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Extremally Disconnectedness via a Soft Minimal Structure

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Abstract: We interpose an alteration of soft extremally disconnected spaces (SES) which is known as soft minimal-extremally disconnected (SmES) and attain numerous properties of SmES.

Keywords: Soft m-structure, Soft extremally disconnected spaces, soft m-extremally disconnected.

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1. INTRODUCTION

In this research paper, we introduced a soft topological space (briefly STS) (P, ς, T̈) over P with a soft m- structure m (P, T̈) over P to be SMS if m-closure (briefly m-CL) of soft open (O, T̈) is for each SOPS (O, T̈) of (P, ς, T̈) We defined numerous characterizations of soft m-extremally disconnected spaces. we will show that minimal extremal disconnectedness and soft extremal disconnectedness are independent by giving simple examples. Although, if soft minimal structure m(P, T̈) = SO (P, ς, T̈) or SPO (P, ς, T̈), then the mixed space (P, ς, m (P, T̈)) is minimal-extremally disconnected for each (P, ς, T̈). If m(P, T̈)= α (P, ς, T̈), PO (P, ς, T̈) or bO (P, ς, T̈), then (P, ς, m(P, T̈)) is soft minimal-extremally disconnected for each (P, ς, T̈). Recently papers have studied few innovative classes of soft sets (briefly ST) through soft minimal-structures (briefly SmS)**.**

2. PRELIMINARIES:

Let Z is initial universe set and set T̈ is parameters, P(Z) denote the power set of Z. All the way through this paper soft set, SOPS soft topological space, soft minimal structure and soft m-extremally disconnected denotes ST, SOPS, STS, SmS and SmES respectively.

Definition 2.1 [17]: Given mapping S: T̈ → P(Z). A pair (S, T̈) is said to be ST over Z.

So, (S, T̈) is parameterized family over Z. For all t ∈ T̈, S(t) is the set of t-approximate members of (S, T̈).

Definition 2.2 [22]: A soft family ς ∈S (P, T̈) is called soft topology over P if:

1. φ̆, P̆ ∈ ς.
2. ς is closed under union of any number of ST and intersection of any two ST.

Structure (P, ς, T̈) is called a S.T.S. over P.

Definition2.3 S.T. (M, T̈) of a S.T.S (P, ς, T̈) is called:

[a] If (M, T̈) =Int (Cl (M, T̈)) then soft regular open [7];

[b] if (M, T̈) ⊆ Int (Cl (Int (M, T̈))) then soft α-open [5];

[c] if (M, T̈) ⊆Cl (Int (M, T̈)) then soft semiopen [15];

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[d] if (M, T̈) ⊆Int (Cl (M, T̈)) then soft preopen [3];

[e] if (M, T̈) ⊆Int (Cl (M, T̈)) UCl (Int (M, T̈)) then soft b-open [2].

[f] if (M, T̈) ⊆ Cl (Int (Cl (M, T̈))) then soft β-open [4]

Family of each soft regular open (resp. soft-α-open, soft-pre-open, soft-semi-open, soft-β-open, soft-b-open) sets of P will be denoted by SRO (P, T̈) (resp. SαO (P, T̈), SPO (P, T̈), SSO (P, T̈), SβO (P, T̈), SbO (P, T̈)).

Remark 2.4 [2]: The concepts of softsemi open and soft preopen sets are independent.

Definition 2.5 [21]: m (P, T̈) of S(P, T̈) over P is called a soft minimal structure (SmS) on P if φ∈ m (P, T̈) and P̌∈ (P, T̈).

Remark 2.6 [21]: Let (P, ς, T̈) be STS. Then the families ς, SO(P, T̈), SPO(P, T̈), SαO(P, T̈), SβO(P, T̈), SbO(P, T̈) are all SmS on P.

Definition 2.7 [21]: A sms m (P, T̈) over P is called to include the property **B** if the union of any family of ST ∈ m (P, T̈).

A STS (W, ς, T̈) with a SMS m (P, T̈) on P is called a soft mixed space and is denoted by (P, ς, m(P, T̈)).

Definition2.8: A ST (P, T̈) of a soft mixed space (P, ς, m (P, T̈)) is said to be:

(1)m (P, T̈) dense if mCl (P, T̈) = P.

