IOSR Journal of Mathematics (IOSR-JM)
e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 16, Issue 4 Ser. III (Jul.–Aug. 2020), PP 33-38
www.iosrjournals.org

Restriction of Soft Setsand Soft Mappings and Some of its Real LifeApplications

Majd Hamid Mahmood
Department of Mathematics Collage of Education,
Al-Mustansiriyah University, Baghdad,Iraq .

Abstract
In this search we define the restriction of soft set in two methods ,first method ,the restriction of soft set (F,E) on $A \subset E$ (E is the set of parameters),second method ,the restriction of soft set (F,E) with respect to $A \subset X$ (X is the universal set) , introduce some practical examples .Then ,we introduce and study restriction of soft mappings .
***Key words** : restricted soft set, soft topology ,image processing , restriction of soft mappings .*

Date of Submission: 18-07-2020 Date of Acceptance: 03-08-2020

I. INTRODUCTION

soft set was introduce in [8] by Molodtsov.Maji and Roy[7]introduced operations on soft sets, new operations in soft set was introduced in [2],[5] by Irfan and Feng, in [1],[3],[4] ,[10] properties of soft topological spaces has been studied , [9],[6] introduce a new studies on soft spaces ,soft relative topology is defined in [3], soft mapping defined in [11] by Wardowski .
In this search we will define the restriction of soft set, give an examples in restriction of a matrix of pixels .
Then, introduce the restriction mappings over a soft set , study the restriction of mapping on soft continuous , soft open, soft close maps , we would like to mention that all soft sets in this search are on the same set of parameters E, denoted by $S(X)_E$,through this search simply (A,E) equals to $\widetilde{A}$, (F,E) equals to $\widetilde{F}$.

Definition1.1.[5][7]
1- The soft set (F,E) over X is said to be a (null soft set) denoted by $\widetilde{\Phi}$, if $\forall e \in E, F(e) = \Phi$, ($\Phi$ the null set) .
2- The soft set (F,E) over X is said to be an (absolute soft set) denoted by $\widetilde{X}$ if$\forall e \in E, F(e) = X$.
3- Let (F,A) ,(G,B) be two soft sets in $S(X)_E$, we say that (F,A) is a soft subset of (G,B) denoted (F,A) $\widetilde{\subseteq}$(G,B) if (i) $A \subseteq B$ and (ii) $F(e) \subseteq G(e)\ \forall e \in A$.
4- The soft difference (H,E) of two soft sets (F,E) and (G,E) over X denoted by (F,E)$\widetilde{\setminus}$ (G,E) is defined as $H(e) = F(e) \setminus G(e)$ for all $e \in E$.
5- The union of two soft sets of (F,A) and (G,B) over the common universe X is the soft set (H,C), where $C= A\cup B$, and $\forall\ e \in C$ we write (F,A) $\widetilde{\cup}$ (G,B)= (H,C) ,

$$H(e) = \begin{cases} F(e) & \text{if } e \in A\setminus B \\ G(e) & \text{if } e \in B\setminus A \\ F(e)\cup G(e) & \text{if } e \in A\cap B \end{cases}$$

6- The intersection of two soft sets (F,A) and (G,B) over a common universe set X is the soft set (H,C) where $C = A\cap B$ and$\forall\ e \in C$, $H(e) = F(e)\cap G(e)$,we write (F,A)$\widetilde{\cap}$(G,B) = (H,C).

Definition 1.2. [10]
Let $\widetilde{T}$ be the collection of soft sets over X then $\widetilde{T}$ is soft topology on X if :
1- Φ , X belong to $\widetilde{T}$.
2- The union of any number of soft sets in T belongs to $\widetilde{T}$.
3- The intersection of any two soft sets in T belongs to $\widetilde{T}$.
The triple (X,$\widetilde{T}$,E) is called a soft topological space over X .

II. The restriction of soft set on $A \subset E$ (E is the set of parameters)

Definition 2.1.
Let X the universal set , (F,E) is soft set where $F:E \rightarrow P(X)$ the restriction of (F,E) with respect to the set of parameters $A \subset E$ is (G,E)where $G:E \setminus A \rightarrow P(X)$, $F(e) = G(e) \ \forall \ e \in A$.

