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A Novel Fuzzy Soft Theory on Compact Spaces for Particular Issues

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Abstract— **The aim of this work is to study some properties related to fuzzy soft topological spaces particularly fuzzy soft boundary point, fuzzy soft compact space, fuzzy soft open base and fuzzy soft open sub-base.**

Keywords— Fuzzy soft set, fuzzy soft topological space, fuzzy soft interior, fuzzy soft closure, fuzzy soft boundary point,fuzzy soft neighborhood, fuzzy soft compact space, fuzzy soft open base, fuzzy soft open subbase, fuzzy soft basic open cover, fuzzy soft sub basic cover fuzzy soft closed base, fuzzy soft closed subbase.

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I. Introduction

We are not able to solve some kind of problems in Medical Science, Sociology, Economics, Environment,Engineering etc. by using classical methods because of the uncertainity.To deal with these uncertainties some theories like Fuzzy sets, rough sets intuitionistic fuzzy sets were developed as mathematical tools. [6] As these theories also have their own difficulties Soft theory was introduced by Molodtsov in 1999.

[5] Fuzzy soft set, a combination of fuzzy set and soft set was first introduced by Maji in 2001. [10] Later Topological structure of fuzzy soft sets has been introduced by B Tanay, MB Kandemir in 2011.[2] In 2012 J.Mahanta and PK Das introduced fuzzy soft point and studied the concept of neighborhood of a fuzzy soft point in a fuzzy soft topological space. They studied fuzzy soft closure and fuzzy soft interior etc.[4] T Simsekler and S Yuksel too studied and proved some results on this theory.Theydefined fuzzy soft open sets, fuzzy soft closed sets, fuzzy soft Q- neighborhoodetc in 2012. [8] TJ Neog, DK Sut and GC Hazarika have established some properties and propositions related to fuzzy soft topological spaces in 2012. [3] In 2013 S Atmaca and I Zorlutuna introduced the notion of soft quasi-coincidence for fuzzy soft sets and used this notion to characterize fundamental concepts of fuzzy soft topological spaces such as fuzzy soft closures, fuzzy soft bases and fuzzy soft continuity. Some basic properties are also presented.

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II. Preliminaries

Let U be an universal set and E be a collection of all possible parameters with respect to U, where parameters are the characteristics or properties of objects in U.

Definition 2.1: [9]. Let $A \subset E$ and $\rho(U)$ be the set of all fuzzy sets in U. Then the pair (FS, A) denoted by FS_A is called a fuzzy soft set over U, if FS: $A \longrightarrow \rho(U)$ is a function.

Definition 2.2: [9]. Two fuzzy soft sets FS_A and FS_B are said to be disjoint if $FS(a) \cap FS(b)=\phi, \forall\ a \in A, b \in B$.

Definition 2.3: [9]. A fuzzy soft set FS_A is said to be a subset of a fuzzy soft set FS_B, if $A \subset B$ and $FS_A(a) \leq FS_B(a) \quad \forall\ a \in A$.

Definition 2.4: [9]. The union of two fuzzy soft sets FS_A and FS_B over a common universe U is the fuzzy soft set $FS_{A\cup B}$ and $\forall\ e \in A\cup B$, we have

$$FS_{A\cup B}(e)=\begin{cases} S_A(e), & \text{if } e\in A-B;\\ S_B(e), & e\in B-A;\\ S_A(e)\cup S_B(e), & e\in B\cap A.\end{cases}$$

and We write $S_A \cup S_B = S_{A\cup B}$.

Definition 2.5: [9]. The intersection of two fuzzy soft sets FS_A and FS_B over a common universe U is the soft set $FS_{A\cap B}$ and $\forall\ e \in A\cap B$, $FS_{A\cap B}(e)=FS_A(e) \cap FS_B(e)$.

We write $FS_A \cap FS_B = FS_{A\cap B}$.

Definition 2.6: [4]. The complement of a fuzzy soft set FS_A, denoted by $FS_A{}'$ and is defined by $FS'(a)=(FS(a))' \forall\ a \in A$.

Definition 2.7: [4]. A fuzzy soft set FS_A over U is called a fuzzy soft null set, denoted by FS_ϕ if A=E and $\forall a\in E, FS(e) = \overline{0}$.