(2) soft m (P, T̈) nowhere dense if Int (mCl (P, T̈)) = φ.

(3) soft α-m (P, T̈) open if (P, T̈) ⊆ Int (mCl (Int (P, T̈))).

(4) soft semi-m (P, T̈) open if (P, T̈) ⊆ m Cl (Int (P, T̈)).

(5) soft pre-m (P, T̈) open if (P, T̈) ⊆ Int (mCl (P, T̈)).

(6) soft β-m (P, T̈) open if (P, T̈) ⊆Cl (Int (mCl (P, T̈))).

(7) soft semi-m (P, T̈) *-open if (P, T̈) ⊆Cl (mInt(P, T̈)).

(8) soft strongly-βm (P, T̈) open if (P, T̈) ⊆mCl(Int(mCl(P, T̈))).

3. PROPERTIES of SOFT m-EXTREMALLY DISCONNECTED SPACES

In this section, soft extremally disconnected spaces and soft m-extremally disconnected spaces means SEDS, SmEDS respectively.

Definition3.1: (P, ς, m (P, T̈)) is said to be soft SmEDS (resp. m-hyperconnected) if mCl (P, T̈) ∈ς (resp. mCl (P, T̈) = P) ∀ (P, T̈) ∈ς.

Example 3.2: P = {a,b,c}, T̈ = {t1, t2}& (A,T̈) = (t1,{a}),(t2,{a}),(B, T̈) = (t1, b),(t2, {b}), (C,T̈) = (t1, {a,b}),(t2, {a,b}), (D,T̈) =(t1, {c}), (t2, {c})be ST.

Let ς= {φ, (A, T̈), (B, T̈), (C, T̈), P̌}, m (P, T̈) = {φ, (A, T̈), (B, T̈), (D, T̈), P̌}. Then STS (P, ς, T̈) is not SEDS and soft mixed space (P, ς,m (P, T̈)) is SmEDS.

Example 3.3: Let P = {a,b,c} , T̈ = {t1, t2} & (A,T̈) = (t1,{a}),(t2,{a}) , (B,T̈) = (t1, {b,c}),(t2,{b,c}) , (C,T̈) = (t1,{b}),(t2,{b}),(D, T̈) =(t1,{a,c}),(t2,{a,c}) be ST. Let ς = {φ, (A, T̈), (B, T̈), P̌}, m (P, T̈) = {φ, (A, T̈), (C, T̈), (D, T̈), P̌}. Then STS (P, ς, T̈) is SEDS and soft mixed space (P, ς,m (P, T̈))is not SmEDS.

Let Ω⊆ P(W) is called a generalized soft topology (i.e., GST) [8] on W if φ∈Ω, Gi∈Ω for i∈ I ≠φ → G = U {i ∈I} Gi ∈Ω. We say structure (W, Ω, T̈) a soft generalized topological space (brief SGTS) on W.

For a SGTS (W, Ω, T̈), elements of Ω are said to be Ω-open sets and complements are said to be Ω-closed sets. For (P, T̈) ⊆ W, symbolically by (C_Ω, (P, T̈)) the intersection of each soft Ω-closed sets ⊆ (P, T̈), m (W, T̈) =Ω, where m (W, T̈) including property B, as special case of Definition 3.1.

We defined the subsequent definition:

Definition3.4: Let (W, Ω, T̈) be a SGTS and G ⊆ W.

(1) G is called soft Ω -dense if c_Ω(G) = W,

(2) (W, Ω, T̈) is said soft hyperconnected if G is soft Ω-dense ∀ soft Ω-open set

G ≠φ of (W, Ω, T̈).

Lemma3.5: Let (W,Ω,m(W, T̈)) is soft mixed space. Then, subsequent properties hold: (1) If W is soft m-hyperconnected, then W is SmEDS.

(2) If m (W, T̈) =SO (W, T̈) or SPO (W, T̈), then (W,ς,m(W, T̈)) is SmEDS.

(3) Let (W, Ω, T̈) be SEDS. If m (W, T̈) =α (W, T̈), PO (W, T̈) orBO (W, T̈), then (W,ς,m(W, T̈)) is SmEDS.

