

Soft s^*g -locally closed sets

K. Kannan, D. Rajalakshmi, U. Durga

G. Elakkiya, M. Ezhil and G. Manimozhi

Department of Mathematics, Srinivasa Ramanujan Centre
SASTRA University, Kumbakonam, Tamil Nadu-612 001 India
anbukkannan@rediffmail.com and drajilak@gmail.com

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Abstract

Soft sets have many applications in various real time problems in the field of engineering, social science, medical science etc. Recently, the concept of soft topological space has been developed with the help of soft sets. In the present paper, we continue the study of soft semi star generalized closed sets in soft topological spaces by introducing new concepts, namely soft s^*g -locally closed sets, soft s^*g -locally closed* sets, soft s^*g -locally closed** sets.

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1 Introduction

Molodtsov [1] initiated the study of soft set theory as a new mathematical tool. According to him, a soft set over the universe U is a parametrized family of subsets of the universe U . In decision making problems, Maji et al. [2, 3] found an application of soft sets whereas Chen [4] gave a new idea of soft set parametrization reduction and a comparison of it with attribute reduction in rough set theory. Further, soft sets are a class of special information [5].

Muhammad Shabir and Munazza Naz [6] introduced soft topological spaces which are defined over an initial universe with a fixed set of parameters. The notions of soft open sets, soft closed sets, soft closure, soft interior points, soft neighborhood of a point and soft separation axioms are also introduced and their basic properties are investigated by them [6]. Meanwhile, generalized closed sets [7] in topological spaces were introduced by Levine in 1970 and it can be seen in [8] which is extended to soft topological spaces in the year 2012 [9]. Balachandran et al [10] introduced generalized locally closed sets in topological spaces. Kannan and Rajalakshmi introduced soft g -locally closed sets [11] and soft s^*g -closed sets [12] in soft topological spaces. In the present paper, we continue the study of soft semi star generalized closed sets in soft topological spaces by introducing new concepts, namely soft s^*g -locally closed sets, soft s^*g -locally closed* sets, soft s^*g -locally closed** sets.

2 Preliminaries

Let U , E be an initial universe and a set of parameters, respectively. Let $P(U)$, E_1 denote the power set of U and a non-empty subset of E , respectively. A pair (M, E_1) is called a soft set over U , where $M : E_1 \rightarrow P(U)$ is a mapping. For $\varepsilon \in E_1$, $M(\varepsilon)$ may be considered as the set of ε -approximate elements of the soft set (M, E_1) .

For two soft sets (M, E_1) and (N, E_2) over a common universe U , we say that (M, E_1) is a soft subset of (N, E_2) if (1) $E_1 \subseteq E_2$ and (2) for all $e \in E_1$, $M(e)$ and $N(e)$ are identical approximations. We write $(M, E_1) \tilde{\subseteq} (N, E_2)$. (M, E_1) is said to be a soft superset of (N, E_2) , if (N, E_2) is a soft subset of (M, E_1) . We denote it by $(M, E_1) \tilde{\supseteq} (N, E_2)$. Two soft sets (M, E_1) and (N, E_2) over a common universe U are said to be soft equal if (M, E_1) is a soft subset of (N, E_2) and (N, E_2) is a soft subset of (M, E_1) .

The union of two soft sets of (M, E_1) and (N, E_2) over the common universe U is the soft set (O, E_3) , where $E_3 = E_1 \cup E_2$ and for all $e \in E_3$, $O(e) = M(e)$ if $e \in E_1 - E_2$, $N(e)$ if $e \in E_2 - E_1$ and $M(e) \cup N(e)$ if $e \in E_1 \cap E_2$. We write $(M, E_1) \tilde{\cup} (N, E_2) = (O, E_3)$. The intersection (O, E_3) of two soft sets (M, E_1) and (N, E_2) over a common universe U , denoted by $(M, E_1) \tilde{\cap} (N, E_2)$, is defined as $E_3 = E_1 \cap E_2$, and $O(e) = M(e) \cap N(e)$ for all $e \in E_3$. The

relative complement of a soft set (M, E_1) is denoted by $(M, E_1)'$ and is defined by $(M, E_1)' = (M', E_1)$ where $M' : E_1 \rightarrow P(U)$ is a mapping given by $M'(e) = U - M(e)$ for all $e \in E_1$.