Definition 2.8: [4].A fuzzy soft set FS_A over U is called a fuzzy soft fullset, denotedby $\bar{S}_E$, if A=E and $\forall a \in E$, $FS(e) = \overline{1}$.

Definition 2.9: [4]. Let FS_A be a fuzzy soft set,{$\mathbf{FS_{A\alpha}}$}be the class of all fuzzy soft subsets of FS_A and **T** be a subclass of { $\mathbf{FS_{A\alpha}}$} .Then **T** is called a fuzzy soft topology onFS_A if the following conditions hold.

(i).FS_ϕ, $\bar{S}_A \in \mathbf{T}$;

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(ii). $FS_A, FS_B \in \mathbf{T} \Rightarrow FS_A \cap FS_B \in \mathbf{T}$;

(iii). $\{(FS_{A\lambda} \backslash \lambda \in \Lambda\} \subset \mathbf{T} \Rightarrow \bigcup_{\lambda \in \Lambda} FS_{A\lambda} \in \mathbf{T}$.

Then (FS_A, **T**) is called a fuzzy soft topological space. Members of **T**are called fuzzy soft open sets and their complements are called fuzzy soft closed sets.

Definition 2.10: [4]. Let (FS_A, **T**) be a fuzzy soft topological space and $FS_B \in \{ S_{A\alpha}\}$.Then the fuzzy soft topology $\mathbf{T}_B = \{ FS_B \cap FS_A \setminus FS_A \in \mathbf{T}\}$ is called fuzzy soft subspace and (FS_B, $\mathbf{T}_B$) is called fuzzy soft subspace of (FS_A, **T**).

Definition 2.11: [4]. A fuzzy soft set FS_A is said to be a fuzzy soft point in (FS_A, **T**),denoted by FS_{Ae}, if for the element $e \in A, FS(e) \neq \phi$ and $FS(e') = \phi, \forall e' \in A - \{e\}$.

Definition 2.12: [4].The complement of a fuzzy soft point FS_{Ae} is a fuzzy soft point $(FS_{Ae})'$ such that $FS_A'(e) = 1 - FS(e)$, and $FS_A'(e') = 1, \forall e' \in A - \{e\}$.

Definition 2.13: [2]. A fuzzy soft point $FS_{Ae}$is said to be in a fuzzy soft topological space $\{ FS_\phi, \bar{S}_E, FS_B \}$, denoted by $FS_{Ae} \in FS_B$ if for the element $e \in A, FS_A(e) \leq FS_B(e)$.

Example:- Let U={a, b, c, d} E={e1,e2,e3,e4,e5}, A={e1,e3,e4}, B={e1,e2,e3,e4} $FS_A=\{FS(e1)=\{a_{.2},b_{.4}c_{.0,}d_{.7}\},FS(e3)=\{a_{.5},b_{.0},c_{.8},d_{.4}\},FS(e4)=\{a_{.2},b_{.5},c_{.3},d_{.9}\}$.

$FS_B=\{FS(e1)=\{a_{.3},b_{.4},c_{.1},d_{.9}\},FS(e2)=\{a_{.3},b_{.0},c_{.4},d_{.4}\},FS(e3)=\{a_{.5},b_{.2},c_{.9},d_1\},FS(e4)=\{a_{.1},b_{.5},c_{.6},d_1\}\}$.

Here FS_{Ae1}, FS_{Ae3}, are the fuzzy soft points of the fuzzy soft topology $\{ FS_\phi, \bar{S}_E, FS_B\}$but FS_{Ae4} is not a fuzzy soft point of $\{FS_\phi, \bar{S}_E, FS_B \}$.

And $(FS_{Ae3})' = \{a_{.5}, b_1, c_{.2}, d_{.6}\}$.

Definition 2.14: [4] Let (FS_A, **T**) be a fuzzy soft topological space over FS_A,FS_B be a fuzzy soft subset of FS_A and $FS_A x$ be a fuzzy point in (FS_A, **T**), then $FS_B$is called a fuzzy soft neighborhood of $FS_A x$ if there exists a fuzzy soft open set FS_Csuch that $FS_A x$ FFSS$_C \subseteq_B$.

