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ON PSEUDO COMPATIBLE P-FUZZY SOFT RELATIONS

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Abstract:

We introduce the notion of pseudo compatible P-fuzzy soft relations of a sub group, cossets of a group, strongest fuzzy soft relations and how they are related with fuzzy soft normal subgroups.

Key Words: Soft Set, Null Soft Set, Injection Function, Fuzzy Set, P-Fuzzy Soft Middle Cosset, Pseudo Fuzzy Cosset**,** Strongest Fuzzy Relation & Compatible Fuzzy Soft Set.

Introduction:

The concept of fuzzy sets was first introduced by Zadeh [23]. Rosenfeld [16] used this concept to formulate the notion of fuzzy groups. Since then, many other fuzzy algebraic concepts based on the Rosenfeld's fuzzy groups were developed. Anthony and Sherwood [1] redefined fuzzy groups in terms of t- norm which is replaced the min operations of Rosenfeld's definition. Some properties of these redefined fuzzy groups, which we call t- fuzzy groups, have been developed by Sherwood [18], sessa [17], sidky and misherf (19). However the definition of t- fuzzy groups seems to be too general. Soft set theory was introduced in 1999 by Molodtsov [15] for dealing with uncertainties and it has gone through remarkably rapid strides in the mean of algebraic structures as in [1, 2, 11, 14, 15, 16, 18, 21, 23]. Moreover, Atagun and Sezgin [5] defined the concepts of soft sub rings and ideals of a ring, soft subfields of a field and soft sub modules of a module and studied their related properties with respect to soft set operations. Operations of soft sets have been studied by some authors, too. Ali et al. [4] introduced several operations of soft sets and Sezgin and Atagun [21] studied on soft set operations as well. Furthermore, soft set relations and functions [6] and soft mappings [14] with many related concepts were discussed. Here we introduce the notion of pseudo compatible P-fuzzy soft relations of a subgroup, cossets of a group, strongest fuzzy soft relations and how they are related with fuzzy soft normal subgroups.

Section-2 Preliminaries:

In this section, we recall basic definitions of soft set theory that are useful for subsequent sections. For more detail see the papers [[11], [15],] Throughout the paper, U refers to an initial universe, E is a set of parameters and P(U) is the power set of U. $\subset$ and $\supset$ stand for proper subset and super set, respectively.

Definition 2.1 [22]: A pair (F, A) is called a soft set over U, where F is a mapping given by F: A→P(U).

In other words, a soft set over U is a parameterized family of subsets of the universe U. Note that a soft set (F, A) can be denoted by F_A. In this case, when we define more than one soft set in some subsets A, B, C of parameters E, the soft sets will be denoted by F_A, F_B, F_C, respectively. On the other case, when we define more than one soft set in a subset A of the set of parameters E, the soft sets will be denoted by F_A,G_A, H_A, respectively. For more details, we refer to [11, 17, 18, 26, 29, 7]. Note that the set of all soft sets over U will be denoted by S(U).

Definition 2.2 [12]: Let $\lambda, \mu \in$S(U). Then

(i) If $\lambda(e) = \emptyset$ for all $e \in E$, λ is said to be a null soft set, denoted by $\emptyset$.

(ii) If $\lambda(e) = U$ for all $e \in E$, λ is said to be an absolute soft set, denoted by U.

(iii) λ is a soft subset of μ , denoted $\lambda \subseteq \mu$, if $\lambda(e) \subseteq \mu(e)$ for all $e \in E$.

(iv) Soft union of λ and μ, denoted by $\lambda \cup \mu$, is a soft set over U and defined by $\lambda \cup \mu: E \to P(U)$ such that $(\lambda \cup \mu)(e) = \lambda(e) \cup \mu(e)$ for all $e \in E$.

(v) $\lambda = \mu$, if $\lambda \subseteq \mu$ and $\lambda \supseteq \mu$.

(vi) Soft intersection of λ and μ, denoted by $\lambda \cap \mu$, is a soft set over U and defined by $\lambda \cap \mu: E \to P(U)$ such that $(\lambda \cap \mu)(e) = \lambda(e) \cap \mu(e)$ for all $e \in E$.

(vii) Soft complement of λ is denoted by λ^c and defined by $\lambda^c : E \to P(U)$ such that $\lambda^c(e) = U/\lambda(e)$ for all $e \in E$.

