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On Soft Pre-Compact Maps

Mustafa Shamkhi Eiber[1] and Hiyam Hassan Kadhem[2]

[1]Faculty of Computer Science and Mathematics, Kufa University, Iraq
[2]Faculty of Education, Kufa University, Iraq

*Corresponding Author: Mustafa Shamkhi Eiber

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ABSTRACT: This paper holds to establish a soft pre-compact map and to investigate its associations with soft pre-compact maps, almost soft pre-compact maps, A-almost soft compact maps, A*-almost soft compact maps, mildly soft semi-compact maps, M-mildly soft compact maps besides M*-mildly soft compact maps which are utilized from the relations between their spaces under some conditions or without conditions. Consequently, the composition factors of soft pre-compact maps with soft pre-compact maps, almost soft pre-compact maps, and mildly soft pre-compact maps, A-almost soft compact maps, M-mildly soft compact maps are studied based on the previous association between them. Many examples are given to explain the relationships between the topologies and relations of the soft set.

Keywords: soft pre-compact maps, almost soft pre-compact maps, A-almost soft compact maps, A*-almost soft compact maps, mildly soft pre-compact ma- ps, M-mildly soft compact maps, M*-mildly soft compact maps.

1. INTRODUCTION

Molodtsov at the end of the twentieth century presented the soft set with indeterminate information [1]. Afterward, Maji et al. [2] demonstrated numerous novel concepts on soft sets for instance equality, subset, and the complement of a soft set. In 2010, Babitha and Sunil gave the concept of a soft set relation and function, and they explained the composition of functions [3]. Shabir and Naz [4] 2011 originated soft topology and demonstrated some features of soft separation axioms. Aygünoğlu and Aygün [5] established the conception of soft compact spaces. Hida [6] is equipped more powerful explanation for soft compact spaces than space as long as in [5]. Al-Shami et. al. [7] studied unprecedented forms of covering features known as almost soft compact.

Kharal and Ahmad [8] characterized soft maps and instituted principal features. Subsequently, Zorlutuna and Çakir [9] investigated the notion of soft continuous maps. In continuation of their work, Addis et. al. in 2022 proposed a new definition for soft maps and investigate their features [8].

The principal intent of this work is to create a soft pre-compact map and to investigate its correlation between soft pre-compact maps, almost soft pre-compact maps, A-almost soft compact maps, A*-almost soft compact maps, mildly soft semi-compact maps, M-mildly soft compact maps besides M*-mildly soft compact maps which are utilized from the relations between their spaces under some conditions or without conditions. Consequently, the composition factors of soft pre-compact maps with soft pre-compact maps, almost soft pre-compact maps, and mildly soft pre-compact maps, A-almost soft compact maps, M-mildly soft compact maps are studied based on the previous association between them. Many examples are given to explain the relationships between the topologies and relations of the soft set.

2. PRELIMINARIES

Definition 2.1 [1]: Let W be an initial universal set, E be a set of parameters, and let $P(W)$ to signas long asy the power set. A pair (F, E)) F_E for short) is known as a soft set as long as F is a map of E into the set of all subsets of the set W.

Definition 2.2 [2]: Let F_E be a soft setover W. Subsequently:

1) As long as $F(e) = \phi$, for all $e \in E$, so F_E is known as a null soft set and we symbolize it by $\widetilde{\varnothing}$.

2) As long as $F(e) = W$, for all $e \in E$, so $F_E$is known as an absolute soft set and we symbolize it by $\widetilde{W}$.

Definition 2.3 [8]: Let S(W, E) with S(M, K) are families of all soft sets over W and M, one by one. The map φ_ψ is known as a soft map from W to M, indicated by φ_ψ: S(c$W, E) \rightarrow$ S(M, K), where φ: $W \rightarrow M$ and ψ:$E \rightarrow K$ are two maps.

1. (Let F_E S(W, E), therefore the image of F_E under the soft map φ_ψ is the soft set over M indicated by$\varphi_\psi F_E$ and defined by

$$\varphi_\psi (\mathbb{F}_\mathbb{E})(\mathbb{K}) = \begin{cases} \cup_{\in\psi^{-1}(\mathbb{K})\cap\mathbb{E}}\varphi(\mathbb{F}()), & \text{as long as} \quad \psi^{-1}(\mathbb{K}) \cap \mathbb{E} \neq \emptyset; \\ \emptyset, & \text{othrewise.} \end{cases}$$

2. (Let G_K- S(M, K), therefore the pre-image of G_K under the soft map φ_ψ is the soft set over W indicated by ${\varphi_\psi}^{-1}$ G_K and defined by

$$\varphi_\psi^{-1} (\mathbb{G}_\mathbb{K})() = \begin{cases} \varphi^{-1} (\mathbb{G}_\mathcal{K}(\psi())), & \text{as long as } \psi() \in \mathbb{K}; \\ \emptyset & \text{otherwise} \end{cases}$$

The soft map $\varphi_\psi$is known as injective, as long as φ and $\psi$are injective. The soft map $\varphi_\psi$is known as surjective, as long as φ and ψ are surjective.

Definition 2.4 [4]: Let$T$ is a family of soft sets over W, E be a set of parameters. So T is known as a soft topology on W as long as the subsequent is satisfied:

1) $\widetilde{\phi}$ and $\widetilde{W}$ are in T.

2) the union of any number of soft sets in T is in T.

3) the intersection of any two soft sets in T is in T.

The triple (W, T, E) is known as a soft topological space (STS for short) over W. The members of T are known as the soft open sets in W. A soft set $F_E$over W is known as a soft closed set in W, as long as its relative complement $F_E^{'}$ belongs to T.

Definition 2.5 [4]: Let F_E be a non-null soft subset of (W, T, E) subsequently T_F=$\{F_E \cap G_E, \forall G_E \in T\}$ is known as relative STS on F_E and $(F_E,\ T_F,\ E)$ is known as a soft subspace of (W, T, E).

