Pre $\tilde{I}$ Generalized Closed Soft Sets With Respect To Soft Ideal In Soft Topological Spaces

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ABSTRACT:

Soft Set Theory is a generalization of Fuzzy Set theory, that was proposed to deal with uncertainty in a non-parametric manner. The notion of soft ideal is initiated for the first time by Kandil et al. They also introduced the concept of soft local function. In this paper, we introduce and study the concept of pre $\tilde{I}$ generalized closed soft set and discuss its related properties in a soft ideal topological space $(X, \tau, E, \tilde{I})$ over X with illustrations.

Keywords : Soft ideal topology, pre $\tilde{I}$ closed soft set, pre $\tilde{I}$ generalized closed soft set, and pre $\tilde{I}$ generalized soft closure.

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1. Introduction

Soft Set Theory is a consistent and unified theory implied implicitly by existing Fuzzy Theories. Soft Set Theory is a generalization of Fuzzy set Theory, that was proposed to deal with uncertainty in a non-parametric manner.

Molodtsov [9] introduced the concept of soft set as a completely new Mathematical tool with adequate parameterization for dealing with uncertainties. Soft topology was introduced by Muhammad Shabir and Munazza Naz [14] in 2010. The notion of soft ideal is initiated for the first time by Kandil et al.[6]. Kandil et al.[7] introduced a unification of some types of different kinds of subsets of soft topological spaces using the notion of γ- operation and also introduced the notions of $Pre\ \tilde{I}$ open soft sets. These concepts are discussed with a view to find new soft topologies from the original one, called soft topological spaces with soft ideal $(X, \tau, E, \tilde{I})$. Subhashini and Sekar [15] introduced pre generalized closed sets in soft topological spaces. Jeyachitra and Baheerathi [5] introduced pre^* generalized Pre Closed Sets in topological spaces. Mustafa and Sleim [11] introduced the concept of soft generalized closed sets with respect to the soft ideal which is the extension of soft generalized closed sets.

In this paper, we introduce and study the concept of pre $\tilde{I}$ generalized closed soft set and discuss its related properties in a soft ideal topological space $(X, \tau, E, \tilde{I})$ over X with illustrations.

2. PRELIMINARIES

In this section, we present the basic definitions and results of soft set theory which will be needed in the sequel.

Definition 2.1 [10] Let X be an initial universe and E be a set of parameters. Let $P(X)$ denote the power set of X and A be a non-empty subset of E. A pair (F, A) denoted by F_A is called a soft set over X, where F is a mapping given by $F: A \to P(X)$. In other words, the soft set over X, is a parameterized family of subsets of the universe X. For $e \in A, F(e)$ may be considered the set of e-approximate elements of the soft set F_A and if $e \notin A$, then $F(e) = \phi$

i.e. $F_A = \{F(e): e \in A \subseteq E, F: A \to P(X)\}$.

Note 2.1.1.

i. The family of all these soft sets over X denoted by $SS(X)_A$.

ii. The soft operations are denoted by usual set theoretical operations with '~' symbol above.

Definition 2.2 [1] Let $F_A, G_B \tilde{\in} SS(X)_E$. Then F_A is soft subset of G_B, denoted by $F_A \tilde{\subseteq} G_B$, if

1. $A \subseteq B$, and
2. $F(e) \subseteq G(e), \forall e \in A$.

In this case, F_A is said to be a soft subset of G_B and G_B is said to be a soft superset of $F_A, G_B \tilde{\supseteq} F_A$

Definition 2.3 [1] Two soft subset F_A and G_B over a common universe set X are said to be soft equal if F_A is a soft subset of G_B and G_B is a soft subset of F_A.

Definition 2.4 [2] The complement of a soft set F_A, denoted by $F_A{}'$, is defined by $F_A{}' = F'_A$, $F': A \to P(X)$ is a mapping given by $F'(e) = X - F(e), \forall\, e \in A$ and F' is called the soft complement function of F. Clearly, $(F')'$ is the same as F and

$\big((F_A)'\big)' = F_A$.

