iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** I **Month of publication:** January 2019

DOI: http://doi.org/10.22214/ijraset.2019.1111

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue I, Jan 2019- Available at www.ijraset.com

S-Norm Normal Fuzzy Soft Additive Near-Ring

S. Kolanchinathan[1], Dr. S. Subramanian[2]
[1]Research Scholar, Department of Mathematics, PRIST University, Tanjore, Tamilnadu
[2]Professor, Department of Mathematics, PRIST University, Tanjore, Tamilnadu

Abstract: In this paper, we study (m,n) – S- fuzzy soft subgroup structure under suitable norm . By using a s-norm S, we characterize some basic properties of relational aspect has been investigated. Also, we define relational concept of normal (m,n) – S- fuzzy soft subgroup structure with suitable example.
Keywords: S-norm, fuzzy subset, relation, (m,n)- S-fuzzy subgroups, max norm, normal, near-ring , union, intersection,

I. INTRODUCTION

Molodtsov [7] introduced the concept of soft set theory and started to develop the basics of the corresponding theory as a new approach for modeling uncertainties. A soft set can be considered as an approximate description of an object. Soft set theory has a rich potential for applications in several directions.

At present, works on soft set theory and its applications are progressing rapidly. Rosenfeld [9] introduced the idea of fuzzy groups on 1971. Maji et al.[6] presented some new definitions on soft sets. Pei et al.[8] discussed the relationship between soft sets and information systems. In 2001, Maji et al.[5] combined the fuzzy set and soft set models and introduced the concept of fuzzy soft set. To continue the investigation on fuzzy soft sets, Ahmad and Kharal [2] presented some more properties of them. Fuzzy set theory was first proposed by [10]. In this paper, we study (m,n) – S- fuzzy soft subgroup structure under suitable norm . By using a s-norm S, we characterize some basic properties of relational aspect has been investigated. Also, we define relational concept of normal (m,n) – S- fuzzy soft subgroup structure with suitable example.

II. BASIC DEFINITIONS AND PRELIMINARIES

In this section, we will analyze the elementary concepts and its basic properties.

Let R_1 ,R_2 be two arbitrary near-rings with addition operators. A fuzzy subset of R_1 x R_2 , we mean s function from R_1 x R_2 into [0,1]. The set of all fuzzy subsets of R_1 x R_2 is called the $[0,1]^m$ – power set of R_1 x R_2 and is denoted by $[0,1]^{R_1 x R_2}$.

A. *Definition 2.1*

By an s-norm S, we mean a function S: [0.1] x [0,1] → [0,1] satisfying the following axioms

(S1) S(x, 0) = x

(S2) S(x,y) ≤ S(y,z) if y ≤ z

(S3) S(x,y) = S(y,x)

(S4) S(x, S(y,z)) = S(S(x,y),z), for all x,y,z ε [0,1]. Suppose s-norm S is idempotent if S(x,x) = x , for all x ε [0,1].

B. *Proposition 2.2*

For an s-norm , then the following statement holds S(x,y) ≥ max {x,y}, for all x,y ε [0,1].

C. *Definition 2.3*

Let A be a fuzzy soft set of a group R_1 x R_2. Then A is (m-n)- S- norm fuzzy soft subring if for all (a,b), (c,d) ε R_1 x R_2,

1) A $((a,b)^m + (c,d)^n) \leq \max \{A(a,b)^m , A(c,d)^n\}$
2) $A((a,b)^{-m}) = A(a,b)^m$.

Usually the set of all (m-n) –S- fuzzy soft sub rings of R_1 x R is denoted by MNSFR.

D. *Example 2.4*

Let Z_2 = {0 ,1} , Z_3 = { 0,1,2} be two additive rings. Then

Z_2 x Z_3 = { (0,0), (0,1), (0,2), (1,0), (1, 1), (1,2)}. Define a fuzzy soft set A in Z_2 x Z_3 by

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$A(0.0)^m$	0.2
$A(1,0)^m$	0.7
$A(0,2)^m = A(0,1)^m$	0.3
$A(1,1)^m = A(1,2)^m$	0.6

If S(x, y) = min { 0, x +y -1 }, for all (x, y) ε Z_2 x Z_3, then A ε MNSFR (Z_2 x Z_3).

E. *Definition 2.5*

Let A_1, A_2 ε MNSFR (Z_2 x Z_3) and (a,b) ε R_1 x R_2. We define

(i) $A_1 \subseteq A_2$ if and only if $A_1(a, b) \geq A_2(a,b)$
(ii) $A_1 = A_2$ if and only if $A_1(a,b) = A_2(a,b)$.
(iii) (A_1 U A_2)(a ,b) = S {A_1(a,b), A_2(a,b)}.