Definition 2.6 [10]: A soft subset $F_E$of $(W, T, E)$is known as soft pre-open as long as $F_E \widetilde{\subseteq} int(clF_E)$ with its relative complement is known as soft pre-closed.

Definition 2.7 [9]: Let (W, T, E) be a STS over W, $G_E$be a soft set over W, and $x \in W$. Subsequently, G_E is known as a soft neighborhood of x_E, as long as there exists a soft open set F_E such that $\boldsymbol{x}_\mathbb{E} \in \mathbb{F}_\mathbb{E} \subseteq \mathbb{G}_\mathbb{E}$.

Definition 2.8 [11]: Let $(W, T, E)$and $(M, T^{'}, E)$be two STS, $L : (W, T, E) \rightarrow (M, T^{'}, E)$be a soft map. For each soft neighborhood $G_E$of $L(x_E)$, as long as there exists a soft neighborhood $F_E$of x_E, such that $\mathcal{L}(\mathbb{F}_\mathbb{E}) \subseteq \mathbb{G}_\mathbb{E}$, subsequently L is known as a soft continuous map at x_E. As long as L is a soft continuous map for all x_E, subsequently, L is known as a soft continuous map.

Definition2.9 [12] : A soft subset F_E of $STS(W, T, E)$ is said to be:

1) A soft pre-clopen provided that it is soft pre-open and soft pre-closed,

2) A soft pre-dense provided that $clF_E =\ W$

Definition 2.10 [12]:

1) The collection $\{(F_{E\ i} : i \in I\ \}$ of soft pre-open sets is known as a soft pre-open cover of an $STS(W, T, E)$ as long as $W = \widetilde{\cup}_{i \in I} F_{E\ i}$.

2)An STS (W, T, E) is known as a soft pre-compact space (SP-compact space for short) as long as each soft pre-open cover of W has a finite sub-cover of W.

Definition 2.11 [12]: A$STS(W, T, E)$is known as almost SP-compact space as long as each soft pre-open cover of W has a finite sub-cover such that the soft pre-closures whose members cover W.

Definition2.12 [12]: An $STS(W, T, E)$is known as mildly SP-compact space as long as each soft pre-clopen cover of W has a finite soft subcover W.

Proposition 2.13 [12]: Each SP-compact space is an almost SP-compact.

Proposition 2.14 [12]: Each almost SP-compact space is a mildly SP-compact.

Theorem 2.15 [12]: Consider (W, T, E)has a soft pre-base consisting of soft pre-clopen sets. Subsequently, $(W, T, E)$is SP-compact as long as and only as long as it is mildly SP-compact.

Theorem 2.16 [12]: As long as G_E is an SP-compact subset of W and $F_E$is a soft pre-closed subset of W subsequently $G_E \cap F_E$ is SP-compact.
Theorem 2.17 [12]: As long as $G_E$is an almost (resp. a mildly) SP-compact subset of W_E and $F_E$is a soft pre-clopen subset of W, subsequently $G_E \cap F_E$is an almost (resp. a mildly) SP-compact.
Proposition 2.18 [13]: Let (W, T, E) be a STS and F_E be any soft set over $W.\beta$ be an open base of T subsequently $\beta_{F_E} = \{G_E \widetilde{\cap} F_E : G_E \in \beta\}$ is an open base of T_{F_E}.
Definition 2. 19 [12]: A collection β of soft pre-open sets is known as a soft pre-base of (W, T, E)as long as each soft pre-open subset of W can be written as a soft union of members of β.
Theorem 2. 20 [14]: Let (W, T, E) be a STS each open soft set is pre-open soft.
Proposition 2. 21 : Each soft open base is a soft pre-open base.
Proof: Let (W, T, E)be a STS and Let βbe a soft open base. thus, V is a soft open set, $\forall\ V \in \beta$. Theorem (2. 11) V is a soft pre-open set, $\forall\ V \in \beta$.