Definition 2.5 [8] A soft set F_A over X is said to be a $NULL$ soft set denoted by $\tilde{\phi}$ or ϕ_A if for all $e \in A, F(e) = \phi$ (null set).

Definition 2.6 [8] A soft set F_A over X is said to be an absolute soft set denoted by $\tilde{A}$ or X_A if for all $e \in A, F(e) = X$. Clearly we have $\tilde{X}' = \phi_A$ and $\phi'_A = \tilde{X}$.

Definition 2.7 [8] The union of two soft sets F_A and G_B over the common universe X is the soft set H_C, where $C = A \cup B$ and for all $e \in C$,

$$H(e) = \begin{cases} F(e), e \in A - B, \\ G(e), e \in B - A \\ F(e) \cup G(e), e \in A \cap B. \end{cases}$$

Definition 2.8 [8] The intersection of two sets F_A and G_B over the common universe X is the soft set H_C where $C = A \cap B$ and for all $e \in C, H(e) = F(e) \cap G(e)$. Note that, in order to efficiently discuss, we consider only soft sets F_E over a universe X with the same set of parameter E. We denote the family of these soft sets by $SS(X)_E$.

Definition 2.9 [13] The soft set $F_E \tilde{\in} SS(X)_E$ is called a soft point over X, if there exist $e \in E$ and $x \in X$ such that

$$F_E(\varepsilon) = \begin{cases} \{x\} & if \quad \varepsilon = e \\ \phi & if \quad \varepsilon \in E - \{e\}. \end{cases}$$

and the soft point F_E is denoted by x_e.

Proposition 2.10 [13] The union of any collection of soft points can be considered as a soft set and every soft set can be expressed as union of all soft points belonging to it.

Definition 2.11 [14] Let τ be a collection of soft sets over a universe X with a fixed set of parameters E, then $\tau \subseteq SS(X)_E$ is called a soft topology on X if

1. $\tilde{X}, \tilde{\phi} \in \tau$, where $\tilde{\phi}(e) = \phi$ and $\tilde{X}(e) = X, \forall\, e \in E$,
2. the union of any number of soft sets in τ belongs to τ,
3. the intersection of any two soft sets in τ belongs to τ.

The triplet (X, τ, E) is called a soft topological space over X.

Note 2.11.1. The elements of τ are called open soft sets.

Note 2.11.2. The complements of open soft sets are known as closed soft sets.

Definition 2.12 [14] Let (X, τ, E) be a a soft topological space over X and Y be a nonempty subset of X. Then τ_Y = { $\tilde{Y} \tilde{\cap} F_E \setminus F_E \in \tau\}$ is said to be the soft relative topology on Y and (Y, τ_Y, E) is called a soft subspace of (X, τ, E). We can easily verify that τ_Y is a soft topology on Y.

Definition 2.13 [6] Let $\tilde{I}$ be a non-null collection of soft sets over a universe X with a fixed set of parameters E, then $\tilde{I} \subseteq SS(X)_E$ is called a soft ideal on X with a fixed set E if

1. $F_E \in \tilde{I}$ and $G_E \in \tilde{I} \Rightarrow F_E \tilde{\cup} G_E \in \tilde{I}$,
2. $F_E \in \tilde{I}$ and $G_E \tilde{\subseteq} F_E \Rightarrow G_E \in \tilde{I}$,

i.e. $\tilde{I}$ is closed under finite soft unions and soft subsets.

Definition 2.14 [6] Let (X, τ, E) be a soft topological space and $\tilde{I}$ be a soft ideal over X with the same set of parameters E. Then

$$(F_E)^*(\tilde{I}, \tau) = \tilde{\cup}\{x_e \in \tilde{X}: O_{x_e} \tilde{\cap} F_E \tilde{\notin} \tilde{I} \;\forall\; O_{x_e} \in \tau\}$$

is called the soft local function of F_E with respect to $\tilde{I}$ and τ, where O_{x_e} is a τ-open soft set containing x_e.