Proof. (1) obviously. (2) It is known in [3] that sCl (W, T̈) = (W, T̈) (Int (Cl (W, T̈))) and spCl (W, T̈) = (W, T̈) (Int (Cl (Int (W, T̈))) ∀ ST (W, T̈) of W. Therefore, sCl (V, T̈) and spCl (V, T̈) aresoft open for every softopen set (V, T̈) and consequently (W,Ω,m(W, T̈) is SmEDS for m(W, T̈)= SO(W, T̈) or SPO(W, T̈). (3) Since α (W, T̈) = (W, T̈) U Cl (Int (Cl (W, T̈))), pCl (W, T̈) = (W, T̈) UCl(Int(W, T̈)) and bCl(W, T̈) = sCl(W, T̈)⋂pCl(W, T̈) ∀ soft set (W, T̈) of W. Therefore, α (V, T̈), pCl(V, T̈) and bCl(V, T̈) are soft open ∀ (V, T̈) of a SEDS (W,Ω, T̈) and consequently (W,Ω,m(W, T̈)) is SmEDS for m(W, T̈)= α(W, T̈), PO(W, T̈), or BO(W, T̈).The subsequent eg. shows that converse of every statement of Lemma3.5 are not true.

Example 3.6: Let soft mixed space (W,Ω,m(W, T̈)), where W = {a,b,c,d} , T̈ = {t1, t2} and Ω = {φ,(t1,{a}),(t2,{a}), W̆ }, m(W, T̈) = {φ,(t1,{a}),(t2,{a}),(t1,{a,c}),(t2,{a,c}) ,(t1,{a,d}),(t2,{a,d}),(t1,{b,d}),(t2,{b,d}),(t1,{c,d}),(t2,{c,d}),(t1,{a,b,d}),(t2,{a,b,d}),(t1,{a,c,d}),(t2,{a,c,d}),(t1,{b,c,d }),(t2,{b,c,d}) ,W̆ }. If (P, T̈) = (t1, {a}), (t2, {a}), then (P, T̈) is soft open and mCl (P, T̈) = (t1, {a}), (t2, {a}) ≠ W. Hence (W,Ω,m(W, T̈)) is soft not m-hyperconnected. Since soft closure-m (W, T̈) of each softopen is openset, W is SmEDS. Moreover, since (t1, {b,d}),(t2,{b,d}) is not soft β-open,m(W, T̈)is not SPO(W, T̈).

Theorem3.7: Let (W,Ω,m(W, T̈)) is soft mixed space, the subsequent properties areequivalent:

(1) W is SmEDS;

(2) m-Int (P, T̈) is soft closed ∀soft closed set (P, T̈) of W;

(3) m-Cl (Int (P, T̈)) ⊆Int (mCl (P, T̈)) ∀soft set (P, T̈) of W;

(4) Every soft semi-m (P, T̈) open set is soft pre--m (P, T̈) open;

(5) mCl (P, T̈) ∈ Ω ∀strongly-soft β-m (P, T̈) open set (P, T̈);

(6) Every strongly-soft β-m (P, T̈) open set is soft pre-m (P, T̈) open;

(7) (P, T̈) is soft α-m (P, T̈) open ↔ it is soft-semi-m (P, T̈)-open ∀ (P, T̈) ⊆ W.

Proof. (1) → (2): Let (P, T̈) be a soft closed set in W. Then W - (P, T̈) is open. By (1)

mCl (W - (P, T̈)) = W – mInt (P, T̈) is soft open. Thus, mInt (P, T̈) is softclosed.

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(2) → (3): (P, T̈) be any soft set of W. So, W -Int (P, T̈) is closed in W and by (2) mInt[W -Int(P, T̈)] is soft closed in W. Therefore, mCl (Int (P, T̈)) is soft open in W and consequently mCl (Int (P, T̈)) ⊆ Int (mCl (P, T̈)).

(3) → (4): Let (P, T̈) be soft semi-m (P, T̈) open. By (3), we have (P, T̈) ⊆mCl (Int (P, T̈)) ⊆ Int (mCl(P, T̈)). Thus, (P, T̈) is soft pre-m (P, T̈) open.

