. Thus, we get $x-y \in X_{\bar{\mu}}$ .For all a, $b \in X$ and $x \in X_{\bar{\mu}}$, we have $\bar{\mu}(ax - a(b-x)) \geq \bar{\mu}(x) = \bar{\mu}(0)$Thus, $ax-a(b-x) \in X_{\bar{\mu}}$. Hence, $X_{\bar{\mu}}$ is a left ideal of X.

Theorem 3.11:

Let $\bar{\mu}$ be an i-v fuzzy right ideal of X. Then the set $X_{\bar{\mu}} = \{x \in X \mid \bar{\mu}(x) = \bar{\mu}(0)\}$ is a right ideal of X .

Theorem 3.12:

Let $\bar{\mu}$ is be i-v fuzzy ideal of X. Then the set $X_{\bar{\mu}} = \{x \in X \mid \bar{\mu}(x) = \bar{\mu}(0)\}$ is a ideal of X .

References

[1] J. C. Abbott, Sets, *Lattices and Boolean Algebras*, Allyn and Bacon, Boston, 1969.
[2] P. Dheena and G. Satheeshkumar, *On strongly regular near-subtraction semigroups,* Common Korean Math. Soc.22 (3) (2007) 33-330.
[3] Y. B. Jun, Kyung Ja Lee and Asghar Khan, *Ideal Theory of Subtraction algebras*, Sci. Math. Jpn 61(2005) 459-464.
[4] K. J. Lee and C. H. Park, *Somequestions on fuzzifications of ideals in subtractionalgebras*, commun. Korean Math. Soc.22(2007),pp.35-363.
[5] G. Pilz , *Near-rings*, North sHolland , Amsterdam, 1983.
[6] D. R. Prince Williams , Fuzzy ideals in near-subtraction semigroups, International Scholarly and Scientific Research & Innovation 2 (7) (2008) 625-632.
[7] E. H. Roh , K. H. Kim , and Jong Geol Lee, *On Prime and semiprime ideals in subtraction semigroups,* Scientiae Mathematicae Japonicae 61(2005) , no.2,259 266.
[8] B. M. Schein, *Difference Semigroups*, Communications in algebras 20(1992), 21532169
[9] N. Thillaigovidan and V. Chinnadurai, *On Interval valued fuzzy quasi- ideals ofsemigroups,* East Asian Mathematics Journals , 25(2009), no.4, 49-467.
[10] N. Thillaigovidan and V. Chinnadurai, *Interval valued fuzzy ideals of near-rings*, J. Fuzzy Math.23(2)(2015) 471-484.
[11] L.A. Zadeh, *Fuzzy sets*, Inform and control, 8(1965), 338-353.
[12] B. Zelinka, *Subtraction semigroups* , Math. Bohemica 120 (1995), 445 447