Theorem 2.15 [7] Let (X, τ, E) be a soft topological space and $\tilde{I}$ be a soft ideal over X with the same set of parameters E. Then the soft closure operator

$cl^*: SS(X)_E \to SS(X)_E$ defined by :

$$cl^*(F_E) = (F_E) \tilde{\cup} (F_E)^*$$

satisfies Kuratowski's axioms.

Definition 2.16 [7] Let $(X, \tau, E, \tilde{I})$ be a soft topological space with soft ideal and $F_E \tilde{\in} SS(X)_E$. Then F_E is called $\tilde{I}$-open soft if $F_E \tilde{\subseteq} int\;((F_E)^*(\tilde{I}, \tau))$.

We denote the set of all $\tilde{I}$-open soft sets by $\tilde{I}OS(X, \tau, E, \tilde{I})$, or when there can be no confusion by $\tilde{I}OS(X)$.

Definition 2.17 [7] A soft subset $F_E \tilde{\in} SS(X)_E$ is called $\tilde{I}$-closed soft sets if its complement is $\tilde{I}$-open soft sets.

Note: 2.17.1 X_E need not be an $\tilde{I}$-open soft subset. Therefore, a collection of all $\tilde{I}$-open soft sets do not give a soft topology.

Definition 2.18 [7] Let $(X, \tau, E, \tilde{I})$ be a soft topological space with soft ideal and $F_E \tilde{\in} SS(X)_E$. A soft set $F_E$is said to be pre $\tilde{I}$-open soft sets over X if

$$F_E \subseteq int(cl^*(F_E)).$$

We denote the set of all pre $\tilde{I}$-open soft sets by $P\tilde{I}OS(X, \tau, E, \tilde{I})$ or $P\tilde{I}OS(X)$.

The complement of pre $\tilde{I}$-open soft set is pre $\tilde{I}$ closed soft sets

Definition 2.19 [7]

Let $(X, \tau, E, \tilde{I})$ be a soft topological space over X and $F_E \tilde{\in} SS(X)_E$. Then the Pre $\tilde{I}$ soft closure of F_E denoted by $P\tilde{I}Scl(F_E)$ is defined as the soft intersection of all Pre $\tilde{I}$ closed supersets of soft set F_E.

That is $P\tilde{I}Scl(Q_E) = \tilde{\cap}\{Q_E : Q_E$ is Pre $\tilde{I}$ closed soft set and $Q_E \tilde{\supseteq} F_E\}$.

3. Pre $\tilde{I}$ Generalized Closed Soft Sets With Respect To Soft Ideal

In this section, we introduce the concept of pre $\tilde{I}$ generalized closed soft set and discuss its related properties in a soft ideal topological space $(X, \tau, E, \tilde{I})$ over X with illustrations.

Definition 3.1

Let $(X, \tau, E, \tilde{I})$ be a soft ideal topological space over X. A soft set F_E is said to be pre $\tilde{I}$ generalized closed soft set with respect to a soft ideal $\tilde{I}$ in a soft topological space $(X, \tau, E, \tilde{I})$ if $(P\tilde{I}Scl(F_E)) \setminus G_E \tilde{\in} \tilde{I}$ whenever $F_E \tilde{\subseteq} G_E$ and G_E is pre $\tilde{I}$ open soft. The set of all pre $\tilde{I}$ generalized closed soft sets over X is denoted by $P\tilde{I}_g CS(X)$.

Example 3.1.1

Let $X=\{x, y\}$, $E=\{e_1, e_2\}$, where $\tilde{X} = \{ (e_1, \{x, y\}), (e_2, \{x, y\}) \}$.