3. SOFT *SP*-COMPACT MAP

Definition3.1: let $(W, T, E)$and (M, T', E)be two STS and let, $L :(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called a SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each SP-compact subset of M is a SP-compact subset of W.
Example 3.2: Let $W = R$, E={0} and T={ $\widetilde{\emptyset}$, $\widetilde{W}$, G_E} are STS on W such that $G(0) = (-1,1)$. A map $L : (W, T, E)\longrightarrow (M, T', E)$ such that $L(x_e) = -x_e$, $\forall\ x \in W$, therefore L is a SP-compact map.
Definition3.3: let $(W, T, E)$and $(M, \acute{T}, E)$be two STS and let, L:$(W, T, E) \longrightarrow (M, \acute{T}, E)$ be a soft map. then, L is called an almost SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each almost SP-compact subset of M is an almost SP-compact subset of W.
Example 3.4:Let W={x, y, z, h}, $E = \{e_1, e_2\}$ and T= {$\widetilde{\emptyset}$, $\widetilde{W}$, F_E, G_E, H_E , D_E, K_E , M_E} where F_E= {(e_1,{y}),(e_2, $\emptyset$)}, G_E = {(e_1, $\emptyset$),(e_2, h)}, D_E ={(e_1, $\emptyset$),(e_2,{ y, z})}, H_E ={(e_1, $\emptyset$),(e_2,{ y, h})} K_E={(e_1,{ y, z, h}),(e_2, $\emptyset$)}, M_E= {(e_1 ,{x, y, h}),(e_2, $\emptyset$)}.
Define a soft mapping$L : (W, T, E)\longrightarrow(W, T, E)$ by
$L(e_1,\{x\})=(e_1,\{x\})$, $L(e_2,\{x\})=(e_2,\{x\})$, $L(e_1,\{y\})=(e_1,\{z\})$, $L(e_2,\{y\})=(e_2,\{z\})$, $L(e_1,\{z\}) =(e_1, \{y\})$, $L(e_2,\{z\})=(e_2,\{y\})$, $L(e_1,\{h\})=(e_1,\{h\})$, $L(e_2,\{h\})=(e_2,\{h\})$. Then L is continuous and surjective mapping , Also L is an almost SP-compact map.
Definition 3.5: let $(W, T, E)$and (M, T', E)be two STS and let, L:$(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called a mildly SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each mildly SP-compact subset of M is a mildly SP-compact subset of W.
Example 3.6: Let W={m, y, z, h, V}, $E = \{e_1, e_2\}$. Define a mapping $L : (W, T_{dis}, E)\longrightarrow(W, T_{dis}, E)$ by $L(x_e)$= x_e for all $x_e \in W$. Then L is continuous, surjective. Also is a mildly SP-compact map.
Definition 3.7: let $(W, T, E)$and (M, T', E)be two STS and let, L:$(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called A-almost SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each almost SP-compact subset of M is a SP-compact subset of W.
Definition 3.8: let $(W, T, E)$and (M, T', E)be two STS and let, L:$(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called A*-almost SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each SP-compact subset of M is an almost SP-compact subset of W.
Definition 3.9: let $(W, T, E)$and (M, T', E)be two STS and let, L:$(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called M-mildly SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each mildly SP-compact subset of M is a SP-compact subset of W.
Definition 3.10: let $(W, T, E)$and (M, T', E)be two STS and let, L:$(W, T, E) \longrightarrow (M, T', E)$be a soft map. then, L is called M*-mildly SP-compact map, if it is a soft surjective continuous map, and if the pre-image of each SP-compact subset of M is a mildly SP-compact subset of W.
Theorem 3.11: Every A-almost SP-compact map is a SP-compact map.
Proof: let $L : (W, T, E)\longrightarrow (M, T', E)$ be an A-almost SP-compact map. T.P L is a SP-compact map. let $G_E$be a SP-compact set in M. $G_E$is an almost SP-compact set in M by Proposition 2.13,. Now $L^{-1}(G_E)$ is a SP-compact set in W since L soft A-almost SP-compact map. Therefore L is a SP-compact map.
Theorem 3.12: Every A-almost SP-compact map is an almost SP-compact map.
Proof: let $L : (W, T, E)\longrightarrow (M, T', E)$ be an A-almost SP-compact map. T.P L is an almost SP-compact map. let $G_E$be an almost SP-compact set in M. Now $L^{-1}(G_E)$ is a SP-compact set in W. since L soft A-almost SP-compact map, now $L^{-1}(G_E)$ is an almost SP-compact set by Proposition 2.13, Therefore L is an almost SP-compact map.
Theorem 3.13:Every A-almost SP-compact map is A*-almost SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an A-almost SP-compact map. T.P L is A*-almost SP-compact map. let G_E be a SP-compact set in M. G_E be an almost SP-compact set in M by Proposition 2.13. Now $L^{-1}(G_E)$ is a SP-compact set in W since L soft A-almost SP-compact map $L^{-1}(G_E)$ is an almost soft compact set Proposition 2.13. Therefore L is A*-almost SP-compact map.

Theorem 3.14: Every A-almost SP-compact map is M*-mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an A-almost SP-compact map. T.P L is an M*-mildly SP-compact map. let G_E be a SP-compact set in M. G_E be an almost SP-compact set in M by Proposition 2.13. Now $L^{-1}(G_E)$ is a SP-compact set in W since L soft A-almost soft compact map $L^{-1}(G_E)$ is a mildly SP- compact set in W by Proposition 2.13and Proposition 2.14. Therefore L is M*-mildly SP-compact map.

Theorem 3.15: Every A*-almost SP-compact map is M*-mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an A*-almost SP-compact map. T.P L is an M*-mildly SP-compact map. let G_E be a SP-compact set in M. $L^{-1}(G_E)$ is an almost SP-compact set in W since L is a soft A*-almost SP-compact map. now $L^{-1}(G_E)$ is a mildly SP-compact set in W by Proposition 2.14, Therefore L is an M*-mildly SP-compact map.

Theorem 3.16: Every M-mildly SP-compact map is a SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an M-mildly SP-compact map. T.P L is a SP-compact map. let G_E be a SP-compact set in M. By Proposition 2.13and Proposition 2.14 G_E is a mildly SP-compact set in M $L^{-1}(G_E)$ is a SP-compact set in W since L is soft M-mildly SP-compact map. Therefore L is a SP-compact map.

Theorem 3.17: Every M-mildly SP-compact map is an almost SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an M-mildly SP-compact map. T.P L is an almost SP-compact map. let G_E be an almost SP-compact set in M. By Proposition 2.14 G_E is a mildly SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft M-mildly SP-compact map. by Proposition 2.13 $L^{-1}(G_E)$ is an almost SP-compact set. Therefore L is an almost SP-compact map.

Theorem 3.18: Every M-mildly SP-compact map is a mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an M-mildly SP-compact map. T.P L is a mildly SP-compact map. let G_E be a mildly SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft M-mildly SP- compact map. by Proposition 2.13and Proposition 2.14, $L^{-1}(G_E)$ is a mildly SP-compact set. Therefore L is a mildly SP-compact map.

Theorem 3.19: Every M-mildly SP-compact map is A-almost SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},E)$ be an M-mildly SP-compact map. T.P L is an A-almost SP-compact map. let G_E be an almost SP-compact set in M. By Proposition 2.14 G_E is a mildly SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft M-mildly soft compact map. Therefore L is an A-almost SP-compact map.

Theorem 3.20: Every M-mildly SP-compact map is A*-almost SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an M-mildly SP-compact map. T.P L is an A*-almost SP-compact map. let G_E be a SP-compact set in M. By Proposition 2.13and Proposition 2.14 G_E is a mildly SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft M-mildly SP-compact map. By Proposition 2.13 $L^{-1}(G_E)$ is an almost SP-compact set in W. Therefore L is an A*-almost SP-compact map.

Theorem 3.21: Every M-mildly SP-compact map is an M*-mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be an M-mildly SP-compact map. T.P L is an M*-mildly SP-compact map. let G_E be a SP-compact set in M.By Proposition 2.13and Proposition 2.14 G_E is a mildly SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft M-mildly soft compact map. By Proposition 2.13and Proposition 2.14, $L^{-1}(G_E)$ is a mildly SP-compact set in W. Therefore L is an M*-mildly SP-compact map.