Also we have A_1 U A_2 = A_2 U A_1 and associative laws are holds by using (S3) and (S4) of definition 2.1.

F. *Lemma 2.6*

Let S be a s-norm. Then S(S(a,b), S(w,c)) = S(S (a,w), S(b,c)), for all a,b,w,c ε [0,1].

G. *Proposition 2.7*

Let A_1 , A_2 ε MNSFR (R_1 x R_2).Then A_1 U A_2 ε MNSFR (R_1 x R_2).

Proof: Let (a,b), (c,d) ε R_1 x R_2.

$$(A_1 \cup A_2)((a,b)^m + (c,d)^n) = S(A_1((a,b)^m + (c,d)^n), A_2((a,b)^m + (c,d)^n))$$
$$\leq S(S(A_1((a,b)^m, A_1((c,d)^n), S(A_2((a,b)^m, A_2((c,d)^n)))$$
$$= S(S(A_1((a,b)^m, A_2((a,b)^m), S(A_1((c,d)^n, A2((c,d)^n)))$$
$$= S((A_1 \cup A_2)(a,b), (A_1 \cup A_2)(c,d)).$$

Also

$$(A_1 \cup A_2)(a,b)^{-m} = S(A_1(a,b)^{-m}, A_2(a,b)^{-m})$$
$$\leq S(A_1(a,b), A_2(a,b))$$
$$= (A_1 \cup A_2)(a,b).$$

Therefore union of MNSFR is also MNSFR.

H. *Corollary 2.8*

Let J_n = { 1,2,3 ……. n }. If {A_i / i ε J_n } ⊆ MNSFR (R_1 x R_2). Then
A = $\cup_{i\, \varepsilon\, Jn} Ai$ ε MNSFR (R_1 x R_2).

I. *Example 2.9*

Z_3 = { 0,1,2} be two additive rings. Then
Z_3 x Z_3 = { (0,0), (0,1), (0,2), (1,0), (1, 1), (1,2), (2,0) , (2,1) , (2,2)}. Define a fuzzy soft set A_1, A_2 in Z_3 x Z_3 by

$A(0.0)^m = 0.1$	$A(0.0)^n = 0.9$
$A(1,0)^m = 0.5$	$A(1,0)^n = 0.8$
$A(0,2)^m = 0.7$	$A(0,2)^n = 0.2$
$A(1,0)^m = 0.4$	$A(1,0)^n = 0.6$
$A(2,0)^m = 0.9$	$A(2,0)^n = 0.4$
$A(1,1)^m = 0.4$	$A(1,1)^n = 0.6$
$A(2,2)^m = 0.7$	$A(2,2)^n = 0.2$
$A(2,1)^m = 0.5$	$A(2,1)^n = 0.6$
$A(1,2)^m = 0.6$	$A(1,2)^n = 0.5$

respectively. If S(a,b) = min { 0, a +b – 1 }, for all (a,b) ε Z_3 x Z_3, then A_1, A_2, A_1 U A_2 ε MNSFR (R_1 x R_2).

III. NORMAL (M,N) –S-FUZZY SUBNEAR-RINGS.

1) *Definition 3.1:* Let A **ε** MNSFR (R_1 x R_2). Then A is called (m.n)- S-fuzzy soft normal subgroup of R_1 x R_2 if for all (a,b), (c,d) ε R1 x R2, $A((a,b)^m (c,d)^n (a,b)^{-m}) = A(c,d)^n$.
2) *Note 3.2:* The set of all (m.n)- S-fuzzy soft normal subgroup of R_1 x R_2 is represented as NMNSFR (R_1 x R_2).
3) *Proposition 3.3:* Let A ε NMNSFR (R_1 x R_2) and H1 x H2 be a near-ring. Suppose that ϕ is an epimorphism of R1 x R2 onto H1 x H2. Then ϕ (A) ε NMNSFR (R_1 x R_2).
4) *Proposition 3.4:* Let H1xH2 be a near-ring and α ε NMNSFR (R_1 x R_2). Suppose that ϕ is a homomorphism of R1 xR2 into H1 x H2. Then ϕ-1(α) ε NMNSFR (R_1 x R_2).
5) *Proposition 3.5:* Let A_1 , A_2 ε NMNSFR (R_1 x R_2).Then A_1 U A_2 ε NMNSFR (R_1 x R_2).
6) *Corollary 3.6:* Let J_n = { 1,2,3 ……. n }. If {A_i / i ε J_n } ⊆ NMNSFR (R_1 x R_2). Then A = $\bigcup_{i\,\varepsilon\, Jn} Ai$ ε NMNSFR (R_1 x R_2).
7) *Example 3.7:* Let Z_2 = {0 ,1} , Z_3 = { 0,1,2} be two additive rings. Then