Let X be an initial universe set, E be the set of parameters. Let τ be the collection of soft sets over X , then is said to be a soft topology on X if (1) $\tilde{\phi}, \tilde{X}$ belong to τ , (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 . Let (X, τ, E) be a soft space over X , then the members of τ are said to be soft open sets in X . A soft set (M, E) over X is said to be a soft closed set in X , if its relative complement $(M, E)'$ belongs to τ . The soft closure and soft interior are defined in similar way of defining closure and interior in topological spaces. Let (X, τ, E) be a soft topological space over X and (M, E) be a soft set over X . Then, the soft closure of (M, E) , denoted by $\overline{(M, E)}$ is the intersection of all soft closed supersets of (M, E) . Clearly $\overline{(M, E)}$ is the smallest soft closed set over X which contains (M, E) . The soft interior of (M, E) , denoted by $(M, E)^o$ is the union of all soft open subsets of (M, E) . Clearly $(M, E)^o$ is the largest soft open set over X which is contained in (M, E) . A soft set (A, E) is called soft semi open if $(A, E) \subseteq [(A, E)]^o$.

3 Soft Semi Star Generalized Locally Closed Sets

Recall that a soft set (A, E) is called a soft g -closed (resp. soft s^*g -closed) in a soft topological space (X, τ, E) if $\overline{(A, E)} \subseteq (U, E)$ whenever $(A, E) \subseteq (U, E)$ and (U, E) is soft open (resp. soft semi open) in X . The compliments of soft g -closed and soft s^*g -closed sets are called soft g -open and soft s^*g -open sets, respectively. A soft subset (A, E) of a soft topological space (X, τ, E) is said to be a soft locally closed set (resp. soft g -locally closed set) if $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is a soft open set (resp. soft g -open set) and (F, E) is a soft closed set (resp. soft g -closed set) in X . A soft subset (A, E) of a soft topological space (X, τ, E) is said to be soft g -locally closed* (resp. soft g -locally closed**) if $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is soft g -open (resp. soft open) and (F, E) is soft closed (resp. soft g -closed) in X .

Definition 1. A soft subset (A, E) of a soft topological space (X, τ, E) is said to be a

- (a) soft s^*g -locally closed set if $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is a soft s^*g -open set and (F, E) is a soft s^*g -closed set in X ,
- (b) soft s^*g -locally closed* if $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is a soft s^*g -open set and (F, E) is a soft closed set in X ,
- (c) soft s^*g -locally closed** if $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is soft open and (F, E) is soft s^*g -closed in X .

Remark 2. The class of all soft s^*g -locally closed sets, soft s^*g -locally closed* sets, soft s^*g -locally closed** sets in (X, τ, E) are denoted by $S^*GLC(X, \tau, E)$, $S^*GLC^*(X, \tau, E)$ and $S^*GLC^{**}(X, \tau, E)$ respectively.

Example 3. Let $X = \{a, b\}$, $E = \{e_1, e_2\}$ and $\tau = \{\phi, X, (L, E)\}$ be a soft topology defined on X , where the soft set (L, E) is defined by $L(e_1) = \{b\}$ and $L(e_2) = \phi$. Then (I, E) is soft s^*g -locally closed, s^*g -locally closed*, s^*g -locally closed** where (I, E) is defined as $I(e_1) = \{a\}$ and $I(e_2) = \{a, b\}$.

Theorem 4. In a soft topological space (X, τ, E) ,

- (i) $(A, E) \in S^*GLC^*(X, \tau, E) \Rightarrow (A, E) \in S^*GLC(X, \tau, E)$,
- (ii) $(A, E) \in S^*GLC^{**}(X, \tau, E) \Rightarrow (A, E) \in S^*GLC(X, \tau, E)$,
- (iii) $(A, E) \in S^*GC(X, \tau, E) \Rightarrow (A, E) \in S^*GLC(X, \tau, E)$,
- (iv) $(A, E) \in S^*GO(X, \tau, E) \Rightarrow (A, E) \in S^*GLC(X, \tau, E)$.