Theorem 3.22: Every a mildly SP-compact map is an M*-mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},E)$ be a mildly SP-compact map. T.P L is an M*-mildly SP-compact map. let G_E be a SP-compact set in M.By Proposition 2.13and Proposition 2.14 G_E is a mildly SP-compact set in M. $L^{-1}(G_E)$ is a mildly SP-compact set in W since L is a mildly SP-compact map. Therefore L is an M*-mildly SP-compact map.

Theorem 3.23: Every an almost SP-compact map is an A*-almost SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},E)$ be an almost SP-compact map. T.P L is an A*-almost SP-compact map. let G_E be a SP-compact set in M.By Proposition 2.13 G_E is an almost SP-compact set in M. $L^{-1}(G_E)$ is an almost SP-compact set in W since L is an almost SP-compact map. Therefore L is an A*-almost SP-compact map.

Theorem 3.24: Every SP-compact map is A*-almost a SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be a SP-compact map. T.P L is an A*-almost SP-compact map. let G_E be a SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a soft compact map. By Proposition 2.13 $L^{-1}(G_E)$ is an almost SP-compact set in W. Therefore L is an A*-almost SP-compact map.

Theorem 3.25: Every a SP-compact map is an M*-mildly SP-compact map.

Proof: let $L:(W,T,\ E)\longrightarrow(M,\ T^{'},\ E)$ be a SP-compact map. T.P L is an M*-mildly SP-compact map. let G_E be a SP-compact set in M. $L^{-1}(G_E)$ is a SP-compact set in W since L is a SP-compact map. By Proposition 2.13and Proposition 2.14 $L^{-1}(G_E)$ is a mildly SP-compact set in W. Therefore L is an M*-mildly SP-compact map.

Theorem 3.26: Each SP-compact map is a mildly SP-compact map when the co-domain has a soft pre-base consisting of soft pre-clopen sets.

Proof: Let $L : (W, T,\ E) \longrightarrow (M, T', E)$ be a SP-compact map such that M has a pre-base consisting of soft pre-clopen sets. Suppose that G_E is a mildly SP-compact in M. Since M has a soft pre-base consisting of soft pre-clopen sets. Subsequently, G_E has a soft pre-base consisting of soft pre-clopen sets by Theorem 2.21. Thus, $G_E$is a SP-compact set in M by Theorem 2.15. So, $L^{-1}(G_E)$ is a SP-compact set in W by definition of the SP-compact map. As a result of Proposition 2.13 and proposition 2.14, $L^{-1}(G_E)$ is a mildly SP-compact set in W. Therefore, $L$is a mildly SP-compact map.

Theorem 3.27: Each mildly SP-compact map is a SP-compact map when the domain has a soft pre-base consisting of soft pre-clopen sets.

Proof: Let $L : (W, T,\ E) \longrightarrow (M, T', E)$ be a mildly SP–compact map such that W has a pre-base consisting of soft pre-clopen sets. Suppose that G_E is a SP-compact set in M. Subsequently, G_E is a mildly SP-compact set in M by Proposition 2.13 and Proposition 2.14, subsequently that $L^{-1}(G_E)$is a mildly SP-compact set in W by definition of a mildlySP-compact map. Since W has a pre-base consisting of soft pre-clopen sets subsequently that $L^{-1}(G_E)$has pre-base consisting of soft pre-clopen sets by Theorem 2.21. by Theorem 2.15, that $L^{-1}(G_E)$is a SP-compact set in W. Therefore, $L$is a SP-compact map.

Theorem 3.28: Each SP-compact map is an almost SP-compact map when the co-domain has a soft pre-base consisting of soft pre-clopen sets.

Proof: Let$L : (W, T,\ E) \longrightarrow (M, T', E)$be a SP-compact map such that M has a pre-base consisting of soft pre-clopen sets. Suppose that G_E is an almost SP-compact set in M, so G_E is a mildly SP-compact set in M by Proposition 2.14. Since M has a pre-base consisting of soft pre-clopen sets, subsequently G_E has a soft pre-base consisting of soft pre-clopen sets Theorem 2.21. Thus, G_E is a SP-compact set in M by Theorem 2.15. Subsequently, $L^{-1}(G_E)$ is a SP-compact set in W due to L_E is a SP-compact map. Proposition 2.13 implies that $L^{-1}(G_E)$is an almost SP-compact set in W. Therefore, L is an almost SP-compact map.

Theorem 3.29: Each almost SP-compact map is a SP-compact map when the domain has a soft pre-base consisting of soft pre-clopen sets.

Proof: Let $L : (W, T,\ E) \longrightarrow (M, T', E)$ be an almost SP-compact map such that W has a pre-base consisting of soft pre-clopen sets. Let $G_E pre$-compact set in M by Proposition 2.13. $G_E$is an almost SP-compact set in M. $L^{-1}(G_E)$ is an almost SP-compact set in W by defection almost SP-compact map. $L^{-1}(G_E)$ is a mildly SP-compact set in W by proposition 2.14. W has a soft pre-base consisting of soft pre-clopen sets subsequently $L^{-1}(G_E)$ has a soft pre-base consisting of soft pre-clopen sets by Theorem 2.21. As a result of Theorem 2.15 $L^{-1}(G_E)$is a SP-compact set in W. Therefore, L is a SP-compact map.

Theorem 3.30: Each almost SP-compact map is a mildly SP-compact map When the co-domain has a pre-base of soft pre-clopen sets.

Proof: Let $L : (W, T,\ E) \longrightarrow (M, T', E)$be an almost SP-compact map such that M has a pre-base of a soft pre-clopen set. Suppose that G_E be a mildly SP-compact set in M. Thus, G_E has a pre-base of soft pre-clopen sets because M has a pre-base of soft pre-clopen sets Theorem 2.21. So, $G_E$is a SP-compact set in M by Theorem 2.15, and as a result of Proposition 2.13, M is an almost SP-compact set in M. Thus, $L^{-1}(G_E)$ is an almost SP-compact set in W since $L$is an almost SP-compact map. Therefore, $L^{-1}(G_E)$ is a mildly SP-compact set in W by Proposition 2.14 Therefore, L is a mildly SP-compact map.