Definition 2.3 [12]: Let E be a parameter set, $S \subset E$ and $\lambda: S \to E$ be an injection function. Then $S \cup \lambda(s)$ is called extended parameter set of S and denoted by ξ_S. If S=E, then extended parameter set of S will be denoted by ξ.

Definition 2.4 [6]: The relative complement of the soft set F_A over U is denoted by F^r_A, where F^r_A : A → P(U) is a mapping given as $F^r_A(a)$ =U \ $F_A(a)$, for all a ∈ A.

Definition 2.5 [6]: Let F_A and G_B be two soft sets over U such that A∩B ≠ ∅,. The restricted intersection of F_A and G_B is denoted by $F_A \Cap G_B$, and is defined as $F_A \Cap G_B$ =(H,C), where C = A∩B and for all c ∈ C, H(c) = F(c)∩G(c).

Definition 2.6 [6]: Let F_A and G_B be two soft sets over U such that A∩B ≠ ∅,. The restricted union of F_A and G_B is denoted by $F_A \cup_R G_B$, and is defined as $F_A \cup_R G_B$ = (H, C), where C = A∩B and for all c ∈ C, H(c) = F(c)∪G(c).

Definition 2.7 [12]: Let F_A and G_B be soft sets over the common universe U and ψbe a function from A to B. Then we can define the soft set ψ (F_A) over U, where ψ (F_A) : B→P(U) is a set valued function defined by ψ (F_A)(b) =∪{F(a) | a ∈ A and ψ (a) = b}, ifψ^{-1}(b) ≠ ∅, = 0 otherwise for all b ∈ B. Here, ψ (F_A) is called the soft image of F_A underψ. Moreover we can define a soft set ψ^{-1}(G_B) over U, where ψ^{-1}(G_B) : A → P(U) is a set-valued function defined by ψ^{-1}(G_B)(a) = G(ψ (a)) for all a ∈ A. Then, ψ^{-1}(G_B) is called the soft pre image (or inverse image) of G_B under ψ.

Definition 2.8 [13]: Let F_A and G_B be soft sets over the common universe U and ψ be a function from A to B. Then we can define the soft set $\psi^\star$(F_A) over U, where $\psi^\star$(F_A) : B→P(U) is a set-valued function defined by $\psi^\star$(F_A)(b)=∩{F(a) | a ∈ A and ψ (a) = b}, if ψ^{-1}(b) ≠ ∅, =0 otherwise for all b ∈ B. Here, $\psi^\star$(F_A) is called the soft anti image of F_A under ψ.

3. Structures of Fuzzy Soft Subgroup:

Definition 3.1: A mapping μ: X→ [0, 1], where X is an arbitrary non-empty set is called a fuzzy soft subset in X.

Definition 3.2: Let G be any group. A mapping μ: G→ [0, 1] is a fuzzy soft subgroup of G if (FSG1) μ (xy) ≥ min { μ(x) , μ(y)} (FSG2) $\mu(x^{-1})$ = μ(x) for all x,y ∈ G.

Example:

Let Z be the additive group of all integers. For any integer n, nZ denote the set of all integers multiplies of n.

(i,e) n Z = { 0, ± n, ±2n, ±3n……}. We have Z > 2Z > 4Z > 8Z > 16Z. Define μ : Z→ [0,1] by μ (x) = 1, if x έ 16Z; = 0.7, if x έ 8Z -16Z; = 0.5 if x έ 4Z-8Z; = 0.2 if x έ 2Z- 4Z; = 0 if x έ Z-2Z . It can be easily verified that μ is fuzzy soft sub group of Z. If the Supplementary condition (FSG_3) μ (e $_G$) = 1 are satisfied, then the fuzzy soft group is called a standardized fuzzy soft group where e_G is an identity of the group (G, ·)

Proposition 3.3:

A fuzzy soft subset μ of a group 'G' is a fuzzy soft subgroup of Ĝ if and only if μ (x y^{-1}) ≥ min { μ (x), μ (y) for every x, y in G

Proof:

Let 'μ' be a fuzzy soft subgroup of Ĝ. Form 'μ' is a fuzzy group (FSG_1) and (FSG_2) are satisfied.
μ (xy^{-1}) ≥ min { μ (x), μ (y^{-1})} = min {μ (x) μ (y) } conversely let μ (x y^{-1}) ≥ min {μ (x), μ (y)} in equality be satisfied. Choosing y = x we get that μ (xx^{-1}) = μ (e) ≥ min { μ (x), μ (x^{-1})} = μ (x). Hence for x=e. μ (y^{-1}) = μ (ey^{-1}) ≥ min { μ (e) μ (y) } = μ (x) consequently μ (xy^{-1}) ≥ min { μ (x) μ (y^{-1})} = min { μ(x), μ (y)}