Definition 2.15: [2]. The fuzzy soft interior of a fuzzy soft set FS_A denoted by $\mathbf{I}(FS_A)$ is defined by the union of all fuzzy soft open sub sets of FS_A .

i.e = $\bigcup_i \{FS_{Bi}$: FS_{Bi} is fuzzy soft open sub set of $FS_A \}$

By the definition it is clear that

(i). $\mathbf{I}(FS_A)$ is a fuzzy soft open set **(ii).**$\mathbf{I}(FS_A) \subset FS_A$and **(iii).** If $FS_A$is fuzzy softopen then $FS_A = \mathbf{I}(FS_A)$.

(iv). $\mathbf{I}(FS_A)$ is the largest fuzzy soft open subset of FS_A

Definition 2.16: [10].The fuzzy soft closure of a fuzzy soft set FS_A denoted by $\bar{S}_A$ is defined by the intersection of all fuzzy soft closed super sets of FS_A.

i.e = $\bigcap_i \{FS_{Bi}$: FS_{Bi} is fuzzy soft closed super set of $FS_A \}$

By the definition it is clear that

(i). $\bar{S}_A$ is a fuzzy soft closed set **(ii).**$FS_A \subset \bar{S}_A$ and **(iii).** If FS_A is fuzzy soft closed then $FS_A = \bar{S}_A$.

Example :- Let U = {a,b,c,d} E = {e1,e2,e3,e4}, A = {e1,e3,e4}, B = {e1,e2,e3,e4}

$FS_A = \{S(e1) = \{a_{.2},b_{.4}c_{.0,}d_{.7}\},FS(e2) = \{a_0,b_0,c_0,d_0\}, FS(e3) = \{a_{.5},b_{.0},c_{.8},d_{.4}\}, FS(e4) = \{a_{.2},b_{.5},c_{.3},d_{.9}\}\}$

$FS_B = \{S(e1)=\{a_{.3},b_{.4},c_{.1},d_{.9}\}, FS(e2)=\{a_{.3},b_{.0},c_{.4},d_{.4}\}, FS(e3)=\{a_{.5},b_{.2},c_{.9},d_1\}, FS(e4) = \{a_{.7},b_{.5},c_{.6},d_1\}\}$.

Consider a fuzzy soft topology $\mathbf{T} = \{ \mathbf{FS}_\phi, \bar{S}_E, FS_A, FS_B\}$

$(FS_A)' = \{ FS'(e1) = \{a_{.8},b_{.6,}c_{1,}d_{.3}\},FS'(e2)=\{a_1,b_1,c_1,d_1\}, FS'(e3) = \{a_{.5},b_1,c_{.2},d_{.6}\}, FS'(e4) = \{a_{.8},b_{.5},c_{.7},d_{.1}\}\}$

$(FS_B)' = \{FS'(e1)=\{a_{.7},b_{.6},c_{.9},d_{.1}\}, FS'(e2)=\{a_{.7},b_1,c_{.6},d_{.6}\}, FS'(e3)=\{a_{.5},b_{.8},c_{.1},d_0\}, FS'(e4) = \{a_{.9},b_{.5},c_{.4},d_0\}\}$.

Clearly $(FS_A)'$ and $(FS_B)'$ are fuzzy soft closed sets

Now write $FS_C = \{ FS'(e1)=\{a_{.2},b_{.3},c_0,d_0\}, FS'(e2)=\{a_{.3},b_{.6},c_{.2},d_{.1}\}, FS'(e3)=\{a_{.3},b_{.1},c_0,d_0\}, FS'(e4) = \{a_0,b_{.4},c_{.3},d_0\}\}$.

Its clear that $FS_C \subset (FS_B)'$ and the fuzzy soft closure of S_C,

$\bar{S}_C = (FS_B)' \cap \bar{S}_E = (FS_B)' = \{FS'(e1)=\{a_{.7},b_{.6},c_{.9},d_{.1}\}, FS'(e2)=\{a_{.7},b_1,c_{.6},d_{.6}\}, FS'(e3)=\{a_{.5},b_{.8},c_{.1},d_0\}, FS'(e4) = \{a_{.9},b_{.5},c_{.4},d_0\}\}$.

Here we can observe that $FS_C \subset \bar{S}_C$

III. Fuzzy soft Boundary point

Definition 3.1 : A fuzzy soft point $FS_{Ae}$is said to be a fuzzy soft boundary point of a fuzzy soft set FS_Bif $FS_{Ae} \in \bar{S}_B \cap \overline{S_B'}$

Definition 3.2 : The set of all fuzzy soft boundary points over a fuzzy soft set FS_A is called fuzzy soft boundary of the set FS_A. and is denoted by $\mathbf{B}(FS_A)$.