Example 2.2.
Let X ={Mathematics , Physics , Geology} represent the scientific information's that each book b_1 , b_2 and b_3 consist , E the set of parameters represent the set of three books = { b_1 , b_2 , b_3 } ,
the soft set (F,E) represent the scientific information's that each book consist
(F,E) = { (b_1,{Mathematics}) ,(b_2,{Mathematics , Physics}) , (b_3,{X}) }
Means that the book1 contains Mathematics only , b_2 contains Mathematics and physics , b_3 contains all Mathematics , Physics and Geology.
Let A = { b_1 , b_2 } $\subset$ E , $G:E \setminus A \rightarrow P(X)$.Then, (G,A) = {($b_1$,{Mathematics}) , ($b_2$,{Mathematics , Physics})}is the restriction of (F,E) with respect to A which represent only two books b_1 , b_2 .

Application2.3.
A Pixel is a sets of three numbers that together to represent a particular color.
In this example we will restrict an image on 3×3 matrix of Pixels by using the concept " restriction of soft sets "
Let X represent the three colors read , green and blue the degree of each color n equals 0 to 255,
X = {Rn ,Gn , Bn} for some n , E the set of parameters represent the set of n-Pixels
E = {p_{ij},i = j={1,2,3} } , the soft set (F,E) represent the image that contain 9 Pixels
(F,E) = { (p_{11},{ R_{255} ,G_0 , B_0 }) , (p_{21},{ R_{102} ,G_{102} , B_{255}}) , (p_{31},{ R_{51} ,G_{204} , B_{153}}) , (p_{12},{ R_{255} ,G_{255} , B_{102}}) , (p_{22},{ R_{255} ,G_0 , B_{204}}) , (p_{32},{ R_{51} ,G_{204} , $B2_{55}$}) ,
(p_{13},{ R_{51} ,G_{51} , B_0}) ,(p_{23},{ R_{51} ,G_{51} , B_{153}}) , (p_{33},{ R_{255} ,G_{153} , B_{153}}) } .
Let A = { p_{11} ,p_{21}, p_{12} , p_{22}} $\subset$ E , $C: E \setminus A \rightarrow P(X)$.
Then, (C,A) = { (p_{11},{ R_{255} ,G_0 , B_0 }) , (p_{21},{ R_{102} ,G_{102} , B_{255}}) ,
(p_{12},{ R_{255} ,G_{255} , B_{102}}) , (p_{22},{ R_{255} ,G_0 , B_{204}}}
is the restriction of (F,E) with respect to A.

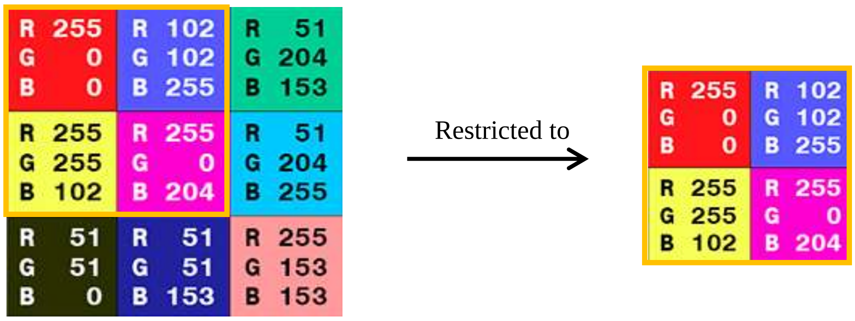

Figure 1. This figure show the restriction of 3×3 matrix of Pixels in to a of 2×2 matrix of Pixels .