Remarks 3.4: Let 'μ' be a fuzzy soft sub group of a group 'G' and x ∈ G. then μ (x y)= μ (y) for every y ∈ G if and only if μ (x) = μ (e)

Definition 3.5: Let 'μ' be a fuzzy soft sub group of a group 'G'. For any a ∈ G. are defined by (a μ) (x) = μ (a^{-1} x) for every x ∈ G is called the P-fuzzy soft cosset of the group G determined by 'a' and 'μ'

Definition 3.6: Let 'μ' be the fuzzy soft sub group of a group G. then for any a, b ∈ G a P-fuzzy soft middle cosset a μ b of the group G is defined by (a μ b) (x) = μ (a^{-1} x b_{-1}) for every x ∈ G.

Definition 3.7: Let 'μ' be a fuzzy soft sub group of G and a ∈ G. Then the P-pseudo fuzzy cosset $(a\mu)^p$ is defined by $(a\ \mu)^p$ (x) = p (a) μ (x) for every x ∈ G and for some p∈P.

Example:

Let G = {1, w, w^2} be a group with respect to multiplication where 'w' denotes the cube root of unity. Define a map μ : G → [0,1] by

$$\mu(x) = \begin{cases} 0.7 & \text{if } x = 1 \\ 0.3 & \text{if } x = w, w^2 \end{cases}$$

The pseudo fuzzy soft cosset $(a\ \mu)^p$ for p (x) = 0.4 for every x ∈ G to be equal to 0.28 if x =1 and 0.12 if x = w, w^2.

Definition 3.8: Let μ and λ be any two fuzzy soft subsets of a set 'X' and p ∈ P. the P-pseudo fuzzy soft double cosset to $(\mu\ x\ \lambda)^p$ is defined as $((\mu\ x\ \lambda)^p = (x\ \mu)^p \cap (x\ \mu)^p$ for x ∈ X.

Definition 3.9: Let λ and 'μ' be two fuzzy soft subgroups of a group 'G' then λ and μ are said to be P- fuzzy soft conjugate subgroups of G if for some $g \in G\lambda (x) = \mu (g^{-1} x g)$ for every $x \in G$.

4. Some Properties of Pseudo Fuzzy Softt Cosets:

Proposition 4.1:

Let 'μ' be a fuzzy soft subgroup of a group 'G'. Then P-pseudo fuzzy soft cosset $(a \mu)^{p}$ is a fuzzy soft sub group of 'G' for every $a \in G$.

Proof: Let 'μ' be a fuzzy soft sub group of G, for every x, y in G we have $(a \mu)^{p} (xy^{-1}) = p(a) \mu (xy^{-1}) \geq p (a) \min \{ \mu(x), \mu (y)\} = \min \{p(a) \mu (x), p (a), \mu (y)\} \geq \min \{ a \mu\}^{p} (x), (a, \mu)^{p} (y)\}$ for every $x \in G$. This proves that $(a \mu)^{p}$ is a fuzzy soft subgroup of G.

Remark 4.2: A fuzzy soft subgroup 'μ' of a group G is said to be positive fuzzy soft subgroup of 'G' if 'μ' is positive fuzzy soft subset of the group 'G'.

Proposition 4.3:

Every P- pseudo fuzzy soft double cosset is a fuzzy soft subgroup of a group 'G'

Proof:

(i) $(\mu \times \lambda)^{p} (x y) = \{ (x \mu)^{p} \cap (x \lambda)^{p} \} (xy) = (x \mu)^{p} (x y)$ and $(x \lambda)^{p} (xy) \}$

$= p (x) \mu (x y)$ and $p (x) \lambda (xy)\}$

$\geq p (x) \min \{ \mu (x), \mu (y) \}$ and $p (x) \min \{ \lambda (x), \lambda (y)\}$

$\geq \min \{p (x) \mu (x), p (x) \mu (y)\}$ and $\min \{ p (x) \lambda (x), p (x) \lambda (y)\}$