Then the soft subsets over X are $\tilde{X}$, $\emptyset$, $F_{E_1} = \{(e_1, \{x\})\}$, $F_{E_2} = \{(e_1, \{y\})\}$,

$F_{E_3} = \{(e_1, \{x, y\})\}$, $F_{E_4} = \{(e_2, \{x\})\}$, $F_{E_5} = \{(e_2, \{y\})\}$, $F_{E_6} = \{(e_2, \{x, y\})\}$,

$F_{E_7} = \{(e_1, \{x\}), (e_2, \{x\})\}$, $F_{E_8} = \{(e_1, \{x\}), (e_2, \{y\})\}$, $F_{E_9} = \{(e_1, \{x\}), (e_2, \{x, y\})\}$,

$F_{E_{10}} = \{(e_1, \{y\}), (e_2, \{x\})\}$, $F_{E_{11}} = \{(e_1, \{y\}), (e_2, \{y\})\}$, $F_{E_{12}} = \{(e_1, \{y\}), (e_2, \{x, y\})\}$,

$F_{E_{13}} = \{(e_1, \{x, y\}), (e_2, \{x\})\}$, $F_{E_{14}} = \{(e_1, \{x, y\}), (e_2, \{y\})$. So $|SS(X)_E| = 2^4 = 16$.

Consider the soft ideal topological space $(X, \tau_1, E, \tilde{I})$ where $\tau_1 = \{\tilde{X}, \emptyset, F_{E_1}, F_{E_3}\}$ and $\tau_1' = \{\emptyset, \tilde{X}, F_{E_{12}}, F_{E_6}\}$. Consider the soft ideal $\tilde{I} = \{\tilde{\phi}, F_{E_1}, F_{E_2}, F_{E_3}\}$ where F_{E_1}, F_{E_2} and F_{E_3} are soft sets defined by $F_{E_1} = \{(e_1, \{x\})\}$, $F_{E_2} = \{(e_1, \{y\})\}$, $F_{E_3} = \{(e_1, \{x, y\})\}$.

Since, $P\tilde{I}OS(X) = \{F_{E_1}, F_{E_3}, F_{E_{13}}, F_{E_{14}}, \emptyset, \tilde{X}\}$ *and* $P\tilde{I}CS(X) = \{F_{E_{12}}, F_{E_6}, F_{E_5}, F_{E_4}, \emptyset, \tilde{X}\}$

Clearly, F_{E_4} is p$re\ \tilde{I}$ generalized closed soft set. Since $F_{E_4} \tilde{\subseteq} F_{E_{13}}$ where $F_{E_{13}}$ is pre $\tilde{I}$ open soft set and $\left(P\tilde{I}Scl\left(F_{E_4}\right)\right) \setminus F_{E_{13}} = \emptyset \tilde{\in} \tilde{I}$.

Proposition 3.2

Every Pre $\tilde{I}$ closed soft set is p$re\ \tilde{I}$ generalized closed soft set.

Proof

Let F_C be a Pre $\tilde{I}$ closed soft set.

Then for every Pre $\tilde{I}$ closed soft set $F_C, F_C = P\tilde{I}Scl(F_c)$,

We have every Pre $\tilde{I}$ closed soft set is p$re\ \tilde{I}$ generalized closed soft set.

But the converse is not true in general.

Remark 3.3

A p$re\ \tilde{I}$ generalized closed soft set need not be a pre $\tilde{I}$ closed soft set. The following example supports our claim.

Example 3.3.1

Let us consider the soft subsets in Example 3.1.1.

Consider the soft ideal topological space $(X, \tau_1, E, \tilde{I})$ where $X=\{x, y\}$, E=$\{e_1,e_2\}$, and

$\tau_1 = \{\tilde{X}, \emptyset, F_{E_1}, F_{E_3}\}, \tau_1{}' = \{\emptyset, \tilde{X}, F_{E_{12}}, F_{E_6}\}, \tilde{I} = \{\tilde{\phi}, F_{E_1}, F_{E_2}, F_{E_3}\}$,

$P\tilde{I}OS(X) = \{F_{E_1}, F_{E_3}, F_{E_{13}}, F_{E_{14}}, \emptyset, \tilde{X}\}$ *and* $P\tilde{I}CS(X) = \{F_{E_{12}}, F_{E_6}, F_{E_5}, F_{E_4}, \emptyset, \tilde{X}\}$

Then $P\tilde{I}_gCS(X) = \{F_{E_4}, F_{E_5}, F_{E_6}, F_{E_9}, F_{E_{12}}, \emptyset, \tilde{X}\}$.