Proof. (i) Since (A, E) is soft s^*g -locally closed* in (X, τ, E) and every soft closed set is soft s^*g -closed in (X, τ, E) , we have $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is soft s^*g -open and (F, E) is soft s^*g -closed in (X, τ, E) . Therefore, $(A, E) \in S^*GLC(X, \tau, E)$.

The proof of (ii) to (iv) are obvious. □

Remark 5. The converses of the assertions of the above theorem are not true in general. For example, in Example 3, the soft set the soft set (J, E) is soft s^*g -locally closed but not soft s^*g -locally closed* where (J, E) is defined by $J(e_1) = \{a\}$ and $J(e_2) = \{a\}$. Also soft set (O, E) is soft s^*g -locally closed but not

soft s^*g -locally closed** where (O, E) is defined by $O(e_1) = \{b\}$ and $O(e_2) = \{b\}$. (O, E) is soft s^*g -locally closed but not soft s^*g -closed where the soft set (O, E) is defined by $O(e_1) = \{b\}$ and $O(e_2) = \{b\}$ and the soft set (K, E) is soft s^*g -locally closed but not soft s^*g -open where the soft set (K, E) is defined by $K(e_1) = \{a\}$ and $K(e_2) = \{b\}$. Every soft open set {resp. soft closed set} is soft s^*g -open {resp. soft s^*g -closed}. Accordingly, we conclude the following.

Theorem 6. (a) Every soft open set is soft s^*g -locally closed and every soft closed set is soft s^*g -locally closed.

(b) Every soft locally closed set is soft s^*g -locally closed, soft s^*g -locally closed* and soft s^*g -locally closed**.

(c) Every soft s^*g -locally closed set is soft g -locally closed.

Remark 7. But the converses of the assertions of above theorem are not true in general. For example, in Example 3, the soft set the soft set (O, E) is soft s^*g -locally closed but it is not soft open where the soft set (O, E) is defined by $O(e_1) = \{b\}$ and $O(e_2) = \{b\}$ and the the soft set the soft set (F, E) is soft s^*g -locally closed but it is not soft closed where the soft set (F, E) is defined by $F(e_1) = \{a, b\}$ and $F(e_2) = \{a\}$. The soft set (N, E) is soft s^*g -locally closed, soft s^*g -locally closed*, but not soft locally closed where the soft set (N, E) is defined by $N(e_1) = \{b\}$ and $N(e_2) = \{a\}$. Further, the soft set (K, E) is soft soft s^*g -locally closed** but not soft locally closed where (K, E) is defined by $K(e_1) = \{a\}$ and $K(e_2) = \{b\}$.

Definition 8. A soft topological space (X, τ, E) is a soft door space if every soft subset of X is either soft open or soft closed in X .

Theorem 9. If (X, τ, E) is a soft door space, then every soft subset of (X, τ, E) is soft s^*g -locally closed.

Proof. Since (X, τ, E) is a soft door space and every soft open (resp. soft closed) subset of (X, τ, E) is soft s^*g -open (resp. soft s^*g -closed), we have every soft subset of (X, τ, E) is either soft s^*g -open or soft s^*g -closed. Therefore, every soft subset of $\tilde{X}$ is

soft s^*g -locally closed. {by Theorem 4 (iii) and (iv)} $\square$

Theorem 10. For a soft subset (A, E) of a soft topological space (X, τ, E) , the following assertions are equivalent:

- (a) $(A, E) \in S^*GLC^*(X, \tau, E)$,
- (b) $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) ,
- (c) $(A, E) \tilde{\cup} [(A, E)]'$ is soft s^*g -open,
- (d) $(A, E) - A$ is soft s^*g -closed.

Proof. (a) $\Rightarrow$ (b) : Since (A, E) is a soft s^*g -locally closed* set in (X, τ, E) , we have $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is a soft s^*g -open set and (F, E) is soft closed in (X, τ, E) . Therefore, $(A, E) \subseteq (G, E) \tilde{\cap} \overline{(A, E)}$. Since $\overline{(A, E)} \subseteq (F, E)$, we have $(G, E) \tilde{\cap} \overline{(A, E)} \subseteq (A, E)$. Consequently, $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) in (X, τ, E) .