(4) → (5): Let (P, T̈) be a strongly-soft β -m (P, T̈)-open set. Then mCl (P, T̈) is soft semi-m (P, T̈) open. By (4), mCl (P, T̈) is soft pre-m (P, T̈) open. Thus, mCl (P, T̈) ⊆ Int (mCl (P, T̈)) andConsequently mCl(P, T̈)is open.

(5) → (6): Let (P, T̈) be a strongly-soft β-m (P, T̈) open set. By (5), mCl(P, T̈)=Int(mCl(P, T̈)).

Thus, (P, T̈) ⊆ mCl (P, T̈) = Int (mCl(P,T̈)) and consequently (P, T̈) is soft pre-m{(P, T̈)-open.

(6) → (7): Let (P, T̈) is soft semi-m (P, T̈) open set. Since a soft semi-m (P, T̈) open set is

soft strongly-β-m (P, T̈) open, then by (6) it is soft pre-m (P, T̈) open. Since (P, T̈) is soft semi-m (P, T̈) open and soft pre-m (P, T̈) open, it is soft α-m (P, T̈) open.

(7) → (1): Let (P, T̈) is softopen set of W. Then mCl (P, T̈) is soft semi-m (P, T̈) open and by (7) mCl(P, T̈)is soft α-m(P, T̈)open. Therefore, mCl(P, T̈)⊆ Int(mCl(Int(mCl(P, T̈)))) = Int(mCl(P,T̈)) ,thus mCl(P,T̈) = Int(mCl(P, T̈)). Hence mCl(P, T̈)is soft open and W is SmEDS.

Corollary 3.8: Let (W,Ώ,m(W, T̈)) is soft mixed space. Then, subsequent properties are equivalent:

(1) W is SmEDS;

(2) m-Cl (W, T̈) ∈Ώ∀soft α-m (W, T̈)-open set (W, T̈) of W;

(3) m-Cl (W, T̈) ∈Ώ∀soft semi- (W, T̈)-open set (W, T̈) of W;

(4) m-Cl (W, T̈) ∈Ώ∀soft pre-m (W, T̈)-open set (W, T̈) of W.

Proof: Follows by Theorem 3.7.

Theorem 3.9: Let (W,Ώ,m (W, T̈))is a soft mixed space and m(W, T̈) have property B. Then, the subsequent properties are equivalent:

(1) W is SmEDS;

(2) For any (P, T̈) ∈Ω and (B,T̈) ∈m (W, T̈) such that (P, T̈)⋂ (B,T̈) = φ, there exist disjoint m (W, T̈)-closed set (U, T̈) and a closed set (V, T̈) such that (P, T̈)⊆ (U, T̈) and (B,T̈) ⊆ (V, T̈);

(3) mCl(U, T̈) ⋂Cl(V, T̈) = φ∀(U, T̈) ∈ς and (V, T̈) ∈ m(W, T̈)with (U, T̈) ⋂(V, T̈) = φ;

(4) mCl[Int(mCl(U, T̈))] ⋂Cl(V, T̈) = φ∀(U, T̈) ⊆ W and (V, T̈) ∈m(W, T̈)with(U, T̈) ⋂(V, T̈) = φ.

Proof. (1) → (2): Let W be SmEDS. Let (P, T̈) and (B, T̈) be two disjoint soft open and m (W, T̈)-open sets, respectively. Then mCl(P, T̈) and W -mCl(P,T̈)are disjoint soft -m(P, T̈)closed and soft closed sets ⊆(P, T̈) and (B, T̈), respectively.

(2) → (3): Let (U, T̈) ∈ς & (V, T̈) ∈m (W, T̈) with (U, T̈) ⊆ (V, T̈) = φ. By (2), there exist

disjoint a soft m (P, T̈) closed set (F, T̈) and a soft closed set (G, T̈) such that (U, T̈) ⊆ (F, T̈) and (V, T̈) ⊆ (G, T̈). Therefore, mCl(U, T̈) ⋂Cl(V, T̈)⊆ (F, T̈) ⋂(G, T̈) = φ. Thus, mCl(U, T̈) ⋂Cl(V, T̈) = φ.