$\geq \min \{p (x) \mu (x), p (x) \mu (x)\}, \min\{p (x) \mu (y)$ and $p (x) \lambda (y)\}$

$= \min \{(x \mu)^{p} \cap (x \lambda)^{p}\} (x), (x \mu)^{p}$ n $(x \lambda)^{p}) (y)\}$

$\geq \min \{ (\mu \times \lambda)^{p} (x), (\mu \times \lambda)^{p} (y) \}$

(ii) $(\mu \times \lambda)^{p} (x) = \{(x \mu)^{p} \cap(x \lambda)^{p}\} (x) = (x \mu)^{p} \cap (x \lambda)^{p} (x)$

$= p (x) \mu (x)$ and $p (x) \lambda (x) = p (x) \mu (x)^{-1}$ and $p (x) \lambda (x)^{-1}$ (since λ and μ are fuzzy subsets) $= (x \mu)^{p} (x)^{-1}$ and $(x \lambda)^{p} (x)^{-1} = \{ (x \mu)^{p}$ n $(x \lambda)^{p} \} (x)^{-1} = (\mu \times \lambda)^{p} (x)^{-1}$

Theorem is proved.

Proposition 4.4:

Every P-fuzzy soft middle cosset of a group 'G' is a fuzzy soft subgroup of G.

Proof:

Let $a \mu b$ be a P-fuzzy soft middle cosset of the group 'G' and 'λ' and 'μ' be two P-conjugate fuzzy soft subgroups of G.

(i) $(a \mu b) (x y) = \mu (a^{-1} x y b^{-1}) = \lambda (x y)$ [$\because$ λ and μ conjugate fuzzy soft subgroups]

$\geq \min \{ \lambda (x), \lambda (y) \} \geq \min \{ \mu (a^{-1} x b^{-1}), \mu ((a^{-1} y b^{-1})\}$

$\geq \min \{ (a \mu b) (x), (a \mu b) (y)\}$

(ii) $(a \mu b) (x) = \mu (a^{-1} x b^{-1}) = \mu (a^{-1} x^{-1} b^{-1})$($\because$ 'μ' fuzzy sub group)$=(a \mu b) (x^{--1})$ Theorem is proved.

Definition 4.5: Let 'G' be a group. A fuzzy soft subgroup 'μ' of 'G' is called normal if $\mu (x) = \mu (y^{-1} x y)$ for all x, y in G. (or) A fuzzy soft subgroup μ_{H} of G is called a fuzzy soft normal subgroup of 'G' if $\mu_{H} (x y) = \mu_{H} (y x)$ for all x, y in G.

Proposition 4.6:

Every P-pseudo fuzzy soft cosset is a fuzzy soft normal subgroup of a group 'G'

Proof:

Let $(a \mu)^{p}$ be any P-pseudo fuzzy cosset. $a \in G$ and for some $p \in P$. Now $(a \mu)^{p} (x) = p (a) \mu (x)= p (a) \min \{ \mu (e) , \mu (x) \}= p (a) \min \{ \mu (y^{-1} y), \mu(x) \}$

$\geq p (a) \min \{ \min \{\mu (y)^{-1,} \mu (y)\},\mu (x) \}\geq p (a) \min \{\mu (y)^{-1} ,\min \{ \mu (y), \mu (x) \}$

$= p (a) \mu (y^{-1} x y)$ for all $y \in G$.

Aliter:

Let $(a \mu)^{p}$ be any P-pseudo fuzzy soft cosset and $a \in G$ for some $p \in P$, Let μ_{H} is a fuzzy soft normal subgroup of G. Now $(a \mu H)^{p} (x y) = p (a) \mu_{H} (xy)= p (a) \mu_{H} (y x)$ (μ_{H} is fuzzy soft normal)$= (a \mu_{H})^{p} (y x)$

Proposition 4.7:

The intersection of two P-pseudo fuzzy soft cosset normal subgroup is also fuzzy soft normal subgroup of a group.

Proof:

Let $(a \mu)^{p}$ and $(b \mu)^{p}$ be any two P-pseudo fuzzy soft cosset normal subgroup of G.