Example:- Take $FS_A = \{ FS'(e1) = \{a_{.1},b_{.2,}c_{0,}d_0\}, FS'(e2)=\{a_{.2},b_0,c_0,d_0\}, FS'(e3) = \{a_{.3},b_0,c_{.8},d_0\}, FS'(e4) = \{a_0,b_{.2},c_{.1},d_0\}\}$

$FS_C = \{ FS(e1)=\{ a_{.2},b_{.3},c_0,d_0\}, FS(e2)=\{a_{.3},b_{.6},c_{.2},d_{.1}\}, FS(e3)=\{a_{.3},b_{.1},c_0,d_0\}, FS(e4) = \{a_0,b_{.4},c_{.3},d_0\}\}$.

$\bar{S}_C = \{FS(e1)=\{a_{.7},b_{.6},c_{.9},d_{.1}\}, FS(e2)=\{a_{.7},b_1,c_{.6},d_{.6}\}, FS(e3)=\{a_{.5},b_{.8},c_{.1},d_0\}, FS(e4) = \{a_{.9},b_{.5},c_{.4},d_0\}\}$.

$(FS_C)' = \{FS'(e1)=\{a_{.8},b_{.7},c_1,d_1\}, FS'(e2)=\{a_{.7},b_{.4},c_{.8},d_{.9}\},$

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FS'(e3)={$a_{.7}$,$b_{.9}$,$c_{.1}$,d_1}, FS'(e4) = {a_1,$b_{.6}$,$c_{.7}$,d_1}}.

$\overline{S_C}'$ = $(FS_A)' \cap \bar{S}_E$ =$(FS_A)'$= { FS'(e1) = {$a_{.9}$,$b_{.8}$,c_1,d_1}, FS'(e2)={$a_{.8}$,b_1,c_1,d_1}, FS'(e3) = {$a_{.7}$,b_1,$c_{.2}$,d_1},F S'(e4) = {a_1,$b_{.8}$,$c_{.9}$,d_1}}

Now **B**(FS_C)= F$\bar{S}_C$ ∩F$\overline{S_C}'$ = {FS(e1)={$a_{.7}$,$b_{.6}$,$c_{.9}$,$d_{.1}$}, FS(e2)={$a_{.7}$,b_1,$c_{.6}$,$d_{.6}$}, FS (e3)={$a_{.5}$,$b_{.8}$,$c_{.1}$,d_0}, FS(e4) = {$a_{.9}$,$b_{.5}$,$c_{.4}$,d_0}}.

A fuzzy soft point, FS_A = { FS'(e1) = {$a_{.1}$,$b_{.2}$,c_0,d_0}, FS'(e2)={$a_{.2}$,b_0,c_0,d_0}, FS'(e3) = {$a_{.3}$,b_0,$c_{.1}$,d_0}, FS'(e4) = {a_0,$b_{.2}$,$c_{.1}$,d_0}} is a fuzzy soft boundary point of FS_C. And we say $FS_{Ae} \in$ **B**(FS_C)$\forall$ e$\in$A.

Note:- Being the intersection of two fuzzy soft closed sets, the fuzzy soft boundary set is fuzzy soft closed.

Theorem 3.3: Let (FS_A, **T**) be a fuzzy soft topological space and $FS_C \in$ **T** then

(i). **B**(FS_C) $\subset \bar{S}_C$ i.e. the fuzzy soft boundary of a fuzzy soft set is subset of the fuzzy soft boundary of the set.

(ii). FS_C is fuzzy soft open set if and only if $FS_C \cap$**B**(FS_C)=FS_ϕ

(iii). FS_C is fuzzy soft closed if and only if**B**(FS_C) $\subset FS_C$

Proof:-

(i)By definition 3.2 we have ,**B**(FS_C)= F$\bar{S}_C \cap \overline{S_C}'$ ⇒**B**(FS_C) ⊂F$\bar{S}_C$.(Also **B**(FS_C) $\subset \overline{S_C}'$)

(ii). Suppose FS_C is fuzzy soft open ⇒ (FS_C)' is fuzzy soft closed.