Application2.4.
Let X represent the three colors read , green and blue the degree of each color n equals 0 to 255,
X = {Rn ,Gn , Bn} for some n ,
E the set of parameters represent the set of n-Pixels
E = {p_{ij},i = j={1,2,3} } , the soft set (F,E) represent the image that contain 9 Pixels
(F,E) = { (p_{11},{ R_{255} ,G_0 , B_0 }) , (p_{21},{ R_{102} ,G_{102} , B_{255}}) , (p_{31},{ R_{51} ,G_{204} , B_{153}}) , (p_{12},{ R_{255} ,G_{255} , B_{102}}) , (p_{22},{ R_{255} ,G_0 , B_{204}}) , (p_{32},{ R_{51} ,G_{204} , $B2_{55}$}) ,
(p_{13},{ R_{51} ,G_{51} , B_0}) ,(p_{23},{ R_{51} ,G_{51} , B_{153}}) , (p_{33},{ R_{255} ,G_{153} , B_{153}}) } .
Let B = { p_{21} ,p_{22} , p_{23} , p_{31}, p_{31}, p_{32}, p_{33} } $\subset$ E , $C: E \setminus B \rightarrow P(X)$.
Then, (C,B) = { (p_{21},{ R_{255} ,G_{255} , B_{102}}) , (p_{31},{ R_{51} ,G_{51} , B_0}) ,
(p_{22},{ R_{255} ,G_0 , B_{204}}) , (p_{23},{ R_{51} ,G_{204} , B_{255}}) ,
(p_{32},{ R_{51} ,G_{51} , B_{153}}) , (p_{33},{ R_{255} ,G_{153} , B_{153}}}
is the restriction of (F,E) with respect to B.

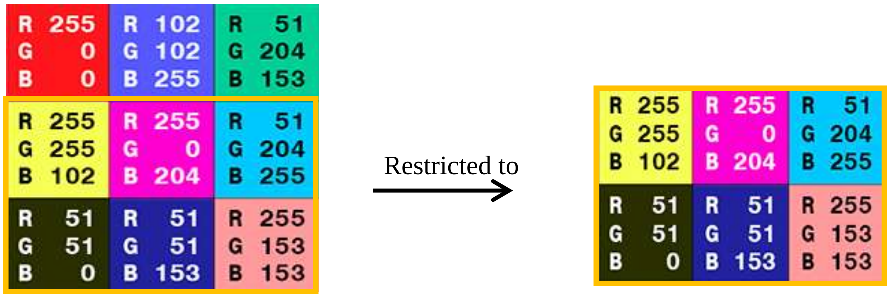

Figure 2. This figure show the restriction of 3×3 matrix of Pixels in to a of 2×3 matrix of Pixels .

Propositions2.5.
Let X be the universal set, for a given soft set the restricted soft set (with respect to $A \subset E$)is a special case of soft subset .
Proof :
Let (F,E) is soft set where $F:E\to P(X)$, (G,A) is the restriction of (F,E) with respect to the set of parameters $A \subset E$ where $G:E\backslash A\to P(X)$, since (i) $A \subseteq E$ and (ii) $G(e) \subseteq F(e)\ \forall\ e \in A$ .Then, $(G,A)\tilde{\subseteq}(F,E)$.

Propositions2.6.
Let X be the universal set , the soft union of a soft set with restricted soft set (with respect to $A \subset E$) is a soft set.
Proof :
Let (F,E) is soft set where $F:E\to P(X)$, (G,A) is the restriction of (F,E) with respect to the set of parameters $A \subset E$ where $G:E\backslash A\to P(X)$, since$e\in A\cap E$and $F(e) \cup G(e) = F(e)$.Then,$(F,E)\ \tilde{\cup}\ (G,A)= (F,E)$.

Propositions2.7.
Let X be the universal set, the soft intersection of soft set with the restricted soft set(with respect to $A \subset E$) is the restricted soft set .
Proof :
Let (F,E) is soft set where $F:E\to P(X)$, (G,A) is the restriction of (F,E) with respect to the set of parameters $A \subset E$ where $G:E\backslash A\to P(X)$, since $F(e) = G(e)\ \forall\ e \in A$ .Then, $(F,E)\tilde{\cap}\ (G,A) = (G,A)$.

III. The restriction of soft set with respect to $A \subset X$ (X is the universal set)

Definition 3.1. Let X be a universal set let (F,E) be a soft set where $F:E\to P(X)$ the restriction of soft set (F,E) with respect to a subset A of a universal set X is a soft set (G,E) where
$G : E \to F(e) \cap A\ ,\ \forall F(e) \in p(X)$ where $G(e) = F (e) \cap A\ ,\ \forall\ e\in E$.

Example 3.2. Let X ={a ,b , c} be a set of three fonts, E the set of parameters represent the set of three words $= \{ w_1 , w_2 , w_3 \}$ where ,$(F,E) = \{(w_1,\{ a, b, c \}) , (w_2,\{ a, c, b\}) , (w_3,\{ \Phi, \Phi, \Phi\}) \}$
(F,E) is a statement contain three words with fonts a, b, c arranged in different ways .
so $(G,E) = \{ (w_1,\{ a ,b ,c\}) , (w_2,\{ a , \Phi , \Phi\}) ,(w_3, \{\Phi, \Phi, \Phi\})\}$ is a restricted soft set with respect to A .