(3) → (4): Let (U, T̈) ⊆ W and (V, T̈) ∈m (W, T̈) with (U, T̈) ⋂ (V, T̈) = φ. Since Int (mCl(U, T̈)) ∈ς and Int(mCl(U, T̈)) ⋂(V, T̈) = φ, by (3) mCl[Int(mCl(U, T̈))] ⋂Cl(V, T̈) = φ.

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(4) → (1): Let (U, T̈) is SOPS. Then [W - mCl(U, T̈)] ⋂(U, T̈) = φ. Since m (P, T̈) has property B, W - mCl(U, T̈) ∈m(P, T̈)and by (4) mCl(Int(mCl(U, T̈))) ⋂Cl(W-mCl(U, T̈)) = φ. Since (U, T̈) ∈ς, we have mCl(U, T̈) ⋂[W - Int(mCl(U, T̈))] = φ.

Therefore, mCl (U, T̈) ⊆ Int (mCl(U, T̈)) and mCl(U, T̈) is soft open. This shows that W is SmEDS.

Definition3.10: A ST (P, T̈) of a soft mixed space (W,Ώ,m(W, T̈)) is said to be a soft Rm-openset if (P, T̈) = Int(mCl(P, T̈)).Complement of a soft Rm-open set is called soft Rm-closed.

Theorem 3.11: Let (W,Ώ,m (W, T̈)) be a soft mixed space and m(W, T̈) have property B. Then, subsequent properties are equivalent:

(1) W is SmEDS;

(2) Each soft Rm-open set of W is soft m (W, T̈)-closed in W;

(3) Each soft Rm-closed set of W is soft m (W, T̈)-open in W.

Proof. (1) → (2): Let W be SmEDS. Let (P, T̈) be a soft Rm-open set of W. Then (P, T̈) = Int (mCl(P, T̈)). Since (P, T̈) is SOPS, then mCl(P, T̈)is soft open. Thus, (P, T̈) = Int (mCl(P,T̈)) = mCl(P,T̈) and consequently (P, T̈) is soft m(W, T̈)-closed.

(2) → (1): Suppose that every soft Rm-open set of W is m (W, T̈)-closed in W. Let SOPS (P, T̈) of W. Since Int (mCl (P,T̈)) is soft Rm-open, then it is soft m(W, T̈)-closed. Therefore, mCl (P, T̈) ⊆ mCl (Int (mCl(P, T̈))) = Int(mCl(P,T̈)) since (P, T̈) ⊆ Int(mCl(P, T̈)). Thus, mCl (P, T̈) is soft open and consequently W is SmEDS.

(2) → (3): It is obvious.

Theorem 3.12: Let (W,Ώ,m (W, T̈)) be a soft mixed space. Then subsequent propertiesare equivalent:

(1) W is SmEDS;

(2) mCl (P, T̈) ∈ Ώ ∀soft Rm-open set (P, T̈) of W.

Proof. (1) → (2): Let (P, T̈) is a soft Rm-open set of W. Then (P, T̈) is open and mCl(P,T̈) ∈Ώ.

(2) → (1): Suppose that mCl (P, T̈) ∈ Ώ∀ soft Rm-open set (P, T̈) of W. Let (V, T̈) is SOPS of W. Then Int (mCl (V, T̈)) is a soft Rm-open set and mCl (V, T̈) = mCl (Int (mCl (V, T̈))) ∈ Ώ. Thus mCl(V, T̈) ∈Ώ and as a result W is SmEDS.

Theorem 3.13: Let (W, Ώ, m (W, T̈)) be a soft mixed space and m (W, T̈) have property B.

Then, the subsequent properties are equivalent:

(1) W is SmEDS;

(2) If (P, T̈) is soft semi-m (P, T̈) open, B is soft semi-m (P, T̈)*-open and (A,T̈) ⋂ (B,T̈) = φ, then mCl(P, T̈)⋂ Cl(B,T̈) = φ.

Proof: (1) → (2): Let (P, T̈) is soft semi-m (P, T̈) open, (B, T̈) soft semi-m (P, T̈)*-open and (P, T̈)⋂ (B,T̈) = φ. Since m (P, T̈) is property B, mInt (B, T̈) is soft -m (P, T̈) open and mCl(P,T̈) ⋂ mInt (B,T̈) = φ. By Corollary 3.8, mCl (P, T̈) is soft open and mCl (P, T̈) ⋂Cl (mInt (B, T̈)) = φ. Since (B, T̈) is soft semi-m (P, T̈)* -open, Cl (B,T̈) = Cl (mInt(B, T̈)) and consequently mCl(P,T̈) ⋂Cl(B,T̈) = φ.