(b) $\Rightarrow$ (a) : Suppose that $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) in (X, τ, E) . Since every soft closed set is soft s^*g -closed in (X, τ, E) , we have $(A, E) \in S^*GLC^*(X, \tau, E)$.

(b) $\Rightarrow$ (c) : Since $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) in (X, τ, E) , we have $(A, E) \tilde{\cup} [(A, E)]' = \{(G, E) \tilde{\cap} \overline{(A, E)}\} \tilde{\cup} [(A, E)]' = (G, E)$. Therefore, $(A, E) \tilde{\cup} [(A, E)]'$ is soft s^*g -open.

(c) $\Rightarrow$ (b) : Suppose that $(A, E) \tilde{\cup} [(A, E)]'$ is soft s^*g -open in (X, τ, E) . Let $(G, E) = (A, E) \tilde{\cup} [(A, E)]'$. Then, $(G, E) \tilde{\cap} \overline{(A, E)} = \{(A, E) \tilde{\cup} [(A, E)]'\} \tilde{\cap} \overline{(A, E)} = (A, E)$. Therefore, $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) in (X, τ, E) .

(c) $\Rightarrow$ (d) : Suppose that $(A, E) \tilde{\cup} [(A, E)]'$ is soft s^*g -open in (X, τ, E) . Let $(G, E) = (A, E) \tilde{\cup} [(A, E)]'$. Then, $(G, E)' = (A, E)' \tilde{\cap} \overline{(A, E)} = \overline{(A, E)} - (A, E)$. Therefore, $(A, E) - (A, E)$ is soft s^*g -closed in (X, τ, E) .

(d) $\Rightarrow$ (c) : Suppose that $\overline{(A, E)} - (A, E)$ is soft s^*g -closed in (X, τ, E) . Let $(F, E) = \overline{(A, E)} - (A, E)$. Then, $(F, E)' = \tilde{X} \tilde{\cap} \{(A, E) - (A, E)\}' = \tilde{X} \tilde{\cap} \{[(A, E)]' \tilde{\cup} (A, E)\} = [(A, E)]' \tilde{\cup} (A, E)$. Hence, $(A, E) \tilde{\cup} [(A, E)]'$ is soft s^*g -open in (X, τ, E) . $\square$

In the sequel, we have found the following fundamental equivalent assertions through the classes of soft generalized open subsets of (X, τ, E) considered:

Theorem 11. In a soft topological space (X, τ, E) , the following assertions are equivalent:

- (a) $(A, E) - (A, E)^o$ is soft s^*g -open in (X, τ, E) ,
- (b) $(A, E)^o \tilde{\cup} (A, E)'$ is soft s^*g -closed in (X, τ, E) ,
- (c) $(G, E) \tilde{\cup} (A, E)^o = (A, E)$ for some soft s^*g -open set (G, E) in (X, τ, E) .

Proof. (a) $\Rightarrow$ (b) : Now, $\{(A, E) - [(A, E)^o]\}' = \tilde{X} \tilde{\cap} [(A, E) \tilde{\cap} \{(A, E)^o\}']' = [(A, E)^o] \tilde{\cup} (A, E)'$. Since $A - (A, E)^o$ is soft s^*g -open, we have $[(A, E)^o] \tilde{\cup} (A, E)'$ is soft s^*g -closed in (X, τ, E) .

(b) $\Rightarrow$ (a) : Suppose that $[(A, E)^o] \tilde{\cup} (A, E)'$ is soft s^*g -closed in (X, τ, E) . Now, $\{[(A, E)^o] \tilde{\cup} (A, E)'\}' = \tilde{X} \tilde{\cap} \{[(A, E)^o] \tilde{\cup} (A, E)'\}' = (A, E) - (A, E)^o$. Therefore, $(A, E) - (A, E)^o$ is soft s^*g -open in (X, τ, E) .