Application 3.3. Let $X = \{ x , y , z \}$, x, y, z are arbitrary three numbers belongs to the set of natural numbers, X represent the set of point in three dimension ,
E the set of parameters represent the set of three points in time $= \{ t_1 , t_2 , t_3 \}$
$(F,E) = \{(t_1,\{ x_1 , y_1 , z_1 \}) , (t_2,\{ x_2 , y_2 , z_2 \}) , (t_3,\{ x_3 , y_3 , z_3 \}) \}$
represent a particle in a specific three dimension space moves through a specific three points in time ,
$\tilde{\Phi} = \{ (t_1,\{0,0,0\}) , (t_2,\{0,0,0\}) , (t_3,\{0,0,0\}) \}$ represents a particle in a three dimension space does not exist in the three discrete points of time,
$\tilde{X} = \{ (t_1, X) , (t_2, X) , (t_3, X) \}$ represent a particle in a three dimension space exist at three discrete points of time, $\tilde{T} = \{\tilde{\Phi} , \tilde{X} , (F, E)\}$represent several probabilities of a particle in three dimension through three points in time .Let $A = \{ x_7 , y_7 , 0 \} \subset X$, for a special case (for numbers we replace the intersection with minimum) where $x_4 = \min \{ x_1, x_7 \}$, $y_4 = \min \{ y_1, y_7 \}$,

$z_4 = \min\{z_1, 0\} = 0$, $x_5 = \min\{x_2, x_7\}$, $y_5 = \min\{y_2, y_7\}$, $z_5 = \min\{z_2, 0\} = 0$
$x_6 = \min\{x_3, x_7\}$, $y_6 = \min\{y_3, y_7\}$, $z_6 = \min\{z_3, 0\} = 0$.
Then(G,E) = $\{(t_1,\{x_4, y_4, 0\}), (t_2,\{x_5, y_5, 0\}), (t_3,\{x_6, y_6, 0\})\}$ which is a particle in two dimension moves through the same three points in time t_1, t_2, t_3 .

Propositions3.4.
Let X be the universal set, for a given soft set the restricted soft set (with respect to $A \subset X$)is a special case of soft subset .
Proof :
Let (F,E) is soft set where $F:E \to P(X)$, (G,E) is the restriction of (F,E) with respect to $A \subset X$
where $G : E \to F(e) \cap A$, $\forall F(e) \in P(X)$, since (i) $E \subseteq E$ and (ii) $G(e) \subseteq F(e)$ $\forall e \in A$ .Then, $(G,A) \tilde{\subseteq} (F,E)$.

Propositions3.5.
Let X be the universal set, the soft union of a soft set with restricted soft set (with respect to $A \subset X$)is a soft set.
Proof :
Let (F,E) is soft set where $F:E \to P(X)$, (G,E) is the restriction of (F,E) with respect to $A \subset X$
where $G : E \to F(e) \cap A$, $\forall F(e) \in P(X)$,since$e \in E \cap E$and $F(e) \cup G(e) = F(e)$. Then, $(F,E) \tilde{\cup} (G,E) = (F,E)$.

Propositions3.6.
Let X be the universal set, the soft intersection of soft set with the restricted soft set (with respect to $A \subset X$)is the restricted soft set .
Proof :
Let (F,E) is soft set where $F:E \to P(X)$, (G,E) is the restriction of (F,E) with respect to $A \subset X$where
$G : E \to F(e) \cap A$, $\forall F(e) \in P(X)$,
since $G(e) = F(e) \cap A = F(e)$ $\forall e \in A$then $(G,E) \tilde{\cap} (F,E) = (G,E)$,$\forall e \in E$.