(2) → (1): Let (P, T̈) is soft semi-m (P, T̈) open set. Since (P, T̈) and W – mCl (P, T̈) are disjoint soft semi-m (P, T̈) open and soft semi-m (P, T̈)*-open, respectively, by (2) we have mCl(P, T̈) ⋂Cl[W - mCl(P, T̈)] = φ. This implies that mCl (P, T̈) ⊆ Int (mCl (P, T̈)). Thus mCl(P, T̈)is soft open. Hence, by Corollary 3.8, W is SmEDS.

Theorem 3.14: Let (W, Ώ, m (W, T̈)) is soft mixed space and m (W, T̈) have property B.Then W is SmEDS if and only if ∀SOPS (G, T̈) and every soft m (W, T̈)-closed set (F, T̈) with (G, T̈) ⊆ (F, T̈), ∃ a SOPS (G1, T̈) and a soft -m(P, T̈)closed set (F1, T̈) such that (G, T̈) ⊆ (F1, T̈) ⊆ (G1, T̈) ⊆ (F, T̈).

Proof. Suppose W is SmEDS. Let (G, T̈) be a SOPS and (F, T̈) a soft -m (P, T̈) closed set in W such that (G, T̈) ⊆ (F, T̈). Then (G, T̈) ⋂ (W - (F, T̈)) = φ. Then by theorem 3.9 mCl(G, T̈) ⋂Cl(W - (F, T̈)) = φ, that is, mCl(G, T̈) ⊆ W - Cl(W -(F, T̈).Using the fact that W-Cl(W-F) ⊆ (F, T̈) and writing mCl(G, T̈) = (F1, T̈), W-(Cl(W-(F, T̈)) = (G1, T̈), we get (G, T̈) ⊆ (F1, T̈) ⊆ (G1, T̈) ⊆ (F, T̈).Conversely, let the condition hold. Let (U, T̈) be a SOPS and (V, T̈) be a soft-m (P, T̈) open set in W such that (U, T̈) ⋂ (V, T̈) = φ. Then, (U, T̈) ⊆ W - (V, T̈) and W - (V, T̈) is -m (P, T̈) closed, ∃ a SOPS (G, T̈) and a soft -m (P, T̈) closed set (F, T̈) such that (U, T̈) ⊆ (F, T̈) ⊆ (G, T̈) ⊆ W - (V, T̈). This implies that mCl (U, T̈) ⋂W - [Int (W - (V, T̈))] = φ. But W- [Int (W- (V, T̈))] = Cl (V, T̈). That is, mCl (U, T̈)⋂ Cl (V, T̈) = φ and by Theorem 3.9 W is SmEDS.