(b) $\Rightarrow$ (c) : Suppose that $(A, E)^o \tilde{\cup} (A, E)'$ is soft s^*g -closed. Let $(U, E) = (A, E)^o \tilde{\cup} (A, E)'$. Now, $(U, E)' \tilde{\cup} (A, E)^o = \{[(A, E)^o]' \tilde{\cap} [(A, E)']\}' \tilde{\cup} (A, E)^o = \{[(A, E)^o]' \tilde{\cap} (A, E)\}' \tilde{\cup} (A, E)^o = (A, E)$. Then $(A, E) = (G, E) \tilde{\cup} (A, E)^o$ for some soft s^*g -open set $(G, E) = (U, E)'$ in (X, τ, E) .

(c) $\Rightarrow$ (b) : Suppose that $(A, E) = (G, E) \tilde{\cup} (A, E)^o$ for some soft s^*g -open set (G, E) in (X, τ, E) . Now, $[(A, E)^o] \tilde{\cup} (A, E)' = (A, E)^o \tilde{\cup} \{(G, E) \tilde{\cup} (A, E)^o\}' = \{(A, E)^o \tilde{\cup} (G, E)'\}' \tilde{\cap} \tilde{X} = (G, E)'$. Therefore, $(A, E)^o \tilde{\cup} (A, E)'$ is soft s^*g -closed in (X, τ, E) . $\square$

Remark 12. Since every soft s^*g -locally closed set is the intersection of a soft s^*g -open set and soft s^*g -closed set, we can conclude the following.

Theorem 13. A soft subset (A, E) of (X, τ, E) is soft s^*g -locally closed if and only if $(A, E)'$ is the union of a soft s^*g -open set and soft s^*g -closed set.

Theorem 14. In any soft topological space (X, τ, E) , the intersection of two soft s^*g -locally closed* sets is soft s^*g -locally closed*.

Proof. Let $(A, E), (B, E)$ be two soft s^*g -locally closed* sets in X . Then, $(A, E) = (G, E) \tilde{\cap} \overline{(A, E)}$ for some soft s^*g -open set (G, E) , $(B, E) = (F, E) \tilde{\cap} \overline{(B, E)}$ for some soft s^*g -open set (F, E) .

Since the intersection of two soft s^*g -open sets is soft s^*g -open and intersection of two soft closed sets is soft closed, $(A, E) \tilde{\cap} (B, E) \in S^*GLC^*(X, \tau, E)$ $\square$

In this sequel our next result exhibits the intersection of a soft s^*g -locally closed set and a soft s^*g -open or soft closed set in a soft topological space.

Theorem 15. If $(A, E) \in S^*GLC(X, \tau, E)$ and (B, E) is soft s^*g -open or soft closed in (X, τ, E) , then $(A, E) \tilde{\cap} (B, E) \in S^*GLC(X, \tau, E)$.

Proof. Let $(A, E) \in S^*GLC(X, \tau, E)$. Then $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is soft s^*g -open and (F, E) is soft s^*g -closed in X . Suppose that (B, E) is soft closed. Then $(H, E) = (B, E) \tilde{\cap} (F, E)$ is soft s^*g -closed. Then, $(A, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (F, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (H, E)$. Hence $(A, E) \tilde{\cap} (B, E) \in S^*GLC(X, \tau, E)$. Suppose that (B, E) is soft s^*g -open. Then $(I, E) = (G, E) \tilde{\cap} (B, E)$ is soft s^*g -open. Then, $(A, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (F, E) \tilde{\cap} (B, E) = (I, E) \tilde{\cap} (F, E)$. Hence $(A, E) \tilde{\cap} (B, E) \in S^*GLC(X, \tau, E)$. $\square$

Theorem 16. If $(A, E) \in S^*GLC^{**}(X, \tau, E)$ and (B, E) is soft open or soft closed in (X, τ, E) , then $(A, E) \tilde{\cap} (B, E) \in S^*GLC^{**}(X, \tau, E)$.