Then soft subset F_{E_9} is a p$re\ \tilde{I}$ generalized closed soft set but it is not a pre $\tilde{I}$ closed soft set.

Proposition 3.4

Let F_E be a p$re\ \tilde{I}$ generalized closed soft set and suppose that G_E is pre $\tilde{I}$ closed soft set. Then $F_E \tilde{\cap} G_E$ is a p$re\ \tilde{I}$ generalized closed soft set.

Proof:

Assume that $F_E \tilde{\cap} G_E \tilde{\subseteq} H_E$ and H_E is is pre $\tilde{I}$ open soft set.

Then $F_E \tilde{\subseteq} H_E \tilde{\cup} G_E'$.

Since F_E is pre $\tilde{I}$ generalized closed soft set, we have $P\tilde{I}Scl(F_E) \setminus H_E \tilde{\cup} G_E' \tilde{\in} \tilde{I}$.

Now, $P\tilde{I}Scl(F_E \tilde{\cap} G_E) \tilde{\subseteq} P\tilde{I}Scl(F_E) \tilde{\cap} P\tilde{I}Scl(G_E) = P\tilde{I}Scl(F_E) \tilde{\cap} G_E = P\tilde{I}Scl(F_E) \tilde{\cap} G_E \setminus G_E'$.

Therefore $F_E \tilde{\cap} G_E \setminus H_E \tilde{\subseteq} P\tilde{I}Scl(F_E) \tilde{\cap} G_E \setminus H_E \tilde{\cap} G_E' \tilde{\subseteq} P\tilde{I}Scl(F_E) \setminus H_E \tilde{\cup} G_E' \tilde{\in} \tilde{I}$.

Hence $F_E \tilde{\cap} G_E$ is a pre $\tilde{I}$ generalized closed soft set.

Remark 3.5

F_E and G_E are pre $\tilde{I}$ generalized closed soft sets then so is $F_E \tilde{\cap} G_E$.

Definition 3.6

Let $(X, \tau, E, \tilde{I})$ be a soft ideal topological space over X and $F_A \tilde{\subseteq} F_E$. Then pre $\tilde{I}$ generalized soft closure of F_A denoted by $P\tilde{I}_gScl(F_A)$ is defined as the soft intersection of all pre $\tilde{I}$ generalized closed soft supersets of F_A.

Remark 3.7

Since the arbitrary soft intersection of pre $\tilde{I}$ generalized closed soft sets is a pre $\tilde{I}$ generalized closed soft set, $P\tilde{I}_gScl(F_A)$ is pre $\tilde{I}$ generalized closed soft set.

Note that, $P\tilde{I}_gScl(F_A)$ is the smallest pre $\tilde{I}$ generalized closed soft set containing F_A.

Remark 3.8

The union of two pre $\tilde{I}$ generalized closed soft sets need not be a pre $\tilde{I}$ generalized closed soft set as shown by the following example.

Example 3.9

Let us consider the soft subsets in example 3.1.1. Let the soft ideal topological space $(X, \tau_2, E, \tilde{I})$ where $X=\{x, y\}$, E $=\{e_1, e_2\}$, and

$\tau_2 = \{\tilde{X}, \emptyset, F_{E_7}\}, \tau_1' = \{\emptyset, \tilde{X}, F_{E_{11}}\}, \tilde{I} = \{\tilde{\phi}, F_{E_1}, F_{E_2}, F_{E_3}\}$,

$P\tilde{I}OS(X) = \{F_{E_4}, F_{E_6}, F_{E_7}, F_{E_9}, F_{E_{10}}, F_{E_{12}}, F_{E_{13}}, F_{E_{14}}, \emptyset, \tilde{X}\}$ *and*

$P\tilde{I}CS(X) = \{F_{E_{14}}, F_{E_3}, F_{E_{11}}, F_{E_2}, F_{E_8}, F_{E_1}, F_{E_5}, F_{E_4}, \emptyset, \tilde{X}\}$.