4. Bibliography

1. U. Acar, F. Koyuncu, B. Tanay, “Soft sets and soft rings”, Comput. Math Appl. ,59, (2010),3458--3463. 010, doi: 10.1016/j.camwa.2010.03.034
2. M. Akdag, A. Ozkan, “Soft b-open sets and soft b-continuous functions”, Math Sci 8:124, DOI10.1007/s40096-014-0124-7 (2014).
3. M. Akdag, A. Ozkan, “On Soft Preopen Sets and Soft Pre-Separation Axioms”, Gazi University Journal of Science GU J Sci ,27, (4), (2014),1077--1083.
4. M. Akdag, A. Ozkan, “On Soft β -Open Sets and Soft β-continuous Functions”, The Scientific World Journal, Article ID 843456, pages 6, (2014).
5. M. Akdag, A. Ozkan, “On Soft α -open Sets and Soft α-Continuous Functions”, Abstract and Applied Analysis http//dx.doi.org/101155/2014/891341, Article ID 891341,7 pages (2014).
6. M. Irfan Ali, F. Feng, X. Liu, W. K. Min and M. Shabir, “On some new operations in soft set theory”, Comput. Math. Appl, 57, (2009),1547--1553.
7. I. Arockiarani, A. A. Lancy, “Generalized soft gβ-closed sets and soft gsβ-closed sets in soft topological spaces”, International Journal of Mathematical Archive,4, (2013),1--7.
8. D.N. Georgiou and A.C. Megaritis, “Soft set theory and topology”. Appl. Gen. Topol., 15, (1) (2014),93--109.
9. H. Hazra, P. Majumdar,S. K. Samanta, “Soft topology”, Fuzzy Inf. Eng., DOI 10 (2012).
10. A.S. Hussain, B. Ahmad, “Some properties of soft topological spaces”, Comput. Math.Appl.,62, (2011),4058--4067.
11. Kandil, O. A. E. Tantawy, S. A. El-Sheikh, A. M. Abd El-latif, “ϒ-operation and decompositions of some forms of soft continuity in soft topological spaces”, Annals of Fuzzy Mathematics and Informatics ,7, (2), (2014),181--196.
12. I. Kharaland B. Ahmad, “Mappings of soft classes”, New Math. Nat. Comput.,7, (2011),471--481.
13. P. K. Maji, R. Biswas and A. R. Roy, “Soft set theory”, Comput. Math. Appl.,45, (2003),555--562.
14. P. K. Maji, R. Biswas and A. R. Roy, “An application of soft sets in decision making problem”, Comput. Math. Appl.,44, (2002),1077--1083.
15. J. Mahanta, P. K. Das, “On soft topological space via semi open and semi closed soft sets”, Kyungpook Math. J., 54, (2014),221--236.
16. Won Keun Min, “A note on soft topological spaces”, Computers and Mathematics with Applications,62, (2011),3524--3528.
17. D. Molodtsov, “Soft set theory First results”, Comput. Math. Appl. 37, (1999) ,19--31.
18. D. Molotov, V.Y. Leonov and D.V. Kovkov, “Soft sets technique and its application”, Nechetkie Sistemyi Myagkie Vychisleniya., (2006),8--39.
19. E. Peyghan, B. samadi, A Tayebi, “On soft Connectedness”, Math GNFeb-9,(2012).
20. E. Peyghan, B. Samadi, A. Tayebi, “About soft topological spaces”,Journal of New Results in Science,2 (2013),60--75.

21. S.S. Thakur and Alpa Singh Rajput, “On Soft M-continuous Mappings”, The Journal of Fuzzy Mathematics Vol. 25, No. 2, 2017,313--326.
22. M. Shabir and M. Naz, “On soft topological spaces”, Computers and Mathematics with Applications Elsevier, 61, (2011),1786--1799. doi.org/10.1016/j.camwa.2011.02.006.
23. Q. M. Sun, Z. L. Zhang, J. Liu, “Rough Sets and Knowledge Technology”, In proceedings of Third International Conference RSKT 2008 17--19, (2008),403--409.
24. S. S. Thakur, Alpa Singh Rajput , Connectedness between soft sets , New Mathematics and Natural Computation Vol. 14, No. 01, pp. 53-71 (2018),doi.org/10.1142/S1793005718500059.
25. S.S. Thakur, Shailendra Singh Thakur Alpa Singh Rajput, “Extremally Disconnectedness in soft topological spaces”, The Journal of Fuzzy Mathematics,27(2),2019,1-11.
26. Tareq Al-shami, El-Sayed Abo, “Connectedness and Local Connectedness on Infra Soft Topological Spaces, Topological Spaces”. Mathematics 2021,9, 1759 DOI: 10.3390/math9151759.
27. Savita Rathee and Ridam Girdhar, “On Soft ω-Connectedness in Soft Topological Spaces”, Communications in Mathematics and Applications Vol. 12, No. 3, pp. 457–474, 2021, DOI: 10.26713/cma. v12i3.1515.
28. I. Zorlutana, N. Akdag, W.K. Min, “Remarks on soft topological spaces”, Ann Fuzzy Math. Inf.,3, (2), (2012),171--185.
29. Idris Zorlutunal, and CakirHatice, “On Continuity of Soft Mappings”, Appl. Math. Inf. Sci. ,9, No. 1, (2015), 403--409. DOI: 10.12785/amis/090147