$(a \mu)^{p} (x) = (a \mu$ $^{p}(y^{-1} x y), y \in G$--- (1)

$(b \mu)^{p} (x) = (a \mu)^{p} (y^{-1} x y), y \in G$—(2)

Now, $\{(a\mu)^{p} \cap (b\mu)^{p} (x) = ((a \cap b)\mu)^{p} (x) = p (a \cap b) \mu (x) = p (a). p (b) \mu (x) = p (a). \mu (x)$ and $p (b) \mu (x)= (a \mu)^{p} (x)$ and $(b \mu)^{p} (x) = (a \mu)^{p} (y^{-1} x y)$ and $(b \mu)^{p} (y^{-1} x y)$ by ((i) & (ii))$= p (a). p (b) \mu (y^{-1} x y)= ((a \cap b) \mu)^{p} (y^{-1} xy) = \{ (a \mu)^{p} \cap (b \mu)^{p}\} (y^{-1} x y)$.

Theorem is proved

Aliter:

Let $(a\, \mu_H)^p \cap (b\, \mu_H)^p\}(x\, y) = ((a \cap b)\, \mu_H)^p\}(x\, y)= p\,(a \cap b)\, \mu\ (x\, y) = p\,(a \cap b)\, \mu_H\,(y\, x)$ (μ_H is fuzzy soft normal)= $(a \cap b)\, \mu_H)^p\}(y\, x)= \{ a \cap b)^p \cap (b\, \mu_H)^p\}\,(y\, x)$

Proposition 4.8:

P-Pseudo fuzzy soft double cosset is a fuzzy soft normal subgroup of a group ‘G’

Proof:

Let $(\mu \times \lambda)^p$ be any P- pseudo fuzzy soft double cosset for $x \in X$.

Now $(\mu \times \lambda)^p\ (x) = \{ (x\, \mu)^p \cap (x\, \lambda)^p\}(x)= (x\, \mu)^p (x) \cap (x\, \lambda)^p\}(x)$

$= p\,(x) \cap \mu\,(x) \cap p\,(x)\, \lambda\,(x)= p\,(x) \min \{\mu\,(x), \mu\,(e)\} \cap p\,(x) \min \{\lambda\,(x), \lambda\,(e)\}$

$= p\,(x) \min \{\mu\,(x), \mu\,(y^{-1} y)\} \cap p\,(x) \min \{\lambda\,(x), \lambda\,(y^{-1} y^{1})$

$\geq p(x) \min \{ \mu(x), \min \mu\,(y^{-1}), \mu(y) \} \cap$

$p\,(x) \min \{ \lambda\,(x), \min \{\lambda\,(y^{-1}), \lambda\,(y)\}$

$= p\,(x) \min \{\mu\,(y^{-1}), \mu\,(x\, y)\} \cap p\,(x) \min \{\lambda\,(y^{-1}), \lambda\,(x\, y)\}$

$= p\,(x)\ \mu\,(y^{-1} x\, y) \cap p\,(x)\ \lambda\,(y^{-1} x\, y)= \{ x\, \mu\}^p \cap (x\, \lambda)^p \}\,(y^{-1} x\, y)$

$= (\mu \times \lambda)^p\,(y^{-1} x\, y)$

Theorem is proved.

Proposition 4.9:

P-Fuzzy soft middle cossets forms a fuzzy soft normal subgroup of G.

Proof:

$(a\, \mu\, b)\,(x) = \mu\,(a^{-1} x\, b^{-1}) = \lambda\,(x) = \min \{ \lambda\,(x), \lambda\,(e) \}$

$= \min \{ \lambda\,(x), \lambda\,(y^{-1} y)\} \geq \min \{ \lambda\,(x), \min (\lambda\,(y^{-1}), \lambda\,(y))\}$

$= \min \{ \lambda\,(y^{-1}) \min (\lambda\,(x), \lambda\,(y)\}= \min (\lambda\,(y^{-1}), \lambda\,(x\, y) \} \ = \lambda\,(y^{-1} x)$

$= \mu\,(a^{-1}\,(y^{-1} x\, y)\, b^{-1}) = (a\, \mu\, b)\,(y^{-1} x\, y)$

Definition 4.10: The strong fuzzy soft α-cut is defined as $A^{+}_{\alpha}= \{x/A(x)> \alpha\}$ where A is any fuzzy soft set .

Definition 4.11: Let ‘A’ be a fuzzy soft set in a set S. Then the strongest fuzzy soft relation on ‘S’ (ie) fuzzy soft relation on ‘A’ is $\mu_A(x,y) = \min \{(A(x), A(y)\}$.