And $P\tilde{I}_gCS(X) = \{F_{E_1}, F_{E_2}, F_{E_3}, F_{E_4}, F_{E_5}, F_{E_8}, F_{E_{11}}, F_{E_{12}}, F_{E_{14}}, \emptyset, \tilde{X}\}$.

Clearly, $F_{E_3} \tilde{\cup} F_{E_4} = F_{E_{13}}$.

$F_{E_{13}}$ is not a $pre\ \tilde{I}$ generalized closed soft set.

Proposition 3.11

Let $(X, \tau, E, \tilde{I})$ be a soft ideal topological space over X and let F_A and F_B be a soft sets over X. Then

(a). $F_A \tilde{\subseteq} P\tilde{I}_gScl(F_A)$

(b). F_A is $pre\ \tilde{I}$ generalized closed soft iff $F_A = P\tilde{I}_gScl(F_A)$

(c). $F_A \tilde{\subseteq} F_B$, then $P\tilde{I}_gScl(F_A) \tilde{\subseteq} P\tilde{I}_gScl(F_B)$

(d). $P\tilde{I}_gScl(\tilde{\phi}) = \phi$ and $P\tilde{I}_gScl(\tilde{X}) = \tilde{X}$.

(e). $P\tilde{I}_gScl(F_A \tilde{\cap} F_B) \tilde{\subseteq} P\tilde{I}_gScl(F_A) \tilde{\cap} P\tilde{I}_gScl(F_B)$.

(f). $P\tilde{I}_gScl(F_A \tilde{\cup} F_B) = P\tilde{I}_gScl(F_A) \tilde{\cup} P\tilde{I}_gScl(F_B)$.

(g). $P\tilde{I}_gScl\left(P\tilde{I}_gScl(F_A)\right) = P\tilde{I}_gScl(F_A)$.

Theorem 3.10

A soft set A_E is $pre\ \tilde{I}$ generalized closed soft set of a soft ideal topological space $(X, \tau, E, \tilde{I})$

iff $F_E \tilde{\subseteq} P\tilde{I}Scl(A_E) \setminus A_E$ and F_E is $pre\ \tilde{I}$ closed soft set implies $F_E \tilde{\in} \tilde{I}$.

Proof :

Assume that A_E is $pre\ \tilde{I}$ generalized closed soft set.

Let $F_E \tilde{\subseteq} P\tilde{I}Scl(A_E) \setminus A_E$. Suppose that F_E is $pre\ \tilde{I}$ closed soft set.

Then $A_E \tilde{\subseteq} {F_E}'$.

By our assumption, $P\tilde{I}Scl(A_E) \setminus {F_E}' \tilde{\in} \tilde{I}$. But $F_E \tilde{\subseteq} P\tilde{I}Scl(A_E) \setminus {F_E}'$, then $F_E \tilde{\in} \tilde{I}$.

Conversely, assume that $F_E \tilde{\subseteq} P\tilde{I}Scl(A_E) \setminus A_E$ and F_E is $pre\ \tilde{I}$ closed soft set implies $F_E \tilde{\in} \tilde{I}$.

Suppose that $A_E \tilde{\subseteq} G_{sE}$ and G_E is $pre\ \tilde{I}$ open soft set.