∴(FS_C)' = $\overline{S_C}'$ ⇒**B**(FS_C) ⊂(FS_C)' Using (i)

⇒$FS_C \cap$**B**(FS_C)=FS_ϕ
Conversely suppose that

$FS_C \cap$**B**(FS_C)=FS_ϕ

$FS_C \cap$(F$\bar{S}_C \cap \overline{S_C}'$) = FSϕ⇒($FS_C \cap \overline{S_C}'$) =(FSϕ)

⇒$\overline{S_C}'$ ⊂(FS_C)'⇒

(FS_C)' = $\overline{S_C}'$ (since (FS_C)' ⊂F$\overline{S_C}'$) ⇒(FS_C)' is fuzzy soft closed set⇒FS_C is fuzzy soft open

(iii).Suppose FS_C is fuzzy soft closed, then FS_C =F$\bar{S}_C$ ⇒**B**(FS_C) ⊂FS_C. using (i).

Conversely suppose that **B**(FS_C) ⊂ FS_C

⇒ FS_C'∩ **B**(FS_C) = FS_ϕ⇒ FS_C' is fuzzy soft open set (from (ii))

⇒ FS_C is fuzzy soft closed set.

IV. Fuzzy Soft Compactness

Definition 4.1 : Let (FS_A, **T**) be a fuzzy soft topological space. A class {FS_{Gi}} of fuzzy soft subsets of FS_A is said to be a fuzzy soft open cover of FS_A if each fuzzy soft point in FS_A belongs to at least one FS_{Gi}.

Definition 4.2 : A subclass of a fuzzy soft open cover which itself is an open cover is called a fuzzy soft subcover.

Definition 4.3 :A fuzzy soft compact space is a fuzzy soft topological space in which every fuzzy soft open cover has a finite fuzzy soft subcover.

Definition 4.4 :A fuzzy soft compact subspace of a fuzzy soft topological space is a fuzzy soft subspace which is fuzzy soft compact as a fuzzy soft topological space in its own right.

Theorem 4.5:- Any fuzzy soft closed subspace of a fuzzy soft compact space is fuzzy soft compact.

Proof:- Let (FS_A, **T**) be a fuzzy soft compact space.

LetFS_B be a fuzzy soft closed subspace of FS_A.

Now we have to prove that FS_B is fuzzy soft compact space.

For this we need to show that every fuzzy soft open cover of FS_Bcontains a finite fuzzy soft subcover.

Let {FS_{Gi}}be a fuzzy soft open cover of FS_B.

By definition 4.1, FS_B= S_{Gi}………………(a)

Since each FS_{Gi} is a fuzzy soft open set in FS_B,FS_{Gi}=FS_{Hi} S_B…………..(b) , where $FS_{Hi} \subset FS_A$for each i by definition of relative fuzzy soft topology.

Since FS_B is fuzzy soft closed subspace of FS_A,FS_B' is fuzzy soft open subspace of FS_A.

And it implies that FS_A= FS_B FS_B'……………….(c)

= S_{Gi} FS_B'(Using (a)).

= S_{Gi} S_B')

= FS_{Hi} S_B) S_B'] (Using (b)).

= (FS_{Hi} S_B') FS_B FS_B')] By distributive property.

= [(FS_{Hi} S_B') S_A] (Using (c)).

= [FS_{Hi} S_B'], Since each FS_{Hi} and FS_B' are subsets of FS_A.

{FS_{Hi},FS_B'} is a fuzzy soft cover of FS_A.

Since FS_A is fuzzy soft compact, this fuzzy soft open cover has a finite fuzzy soft subcover.

Let it be {FS_{H1}, FS_{H2}, FS_{H3}, FS_{H4}……….,FS_{Hn},FS_B'}.

⇒FS_A = FS_{H1} FS_{H2} FS_{H3} S_{H4}………. F_{Hn} FS_B' …………….(d)

Since FS_B FS_A we haveFS_B= FS_A S_B.

⇒FS_B=[FS_{H1} S_{H2} S_{H3} $_{H4}$………. $_{Hn}$ FS_B']

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FS_B.(Using (d)).

$FS_B=[(FS_{H1}\quad S_B\quad (FS_{H2}\quad S_B)\ldots\ldots\ldots\ldots (FS_{Hn}\quad S_B)]\quad (SF_B'\quad S_B)$.