Theorem 3.31: Each mildly SP-compact map is an almost soft SP-compact map when the domain has a pre-base of soft pre-clopen sets.

Proof: Let $L : (M, T,\ E) \longrightarrow (W, T', E)$ be a mildly SP-compact map such that W has a pre-base of a soft pre-clopen set. Suppose that $G_E$is an almost SP-compact set in M. $G_E$is a mildly SP-compact set in M by Proposition 2.14. Subsequently $L^{-1}(G_E)$ is a mildly SP-compact set in W by definition of a mildly SP-compact map. W has a pre-base of soft pre-clopen sets, subsequently, $L^{-1}(G_E)$ has a pre-base of soft pre-clopen sets by Theorem 2.21. As a result of Theorem 2.15, $L^{-1}(G_E)$ is a SP-compact set in W by Proposition 2.13, $L^{-1}(G_E)$ is an almost SP-compact set in W,Therefore, $L^{-1}(G_E)$ is an almost SP-compact map.

4. RESTRICTION OF TYPE PRE-COMPACT MAPS

Theorem 4.1: let $L : (W, T,\ E) \longrightarrow (M, T', E)$ be a SP-compact map. if A_E is a pre-closed subset of W then the restriction $g = L|(A_E, T_A,\ E)$: $(A_E, T_A,\ E) \rightarrow (M, T', E)$ is a SP-compact map.

Proof: let $L : (W, T,\ E) \longrightarrow (M, T', E)$ is a SP-compact map, A_E is a pre-closed subset of W, the relative soft topology on A_E is $T_A = \{A_E{}^* = A_E \cap F_E, \forall F_E \in T\}$. Suppose G_E is a SP-compact set in M, $L^{-1}(G_E)$is a SP-compact set in$W$ since L is a SP-compact map. Subsequently, $A_E \cap L^{-1}(G_E) \in T_A$ is a SP-compact set by Theorem2.16. Therefore $g = (A_E, T_A, E) \rightarrow (M, T', E)$is a SP-compact map.

Theorem 4.2: Let $L : (W, T, E) \longrightarrow (M, T', E)$be an almost(resp. a mildly) SP-compact map. If A_E is a soft pre-clopen subset of W then the restriction $g = L|(A_E, T_A, E)$: $(A_E, T_A, E) \rightarrow (M, T', E)$ is an almost(resp. a mildly) SP-compact map.

Proof: Let $L : (W, T, E) \longrightarrow (M, T', E)$be an almost(resp. a mildly) SP-compact map, A_E is a soft pre-clopen subset of W, the relative topology on A_E is $T_A = \{A_E{}^* = A_E \cap F_E, \forall F_E \in T\}$. Suppose G_E is an almost(resp. a mildly) SP-compact set in M, $L^{-1}(G_E)$ is an almost (resp. a mildly) SP-compact set in W since L is an almost (resp. a mildly) SP-compact map. Subsequently, $A_E \cap L^{-1}(G_E) \in T_A$ is an almost (resp . a mildly) SP-compact set by Theorem 2.17, Therefore, $g = (A_E, T_A, E) \rightarrow (M, T', E)$ is an almost (resp .a mildly) SP-compact map.

Theorem 4.3: let $L : (W, T, E) \longrightarrow (M, T', E)$ be an A-almost(resp. M-mildly) SP-compact map. If A_E is a soft pre-closed subset of W then the restriction $g = L|(A_E, T_A, E)$: $(A_E, T_A, E) \rightarrow (M, T', E)$ is an A-almost(resp. **M-**mildly) SP-compact map.

Proof: Let $L : (W, T, E) \longrightarrow (M, T', E)$be an A-almost(resp. M**-**mildly)SP-compact map, A_E is a soft pre-closed subset of W, the relative topology on A_E is $T_A = \{A_E{}^* = A_E \cap F_E, \forall F_E \in T\}$. Suppose G_E is an almost(resp. mildly) SP-compact set in M, $L^{-1}(G_E)$ is a SP-compact set in W since L is an A-almost (resp. **M-**mildly)SP-compact map. Subsequently, $A_E \cap L^{-1}(G_E) \in T_A$ is a SP-compact set by Theorem2.17. Therefore, $g = (A_E, T_A, E) \rightarrow (M, T', E)$ is an A-almost(resp. **M-**mildly)SP-compact map.

Theorem 4.4: let $L : (W, T, E) \longrightarrow (M, T', E)$ be an **A* -**almost(resp. **M*-**mildly) SP-compact map. If A_E is a soft pre-clopen subset of W then the restriction $g = L|(A_E, T_A, E)$: $(A_E, T_A, E) \rightarrow (M, T', E)$ is an A*-almost(resp.**M*-**mildly) SP-compact map.

Proof: Let $L : (W, T, E) \longrightarrow (M, T', E)$be an **A*-**almost(resp.**M*-**mildly) SP-compact map, A_E is a soft pre-clopen subset of W, the relative topology on A_E is $T_A = \{A_E{}^* = A_E \cap F_E, \forall F_E \in T\}$. Suppose G_E is a SP-compact set in M, $L^{-1}(G_E)$ is an almost(resp. mildly)SP-compact set in W since L is an A*-almost(resp. **M*-**mildly) SP-compact map. Subsequently, $A_E \cap L^{-1}(G_E) \in T_A$ is an almost(resp. mildly) SP-compact set by Theorem 2.17. Therefore, $g = (A_E, T_A, E) \rightarrow (M, T', E)$ is an A*-almost(resp. **M*-**mildly) SP-compact map.

5. COMPOSITION OF CERTAIN TYPES OF SP-COMPACT MAPS

Theorem 5.1: The composition of SP-compact maps (one by one almost SP-compact maps, mildly SP-compact maps) is also a SP-compact map (one by one almost SP-compact maps, mildly SP-compact map).