Then $P\tilde{I}Scl(A_E) \setminus cl(G_E) = P\tilde{I}Scl(A_E) \tilde{\cap} cl(G_E')$ is $pre\ \tilde{I}$ closed soft set in $(X, \tau, E, \tilde{I})$ and $P\tilde{I}Scl(A_E) \setminus G_E \tilde{\subseteq} P\tilde{I}Scl(A_E) \setminus cl(G_E)$.

By assumption $P\tilde{I}Scl(A_E) \setminus G_E \tilde{\in} \tilde{I}$. This implies that A_E is $pre\ \tilde{I}$ generalized closed soft set.

Theorem 3.11

If F_A is $pre\ \tilde{I}$ generalized closed soft set in $(X, \tau, E, \tilde{I})$ and $F_A \tilde{\subseteq} F_B \tilde{\subseteq} P\tilde{I}Scl(F_A)$, then F_B is $pre\ \tilde{I}$ generalized closed soft set.

Proof :

Suppose that F_A is $pre\ \tilde{I}$ generalized closed soft set in $(X, \tau, E, \tilde{I})$ and $F_A \tilde{\subseteq} F_B \tilde{\subseteq} P\tilde{I}Scl(F_A)$,

Let $F_B \tilde{\subseteq} F_O$ and F_O is $pre\ \tilde{I}$ open soft set. Then $F_A \tilde{\subseteq} F_o$.

Since F_A is $pre\ \tilde{I}$ generalized closed soft set, then $P\tilde{I}Scl(F_A) \setminus F_o \tilde{\in} \tilde{I}$.

Now $F_B \tilde{\subseteq} P\tilde{I}Scl(F_A)$ implies that $P\tilde{I}Scl(F_B) \tilde{\subseteq} P\tilde{I}Scl(F_A)$.

So $P\tilde{I}Scl(F_B) \setminus F_o \tilde{\subseteq} P\tilde{I}Scl(F_A) \setminus F_o$ and thus $P\tilde{I}Scl(F_B) \setminus F_o \tilde{\in} \tilde{I}$.

Consequently, F_B is $pre\ \tilde{I}$ generalized closed soft set.

Theorem 3.12

Let Y$\tilde{\subseteq} X$ and $F_E \tilde{\subseteq} \tilde{Y} \tilde{\subseteq} \tilde{X}$. Suppose that F_E is $pre\ \tilde{I}$ generalized closed soft set in $(X, \tau, E, \tilde{I})$.

Then F_E is $pre\ \tilde{I}$ generalized closed soft relative to the soft topological subspace τ_Y of X and with respect to the soft ideal $\tilde{I}_Y = \{H_E \tilde{\subseteq} \tilde{Y} : H_E \tilde{\in} \tilde{I}\}$.

Proof :

Suppose that $F_E \tilde{\subseteq} B_E \tilde{\cap} \tilde{Y}$ and B_E is $pre\ \tilde{I}$ open soft. So $B_E \tilde{\cap} \tilde{Y} \tilde{\in} \tau_Y$ and $F_E \tilde{\subseteq} B_E$. Since F_E is $pre\ \tilde{I}$ generalized closed soft set in $(X, \tau, E, \tilde{I})$, then $P\tilde{I}Scl(F_E) \setminus B_E \tilde{\in} \tilde{I}$.

Now, $(P\tilde{I}Scl(F_E) \tilde{\cap} \tilde{Y}) \setminus (B_E \tilde{\cap} \tilde{Y}) = (P\tilde{I}Scl(F_E) \setminus B_E) \tilde{\cap} \tilde{Y} \tilde{\in} \tilde{I}_Y$ whenever F_E is $pre\ \tilde{I}$ generalized closed soft relative to the soft subspace $(Y, \tau_Y, E, \tilde{I})$.

4. Conclusion:

In this paper, we introduced p$re\ \tilde{I}$ generalized closed soft set with respect to a soft ideal $\tilde{I}$ in a soft topological space $(X, \tau, E, \tilde{I})$ and also discussed the properties of p$re\ \tilde{I}$ generalized closed soft set in soft ideal topological space.

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