$FS_B=FS_{G1}\quad FS_{G2}\quad FS_{G3}\quad S_{G4}\ldots\ldots\ldots\ldots\quad FS_{Gn}$

$\Rightarrow FS_B=FS_{G1}\quad S_{G2}\quad FS_{G3}\quad S_{G4}\ldots\ldots\ldots\ldots\quad S_{Gn}$.

FS_{G1}, FS_{G2}, FS_{G3},FS_{G4}………..,FS_{Gn}} is a finite fuzzy soft subcover of FS_B.

Hence every fuzzy soft open cover of FS_B has a finite fuzzy soft subcover.

And hence FS_B is a fuzzy soft compact space.

Thus any fuzzy soft closed subspace of a fuzzy soft compact space is fuzzy soft compact.Hence the theorem is proved.

Theorem4.6: A fuzzy soft topological space is fuzzy soft compact iff every class of fuzzy soft closed sets with empty intersection has a finite subclass with empty intersection.

Proof: This is a direct consequence of the fact that a class of fuzzy soft open sets is an open cover iff the class of all their complements has empty intersection.

Definition4.7: A class of fuzzy soft subsets of a nonempty fuzzy soft set is said to have the finite intersection property if every finite subclass has non-empty intersection.

Theorem4.8: A fuzzy soft topological space is fuzzy soft compact iff every class of fuzzy soft closed sets with the finite intersection property has non-empty intersection.

Definition4.9: A fuzzy soft open base for a fuzzy soft topological space is a class of open sets with the property that every fuzzy soft open set is a union of fuzzy soft sets in this class.

i.e. If FS_G is an arbitrary non-empty fuzzy soft open set and FS_Ge is a fuzzy soft point in FSG, then there exists a fuzzy soft set FS_B in the fuzzy soft open base such that FS_Ge $FS_B \subseteq FS_G$.

Definition4.10: The fuzzy soft sets in a fuzzy soft open base are referred to as fuzzy soft basic opensets.

Definition4.11: A fuzzy soft open cover of a fuzzy soft topological space whose fuzzy soft sets are all in some given fuzzy soft open base is called a fuzzy soft basic open cover, and if they all lie in some given fuzzy soft open subbase, it is called a fuzzy soft subbasic open cover.

Note: We can observe a trivial fact that every fuzzy soft basic open cover in a fuzzy soft compact space contains a finite fuzzy soft subcover.

Theorem4.12: A fuzzy soft topological space is fuzzy soft compact space iff every fuzzy soft basic open cover has a finite fuzzy soft subcover.

Proof: Let {FS_{Gi}} be a fuzzy soft open cover and {FS_{Bj}} be a fuzzy soft open base.

Each FS_{Gi} is the union of certain FS_{Bj}'s and the totality of all such FS_{Bj}'s is clearly a fuzzy soft basic open cover.

By our hypothesis, this class of FS_{Bj}'s has a finite fuzzy subcover.

For each set in this finite fuzzy soft subcover we can select aFS_{Gi} which contains it by definition4.9.

The class of FS_{Gi}'s which arises in this way is evidently a finite fuzzy soft subcover of the original fuzzy soft open cover.

Definition4.13: Let (FS_A, **T**) be a fuzzy soft topological space.A class of fuzzy soft closed subsets of (FS_A, **T**) is called a fuzzy soft closed base if the class of all complements of its fuzzy soft sets is a fuzzy soft open base and a fuzzy soft closed subbase if the class of all complements is a fuzzy soft open subbase.

Definition4.14: The class of all finite intersections of fuzzy soft sets in a fuzzy soft open subbase is a fuzzy soft open base, it follows that the class of all finite unions of fuzzy soft sets in a fuzzy soft closed subbase is a fuzzy soft closed base.This is called the fuzzy soft closed base generated by the fuzzy soft closed subbase.

Theorem4.14: A fuzzy soft topological space is fuzzy soft compact if every fuzzy soft subbasic open base has a finite fuzzy soft subcover or equilently if every class of fuzzy soft subbasic closed sets with the finite intersection property has non-empty intersection.

Proof: Proof is an easy consequence of theorem4.6 and theorem4.8

V. CONCLUSION

This paper investigates properties of fuzzy soft boundary point and compactness of
fuzzy soft topological spaces. Several properties of fuzzy soft open base and fuzzy soft open subbase are discussed. Other concepts can be studied further.

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