Proof. Let $(A, E) \in S^*GLC^{**}(X, \tau, E)$. Then $(A, E) = (G, E) \tilde{\cap} (F, E)$ where (G, E) is soft open and (F, E) is soft s^*g -closed in X . Suppose that (B, E) is soft closed. Then $(H, E) = (B, E) \tilde{\cap} (F, E)$ is soft s^*g -closed. Then, $(A, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (F, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (H, E)$. Hence $(A, E) \tilde{\cap} (B, E) \in S^*GLC^{**}(X, \tau, E)$. Suppose that (B, E) is soft open. Then, $(I, E) = (G, E) \tilde{\cap} (B, E)$ is soft open. Then, $(A, E) \tilde{\cap} (B, E) = (G, E) \tilde{\cap} (F, E) \tilde{\cap} (B, E) = (I, E) \tilde{\cap} (F, E)$. Hence $(A, E) \tilde{\cap} (B, E) \in S^*GLC^{**}(X, \tau, E)$. $\square$

Remark 17. The complement of soft s^*g -locally closed set in (X, τ, E) is not soft s^*g -locally closed in general and hence the finite union of soft s^*g -locally closed sets need not be soft s^*g -locally closed in (X, τ, E) .

The next result deals with the finite union of soft s^*g -locally closed sets in soft topological spaces.

Theorem 18. If $(A, E), (B, E)$ are any two separated soft s^*g -locally closed* subsets of (X, τ, E) , then $A \tilde{\cup} B \in S^*GLC^*(X, \tau, E)$.

Proof. Since $(A, E), (B, E)$ are two soft s^*g -locally closed* subsets of (X, τ, E) , there exist soft s^*g -open sets $(G, E), (F, E)$ such that $(A, E) = (G, E) \tilde{\cap} (\overline{A, E})$ and $(B, E) = (F, E) \tilde{\cap} (\overline{B, E})$. Put $(U, E) = (G, E) \tilde{\cap} (\overline{B, E})'$ and $(V, E) = (F, E) \tilde{\cap} (\overline{A, E})'$. Then $(U, E), (V, E)$ are soft s^*g -open sets and hence $(U, E) \tilde{\cap} (V, E)$ is soft s^*g -open in (X, τ, E) . Clearly $(A, E) = (U, E) \tilde{\cap} (\overline{A, E})$, $(B, E) = (V, E) \tilde{\cap} (\overline{B, E})$, $(U, E) \tilde{\cap} (\overline{B, E}) = \tilde{\phi}$ and $(V, E) \tilde{\cap} (\overline{A, E}) = \tilde{\phi}$. Consequently, $(A, E) \tilde{\cup} (B, E) = [(U, E) \tilde{\cup} (V, E)] \tilde{\cap} (\overline{A, E}) \tilde{\cap} (\overline{B, E})$. Therefore, $(A, E) \tilde{\cup} (B, E) \in S^*GLC^*(X, \tau, E)$. $\square$

Theorem 19. In a soft topological space (X, τ, E) , the following are equivalent.

- (a) (A, E) is soft s^*g -locally closed if and only if $(A, E)'$ is soft s^*g -locally closed.
- (b) Soft s^*g -locally closed sets are closed under finite union.

Proof. (a) $\Rightarrow$ (b) : Suppose that (A, E) is soft s^*g -locally closed if and only if $(A, E)'$ is soft s^*g -locally closed. Let $(A, E), (B, E)$ be soft s^*g -locally closed. Then by our assumption $(A, E)', (B, E)'$ are soft s^*g -locally closed. Consequently, $[(A, E) \tilde{\cup} (B, E)]' = (A, E)' \tilde{\cap} (B, E)'$ is soft s^*g -locally closed. Therefore, $(A, E) \tilde{\cup} (B, E)$ is soft s^*g -locally closed.

(b) $\Rightarrow$ (a) : Suppose that soft s^*g -locally closed sets are closed under finite union. Let (A, E) be soft s^*g -locally closed. Then $(A, E) = (G, E) \tilde{\cap} (\overline{A, E})$ where (G, E) is soft s^*g -open and $(\overline{A, E})$ is soft s^*g -closed in (X, τ, E) . Since $(G, E)'$ is soft s^*g -closed and $(\overline{A, E})'$ is soft s^*g -open in (X, τ, E) and both soft s^*g -open and soft s^*g -closed set are soft s^*g -locally closed, we have $(A, E)'$ is soft s^*g -locally closed by our assumption. $\square$

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