Z_2 x Z_3 = { (0,0), (0,1), (0,2), (1,0), (1, 1), (1,2)}. Define a fuzzy soft set A in Z_2 x Z_3 by

A_1	$A_1(0,0)^m = A_1(0,1)^m = A_1(0,2)^m = A_1(1,0)^m = A_1(1,1)^m = A_1(1,2)^m = 0.723$
A_2	$A_2(0,0)^m = A_2(0,1)^m = A_2(0,2)^m = A_2(1,0)^m = A_2(1,1)^m = A_2(1,2)^m = 0.5$

IV. CONCLUSION

we study (m,n) – S- fuzzy soft subgroup structure under suitable norm . By using a s-norm S, we characterize some basic properties of relational aspect has been investigated. Also, we define relational concept of normal (m,n) – S- fuzzy soft subgroup structure with suitable example. One can obtain the similar results using soft G-modules and Neutrosophic soft near-rings.

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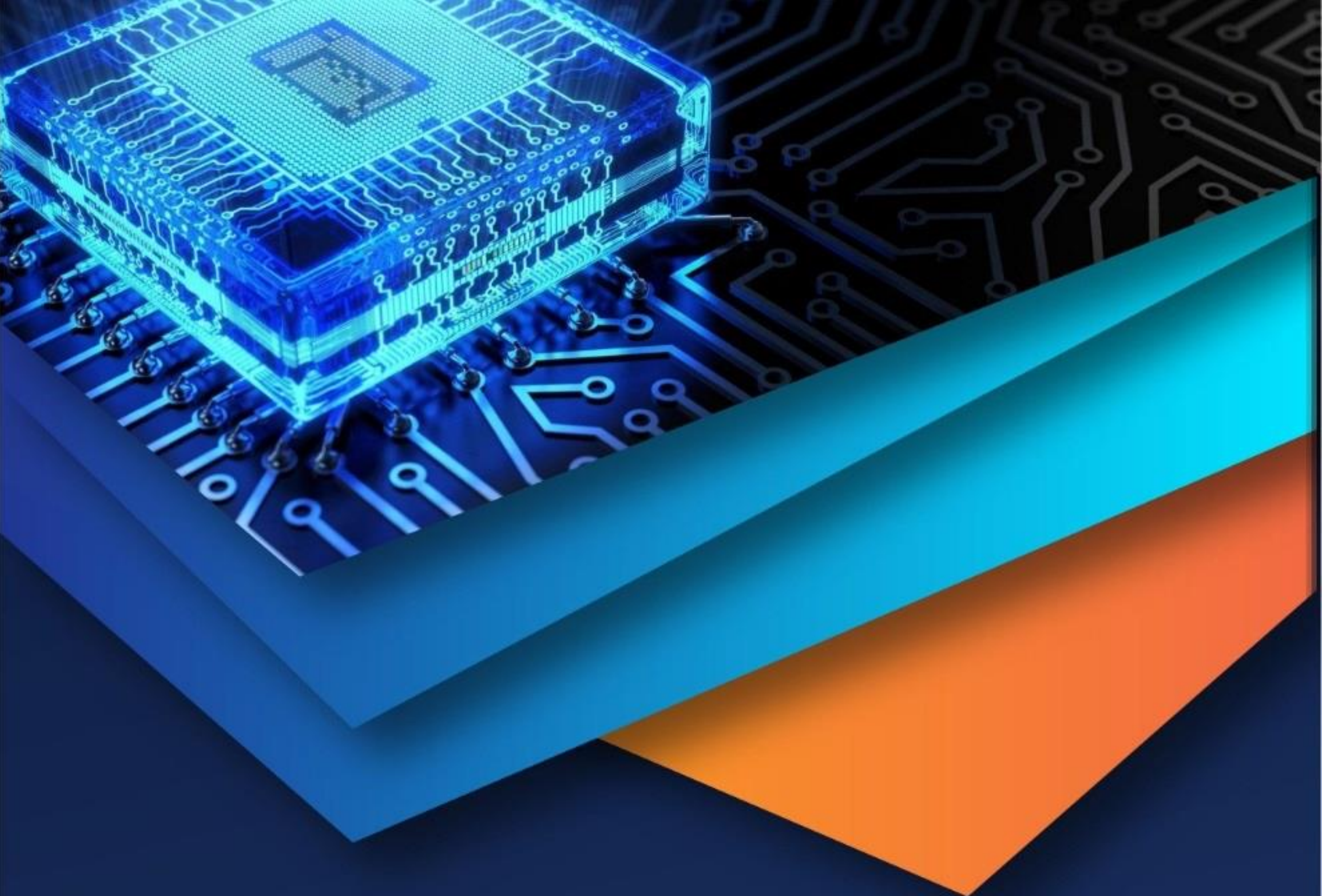

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