Proof: Let $L : (W, T, E)\ (J, T', E)$ and $h : (J, T', E)\ (M, T'', E)$ be two SP-compact(one by one almost SP-compact, mildly SP-compact) maps. To veras long asy that $h \circ L$ is also SP-compact(one by one almost SP-compact, mildly SP-compact) maps. Suppose that G_E is a SP-compact(resp. an almost SP–compact, a mildly SP-compact) set in M. (to show that $(h \circ L)^{-1} G_E$ is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) set in W. We have $h^{-1}(G_E)$ is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) set in J since $h$is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) map. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) set in W because L is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) map. We have $(h \circ L)^{-1} G_E = L^{-1}(h^{-1}(G_E))$. so $(h \circ L)^{-1}$is a SP-compact(one by one an almost SP-compact, a mildly SP-compact) set in W. Therefore, $h \circ L$ is also a SP-compact(one by one an almost SP-compact, a mildly SP-compact) map.

Theorem 5.2: The composition of A-almost (resp. M-mildly) a SP-compact map is also A-almost (resp. M-mildly) SP-compact map.

Proof: Let $L : (W, T, E)\ (J, T', E)$ and $h : (J, T', E)\ (M, T'', E)$ be two A-almost (resp. M-mildly) SP-compact maps. To veras long asy that $h \circ L$ is also A-almost (resp. M-mildly)SP-compact map. Suppose that G_E is an almost (resp. mildly) SP-compact set in M. (to show that $(h \circ L)^{-1} G_E$ is a SP-compact) set in W. We have $h^{-1}(G_E)$ is a SP-compact set in J since h is an A-almost(resp. M-mildly) SP-compact map. By Proposition 2.13 (resp. Proposition 2.13and Proposition 2.14) $h^{-1}(G_E)$is an almost (resp. mildly) SP-compact set in J. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact set in W because L is an A-almost (resp. M-mildly)SP-compact map. We have $(h \circ L)^{-1} G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is an A-almost (resp. M-mildly)SP-compact map.

Theorem 5.3: Let $L : (W, T, E)(J, T', E)$ is a SP-compact map and h: $\left(J, T', E\right)(M, T'', E)$ is an A-almost(resp. M-mildly) SP-compact map then $h \circ L$ is an A-almost(resp. M-mildly) SP-compact map.

Proof: Let $L : (W, T, E)\ (J, T', E)$ be a SP-compact map and $h : (J, T', E)\ (M, T'', E)$ A-almost(resp. M-mildly) SP-compact map. To versa long asy that $h \circ L$ is also A-almost(resp. M-mildly) SP-compact map. Suppose that G_E is an almost(resp. mildly)SP-compact set in M. (to show that $(h \circ L)^{-1} G_E$ is a SP-compact) set in W. We have $h^{-1}(G_E)$ is a SP-compact set in J since h is an A-almost(resp. M-mildly) SP-compact map. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-

compact set in W because L is a SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is an A-almost(resp. M-mildly) SP-compact map.

Theorem 5.4: Let $L : (W, T, E)(J, T', E)$ is an A-almost(resp. M-mildly) SP-compact map and $h:\left(J, T', E\right)(M, T'', E)$ is a SP-compact map. $h \circ L$ is a SP-compact map.

Proof: By Theorem 5.1 and Theorem 3.11(resp. by Theorem 5.1 and Theorem 3.16).

Theorem 5.5: Let $L : (W, T, E)(J, T', E)$ is an A-almost (resp. M-mildly) SP-compact map and $h :\left(J, T', E\right)(M, T'', E)$ is an almost (resp. mildly) SP-compact map. $h \circ L$ is an A-almost (resp.M-mildly) SP-compact map.

Proof: Let $L : (W, T, E)(J, T', E)$ be an A-almost (M-mildly) SP-compact map and $h : (J, T', E)(M, T'', E)$ is an almost(resp. mildly) SP-compact map. To versa long asy that $h \circ L$ is also A-almost(resp. M-mildly) SP-compact map. Suppose that G_E is an almost (resp. mildly) SP-compact set in M. (to show that $(h \circ L)^{-1}G_E$ is a SP-compact) set in W. We have $h^{-1}(G_E)$ is an almost(resp. mildly) SP-compact set in J since h is an almost (resp. mildly)SP-compact map. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact set in W because L is an A-almost(resp. M-mildly) SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is an A-almost(resp. M-mildly) SP-compact map.

Theorem5.6: Let $L : (W, T, E)(J, T', E)$ is an almost (resp. mildly) SP-compact map and $h:\left(J, T', E\right)(M, T'', E)$ is an A-almost (resp. M-mildly)SP-compact map. $h \circ L$ is an almost(resp. mildly) SP-compact map.

Proof: By Theorem 5.1 and Theorem 3.12(resp. By Theorem 5.1 and Theorem 3.18).

Theorem 5.7: Let $L : (W, T, E)(J, T', E)$ is an A-almost (resp. M-mildly) SP-compact map and $h:\left(J, T', E\right)(M, T'', E)$ is an A*-almost(resp. M*-mildly) SP-compact map then $h \circ L$ is a SP-compact map.

Proof: Let $L : (W, T, E)(J, T', E)$ is an A-almost (resp. M-mildly) SP-compact map and $h : (J, T', E)(M, T'', E)$ is an A*-almost(resp. M*-mildly) SP-compact map. To versa long asy that $h \circ L$ is a SP-compact map. Suppose that G_E is a SP-compact set in M. (to show that $(h \circ L)^{-1}G_E$ is a SP-compact) set in W. We have $h^{-1}(G_E)$ is an almost(resp. mildly) SP-compact set in J since h is an A*-almost (resp. M*-mildly) SP-compact map. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact set in W because L is an A-almost (resp. M-mildly) SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is a SP-compact map.