Definition 4.12: Cartesian Product: Let λ and μ be any two fuzzy soft sets in X. Then the cartesian Product of λ and μ is $\lambda x \mu$: $x \times x \to [0, 1]$ defined by $(\lambda \times \mu)\,(x,y) = \min \{\lambda(x)\, , \mu(y)\}$ for all $x,y\ \varepsilon$ X.

Proposition 4.13:

Let μ_A be a strongest Fuzzy soft relation on ‘S’ and ‘A^{+}_{α}’ be the strong α-cut .Then μ_A forms a strong α- cut fuzzy soft group on S.

Proof:

Let $A:S \to [0,1]$ be any function and μ_A be the strongest fuzzy soft relation on S.

(i) Let $x,y\ \varepsilon$ S

$\mu_A(x,y) = \min \{A(x), A(y)\} \ \geq \min \{\alpha,\alpha\} \geq \ \alpha$

(ii) $\mu_A(x^{-1},y^{-1}) = \min \{A(x^{-1}), A(y^{-1})\} = \min \{A(x), A(y)\} =\mu_A(x,y)$

(ii) $\mu_A(e, e) = \min \{A(e), A(e)\} = \min \{1,1\} \quad =1$

μ_A forms a strong fuzzy group α- cut on S.

Proposition 4.14:

Let λ and μ be strong fuzzy soft α- cuts on S. Then $\lambda \times \mu$ is a strong fuzzy soft group α- cut.

Proof: Let $x,y\varepsilon S$ and λ: $x \times x \to [0,1]$ be any function.

(i) $(\lambda \times \mu)\,(x,y) = \min \{\lambda\,(x),\ \mu\,(y)\}\geq \min \{\alpha,\alpha\}\geq \quad \alpha$

(ii) $(\lambda \times \mu)\,(x^{-1},y^{-1}) = \min \{\lambda\,(x^{-1}), \mu\,(y^{-1})\}= \ \min \{A(x), A(y)\}=(\lambda \times \mu)\,(x, y)$

(ii) $(\lambda \times \mu)\,(e,e) = \min \{\lambda\,(e), \mu\,(e)\}= \min \{1,1\}=1$

$(\lambda \times \mu)$ forms a strong fuzzy soft group α-cut on S.

Remark 4.15: i) $\min (a,b)^i = \min \{a^i,b^i\}$ for all Positive integer ‘i’}

ii) $\mu_A i(x,y) = (\mu_A(x,y))^i= \ \min \{A(x), A(y)\}^i = \ \min \{A^i\,(x), A^i\,(y)\}$

Proposition 4.16:

Let $\mu_A{}^i$ and $\mu_A{}^j$ be two strong fuzzy soft relations and $A_\alpha{}^+$ be strong fuzzy soft α- cut .Then $\mu_{A^i{}_{UA^j}}$ forms a strong fuzzy soft α-cut on S.

Proof:

Since i<j

$\mu_{A^i{}_{UA^j}}\,(x,y) = \{(A^iUA^j,)\,(x),(A^i\ U\ A^j)\,(y)\}= \min \{\max \{A^i(x), A^j(x)\}, \max \{A^i(y), A^j(y)\}$

$= \max \{\min \{A^i(x), A^i(y)\}, \min \{A^j(x), A^j(y)\}$

$= \max \{\min \{A(x), A(y)\}^I,\min \{A(x), A(y)\}^j\}$

$\geq\max\{\min\{\alpha,\alpha\}^i,\min\{\alpha,\alpha\}^j\}$

$\geq \max\{\min\{\alpha^i,\alpha^i\},\min\{\alpha^j,\alpha^j\}\}\geq\max \{\alpha^i,\alpha^j\}\geq \alpha^i$

$\mu_A{}^i{}_{UA}{}^j$ is a strong fuzzy soft α-cut on S.

Remark 4.17: Let $\mu_A{}^i$ and $\mu_A{}^j$ be two strong fuzzy soft relations and $A_\alpha{}^+$ be strong fuzzy soft α-cut. Then $\mu_A{}^i{}_{nA}{}^j$ is a strong fuzzy soft α-cut on S.

Proof: It is obvious

Definition 4.18 : A fuzzy soft binary relation μ on a semi group 'S' is called P-fuzzy soft compatible iff μ (ac, bd) $\geq$ min {μ (a,b) , μ(c,d)} for all a,b,c,d ε S.

Preposition 4.19:

Let μ_A be the strongest fuzzy soft relation on S. Then $A_\alpha{}^+$ is a strong α-cut then μ_A forms P-fuzzy soft compatible.