Theorem 5.8: Let $L : (W, T, E)(J, T', E)$ is an A*-almost(resp. M*-mildly) SP-compact map and $h:\left(J, T', E\right)(M, T'', E)$ is an A-almost(resp. M-mildly) SP-compact map then $h \circ L$ is an almost (resp. mildly) SP-compact map.

Proof: Let $L : (W, T, E)(J, T', E)$ is an A*-almost(resp. M*-mildly) SP-compact map and $h : (J, T', E)(M, T'', E)$ is an A-almost(resp. M-mildly) SP-compact map. To versa long asy that $h \circ L$ is an almost (resp. mildly)SP-compact map. Suppose that G_E is an almost(resp. mildly) SP-compact set in M. to show that $(h \circ L)^{-1}G_E$ is an almost(resp. mildly) SP-compact set in W. We have $h^{-1}(G_E)$ is SP-compact set in J since h is an A-almost(resp. M-mildly) SP-compact map. Subsequently, $L^{-1}(h^{-1}(G_E))$is an almost(resp. mildly) soft pre-compact set in W because L is an A*-almost(resp. M*-mildly) SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is an almost(resp. mildly) SP-compact set in W. Therefore, $h \circ L$ is an almost(resp. mildly) SP-compact map.

Theorem 5.9: Let $L : (W, T, E)(J, T', E)$ is an A-almost SP-compact map and $h :\left(J, T', E\right)(M, T'', E)$ is an M-mildly SP-compact map then $h \circ L$ is an M-mildly SP-compact map.

Proof: Let $L : (W, T, E)(J, T', E)$ be an A-almost SP-compact map and $h : (J, T', E)(M, T'', E)$ is an M-mildly SP-compact map. To versa long asy that $h \circ L$ is a mildly SP-compact map. Suppose that G_E is a mildly SP-compact set in M. to show that $(h \circ L)^{-1}G_E$ is a SP-compact set in W. We have $h^{-1}(G_E)$ is SP-compact set in J since h is an M-mildly. By Proposition 2.13 $h^{-1}(G_E)$ is an almost SP-compact set in J. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact set in W because L is an A-almost SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is an M-mildly SP-compact map.

Theorem 5.10: Let $L : (W, T, E)(J, T', E)$ is an M-mildly SP-compact map and $h :\left(J, T', E\right)(M, T'', E)$ is an A-almost SP-compact map then $h \circ L$ is an A-almost SP-compact map.

Proof: Let $L : (W, T, E)(J, T', E)$ is an M-mildly SP-compact map and $h : (J, T', E)(M, T'', E)$ is an A-almost SP-compact map. To versa long asy that $h \circ L$ is an A-almost SP-compact map. Suppose that G_E is an almost SP-compact set in M. to show that $(h \circ L)^{-1}G_E$ is a SP-compact set in W. We have $h^{-1}(G_E)$ is SP-compact set in J since h is an A-almost SP-compact map. By Proposition 2.13and Proposition 2.14 $h^{-1}(G_E)$ is a mildly SP-compact set in J. Subsequently, $L^{-1}(h^{-1}(G_E))$is a SP-compact set in W because L is an M-mildly SP-compact map. We have $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$ so $(h \circ L)^{-1}$is a SP-compact set in W. Therefore, $h \circ L$ is an A-almost SP-compact map.

Theorem 5.11: Let $L : (W, T, E)(J, T', E)$be a SP-compact map and $h : (J, T', E)(M, T'', E)$ is a mildly SP-compact map. As long as (J, T', E) has a soft pre-base of soft pre-clopen sets, subsequently , $h \circ L$ is a mildly SP-compact map.

Proof: Suppose G_E is a mildly SP-compact set in M (to show that $h \circ L$ is a mildly SP-compact map). we have $h^{-1}(G_E)$ is a mildly SP-compact set in Jsince h is a mildly SP-compact map. Subsequently, L is a SP-compact map with a co-domain that has a soft pre-base of soft pre-clopen sets. As a result of Theorem 3.26**.** we get $L^{-1}(h^{-1}(G_E))$. is a mildly SP-compact set in$W$, because of $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. so, $(h \circ L)^{-1}G_E$ is a mildly SP-compact set in W. Therefore, $h \circ L$ is also a mildly SP-compact map.

Theorem 5.12: Let $L : (W, T, E)$ (J, T', E) is a mildly SP-compact map and $h : (J, T', E)$ (M, T'', E) is a SP-compact map. As long as (W, T, E)has a soft pre-base of a soft pre-clopen set Subsequently $h \circ L$ is a SP-compact map.

Proof: Suppose G_E is a SP-compact set in M. (to show that $h \circ L$ is a SP-compact map). we have $h^{-1}(G_E)$ is a SP-compact set in J since h is a SP-compact map. Subsequently, L is a mildly SP-compact map with a domain that has a soft pre-base of a soft pre-clopen set. As a result of Theorem 3.27 $L^{-1}(h^{-1}(G_E))$. is SP-compact set in W. Because of $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. So $(h \circ L)^{-1}G_E$ is SP-compact set in W. Therefore, $h \circ L$ is also a SP-compact map.

Theorem 5.13: Authorize $L : (W, T, E)$ (J, T', E) be a SP-compact map and $h : (J, T', E)$ (M, T'', E) is an almost SP-compact map. As long as (J, T', E)has a soft pre-base of soft pre-clopen. Subsequently $h \circ L$ is an almost SP-compact map.

Proof: Suppose G_E is an almost SP-compact set in M. (to show that $h \circ L$ is an almost SP-compact map). we have $h^{-1}(G_E)$ is an almost SP-compact set in J since h is an almost SP-compact map. Subsequently, L is a SP-compact map with a co-domain that has a pre-base soft pre-clopen set. As a result of Theorem 3.28, we get $L^{-1}(h^{-1}(G_E))$.is an almost SP-compact set in W. Because $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. So $(h \circ L)^{-1}G_E$is an almost SP-compact set in W. Therefore, $h \circ L$is also an almost SP-compact map.

Theorem5.14: Let $L : (W, T, E)$ (J, T', E) is an almost SP-compact map and $h : (J, T', E)$ (M, T'', E) is a SP-compact map. As long as (W, T, E)has a pre-base soft pre-clopen set. Subsequently $h \circ L$ is a SP-compact map.

Proof: Suppose G_E is a SP-compact set in M)to show that $h \circ L$is SP-SP-compact map). we have $h^{-1}(G_E)$ is SP-compact set in J since h is a SP-compact map. Subsequently, L is an almost SP-compact map with a domain that has a pre-base soft pre-clopen set. As a result, to Theorem 3.29**.** we get $L^{-1}(h^{-1}(G_E))$. is a SP-compact set in W. Because of $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. So $(h \circ L)^{-1}G_E$ is a SP-compact set in W. Therefore, $h \circ L$ is also a SP-compact map.

Theorem 5.15: Let $L : (W, T, E)$ $(J, T', E)$is an almost SP-compact map and $h : (J, T', E)$ (M, T'', E) is a mildly SP-compact map. As long as (J, T', E)has a soft pre-base of a soft pre-clopen set. Subsequently $h \circ L$ is a mildly SP-compact map.

Proof: Suppose $G_E$is a mildly SP-compact set in $h^{-1}(G_E)$. (to show that $h \circ L$ is a mildly SP-compact map). we have $h^{-1}(G_E)$is a mildly SP-e−compact set in Jsince h is a mildly SP-compact map. Subsequently L is an almost SP-compact map with a co-domain that has a soft pre-base of a soft pre-clopen set. As a result, of Theorem 3.30 we get $L^{-1}(h^{-1}(G_E))$. is a mildly SP-compact set in W. Because of $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. So $(h \circ L)^{-1}G_E$is a mildly SP-compact set in W. Therefore, $h \circ L$ is a mildly SP-compact map.

Theorem 5.16: Let $L : (W, T, E)$ $(J, T', E)$is a mildly SP-compact map and $h : (J, T', E)$ (M, T'', E) is an almost SP-compact map. As long as (W, T, E)has a soft pre-base soft pre-clopen set. Subsequently, $h \circ L$ is an almost SP-compact map.

Proof: Suppose $G_E$is an almost SP-SP-compact set in M. (to show that $h \circ L$ is an almost SP-compact map). we have $h^{-1}(G_E)$ is an almost SP-compact set in $J_E$since h_E is an almost SP-compact map. Subsequently L is a mildly SP-compact map with a domain that has a pre-base soft pre-clopen set. From Theorem 3.32 we get $L^{-1}(h^{-1}(G_E))$is an almost SP-compact set in W. Because of $(h \circ L)^{-1}G_E = L^{-1}(h^{-1}(G_E))$. So $(h \circ L)^{-1}G_E$ is an almost SP-compact set in W. Therefore, $h \circ L$ is an almost SP-compact map.

6. CONCLUSION

To sum up, we create in this paper a soft pre-compact map and investigate its associations with soft pre-compact maps, almost soft pre-compact maps, A-almost soft compact maps, A*-almost soft compact maps, mildly soft semi-compact maps, M-mildly soft compact maps besides M*-mildly soft compact maps which are utilized from the relations between their spaces under some conditions or without conditions. Moreover, the composition factors of soft pre-compact maps with soft pre-compact maps, almost soft pre-compact maps, and mildly soft pre-compact maps, A-almost soft compact maps, M-mildly soft compact maps are studied based on the previous association between them.

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REFERENCES

[1] D. Molodtsov, "Soft set theory-first results," *Computers and Mathematics with Applications*, vol. 37, no. 4-5, pp. 19–31, 1999.
[2] P. K. Maji, R. Biswas, and A. R. Roy *Soft set theory*, vol. 45, pp. 555–562, 2003.
[3] K. V. Babitha and J. J. Sunil *Soft set relations and functions*, vol. 60, pp. 1840–1849, 2010.
[4] M. Shabir and M. Naz *On soft topological spaces*, vol. 61, pp. 1786–1799, 2011.
[5] A. Aygünoğlu and H. Aygün, "Some notes on soft topological spaces," *Neural Comput. and Applic*, vol. 21, pp. 113–119, 2012.
[6] T. Hida, "A comparison of two formulations of soft compactness," *Ann. Fuzzy Math. Inform*, vol. 8, pp. 511–524, 2014.
[7] T. M. Al-Shami, M. E. El-Shafei, and M. Abo-Elhamayel, "Almost soft compact and approximately soft Lindelöfspaces," *Journal of Taibah University for Science*, vol. 12, no. 5, pp. 620–630, 2018.
[8] A. Kharal and B. Ahmad, "Maps of soft classes," *New Mathematics and Natural Computation*, vol. 7, no. 7, pp. 471–481, 2011.
[9] I. Zorlutuna, M. Akdag, W. K. Min, and S. Atmaca, "Remarks on soft topological spaces," *Annals of Fuzzy Mathematics and Informatics*, vol. 3, no. 2, pp. 171–185, 2012.
[10] I. Arockiarani and A. Lancy, "Generalized soft gβ- closed sets and soft gsβ-closed sets in."
[11] D. Wardowski, "On a soft map and its fixed points"," *Journal of Wardowski Fixed Point Theory and Applications*, vol. 182, no. 1, pp. 1–11, 2013.
[12] T. Al-Shami and M. El-Shafe, "On soft compact and soft Lindel¨of spaces via soft pre-open sets," *Annals of Fuzzy Mathematics and Informatics*, vol. x, No. x, pp. 1–1, 2018.
[13] S. Nazmul and S. Samanta, "Neighbourhood features of soft topologic spaces," *Annals of Fuzzy Mathematics and Informatics*, vol. x, No. x, pp. 1–1, 2012.
[14] A. Kandil, O. A. E. Tantawy, S. A. El-Sheikh, and A. M, "Abd El-Latas long as,"γ-operation and decompositions of some forms of soft continuity in soft topological spaces," *Annals of Fuzzy Mathematics and Informatics*, vol. x, No. x, pp. 1–1, 2013.