Proof:

Now μ_A(ac, bd) = min {A(ac), (A(bd)} $\geq$ min {min {A(a), A(c)}, min (A(b) A(d)}

$\geq$ min {μ_A(a,b), μ_A(b,d)}

3.18 Proposition:

Let μ_A be a P-fuzzy soft compatible. Then μ_A is a strong fuzzy soft α-cut.

Proof:

Now μ_A (ac, bd) $\geq$ {μ_A (a, b), μ_A(b, d)} =min {min (A(a), A(b)}, min {A(b), A(d)}}>min {min {α,α}, min {α,α}}>min {α,α}> α. Hence μ_A is P-fuzzy soft compatible forms a strong fuzzy soft α-cut.

Conclusion:

Here we introduce the notion of pseudo compatible P-fuzzy soft relations of a subgroup, cossets of a group, strongest fuzzy soft relations and how they are related with fuzzy soft normal subgroups**.** One can obtain the similar ideal into Soft G-modular and L- fuzzy structures.

References:

1. J. M. Anthony and H .Sherwood, Fuzzy groups redefined J. Math. Anal. Appl.69 (1979), 124-130.
2. Acar U., Koyuncu F., Tanay B., Soft sets and soft rings, Comput. Math. Appl., 59(2010), 3458-3463.
3. Aktas. H., C. agman N., ˘ Soft sets and soft groups, Inform. Sci., 177(2007), 2726-2735.
4. Ali M.I.,Feng F., Liu X., Min W.K., Shabir M., On some new operations in soft set theory, Comput. Math. Appl., 57(2009), 1547-1553.
5. Atagun A.O., Sezgin A., Soft substructures of rings, fields and modules, Comput. Math. Appl., 61(3) (2011), 592-601.
6. Babitha K.V., Sunil J.J., Soft set relations and functions, Comput. Math. Appl., 60(7)(2010), 1840-1849.
7. Feng F., Jun Y.B., Zhao X., Soft semirings, Comput. Math. Appl., 56(2008), 2621–2628.
8. Feng F., Liu X.Y., Leoreanu-Fotea V., Jun Y.B., Soft sets and soft rough sets, Inform. Sci., 181(6) (2011), 1125-1137.
9. Jun Y.B., Soft BCK/BCI-algebras, Comput. Math. Appl., 56(2008), 1408 -1413.
10. Jun Y.B., Park C.H., Applications of soft sets in ideal theory of BCK/ BCI-algebras, Inform. Sci., 178(2008), 2466-2475.
11. Jun Y.B., Lee K.J., Zhan J., Soft p-ideals of soft BCI-algebras, Comput. Math. Appl., 58(2009), 2060-2068.
12. Kazancı O., Yılmaz S¸., Yamak S., Soft sets and soft BCH-algebras, Hacet. J. Math. Stat., 39(2)(2010), 205-217.
13. Majumdar P., Samanta S.K., on soft mappings, Comput. Math. Appl., 60 (9)(2010), 2666-2672.
14. Molodtsov D., Soft set theory-first results, Comput. Math. Appl., 37(1999), 19-31.
15. A. Rosenfeld, Fuzzy groups, J.math.Anal.Appl.35 (1971), 512- 517.
16. S. Sessa, on fuzzy subgroups and fuzzy ideals under triangular norms, Fuzzy sets and fuzzy systems, 13, (1984), 95-100.
17. H. Sherwood, Product of fuzzy subgroups, Fuzzy sets and systems, 11, (1983), 79-89.
18. F. I. Sidky and M. Atif Misherf, Fuzzy cossets and cyclic and abelian fuzzy subgroups, Fuzzy sets and systems, 43, (1991), 243-250.
19. Sezgin A., Atagun A.O., Ayg un E., A note on soft near-rings and idealistic soft near-rings, Filomat, 25(1)(2011), 53-68.
20. Sezgin A., Atagun A.O., on operations of soft sets, Comput. Math. Appl., 61(5) (2011), 1457-1467.
21. Zhan J., Jun Y.B., Soft BL-algebras based on fuzzy sets, Comput. Math. Appl., 59(6) (2010), 2037-2046. Fuzzy sets and systems, 43, (1991), 243-250.
22. L.A.Zadeh, Fuzzy sets, Inform and control, 8, (1965), 338-353.