IV. Restriction of soft mappings

Definition 4.1. [11]
Let (F,E),(G,E) are soft sets in $S(X)_E$. A soft relation$\tilde{f} \tilde{\subseteq} (F,E) \tilde{\times} (G,E)$ is called a soft mapping from (F,E) to (G,E) [denoted by$\tilde{f} : (F,E) \Rightarrow (G,E)$] if the following two conditions are satisfied :
(i) for each soft element $\tilde{x} \tilde{\in} (F,E)$, there exists only one soft element $\tilde{y} \tilde{\in} (G,E)$ such that $\tilde{x}\tilde{f}\tilde{y}$ which will be noted as $\tilde{f}(\tilde{x}) = \tilde{y}$,
(ii) for each empty soft element $\tilde{x} \tilde{\in} (F,E)$, $\tilde{f}(\tilde{x})$ is an empty soft element of (G,E) .

Definition 4.2.[3]
Let $(X,\tilde{T},E)$ be a soft topological space over X , (F, E) be a non-empty soft subset of $(X,\tilde{T},E)$ .Then,
$\tilde{T}_{\tilde{F}} = \{(F, E)^* = (F,E) \tilde{\cap} (G, E), \forall (G,E) \in \tilde{T}\}$ is the soft relative topology on (F,E) and $((F, E), \tilde{T}_{\tilde{F}}, E)$ is called soft subspace topology of $(X,\tilde{T},E)$.

Definition 4.3.[3]
Let $\tilde{f} : (X,\tilde{T}_x,E) \Rightarrow (Y,\tilde{T}_Y,E)$ be a soft mapping between two soft topological spaces if the image$\tilde{f}((F,E))$ of each soft open set (soft close set) (F,E) over X is a soft open set (soft close set) in Y. Then, $\tilde{f}$is said to be a soft open mapping (soft close mapping).

Theorem 4.4.
The restriction of soft open (soft close) map over a soft open (soft close) set is soft open (soft close) map.
Proof
Let $\tilde{f}: (X,\tilde{T}_x,E) \Rightarrow (Y,\tilde{T}_Y,E)$ be a soft open mapping between two soft topological spaces , (A,E) be a soft open set in $(X,\tilde{T}_x,E)$ to prove$\tilde{f}|(A,E), \tilde{T}_{\tilde{A}}, E) :((A,E), \tilde{T}_{\tilde{A}}, E) \Rightarrow (Y,\tilde{T}_Y,E)$ is soft open map , (G,E) be a soft open subset in (A,E) then $(G,E) \tilde{\cap} (A,E) = (G,E)$ is soft open set in $\tilde{T}_x$ by soft relative topology definition , since $\tilde{f}$ is soft open map then $\tilde{f}((G,E))$ is soft open in$\tilde{T}_Y$ so prove $\tilde{f}\,|\,((A,E), \tilde{T}_{\tilde{A}}, E)$ is soft open map , similarly for close case .

Example 4.5.

Let $X = \{h_1, h_2\}$, $Y = \{k_1, k_2\}$, $E = \{e_1, e_2\}$, the soft map $\tilde{f} : (X, \tilde{T}_d, E) \Rightarrow (Y, \tilde{T}_d, E)$ defined as follow :
$\tilde{f}((e_i, \{h_j\})) = ((e_i, \{k_j\}))$, $\forall i,j = 1,2$ is soft open and soft closed map .

Definition 4. 6.[11]
$\tilde{f} : (X, \tilde{T}_x, E) \Rightarrow (Y, \tilde{T}_Y, E)$ is a soft continuous mapping if for each soft open set (G,E) over Y, $f^{-1}((G,E))$ is a soft open set over X.

Theorem 4.7.
The restriction of soft continuous mapping over a soft open set (soft close set) is soft continuous .
Proof : Let $\tilde{f} : (X, \tilde{T}_x, E) \Rightarrow (Y, \tilde{T}_Y, E)$ be a soft continuous mapping between two soft topological spaces , (A,E) be a soft open set in $(X, \tilde{T}_x, E)$, the restriction of $\tilde{f}$ on (A,E) is the mapping
$\tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E) : ((A,E), \tilde{T}_{\tilde{A}}, E) \Rightarrow (Y, \tilde{T}_Y, E)$, to prove
$\tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E)$ is soft continuous map , (G,E) be a soft open set in $\tilde{T}_Y$.
Then, $(\tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E))^{-1}((G,E)) = \tilde{f}^{-1}((G,E)) \tilde{\cap} (A,E)$
since $\tilde{f}$ is soft continuous then $\tilde{f}^{-1}((G,E))$ is soft open set in $\tilde{T}_x$
by soft relative topology definition $\tilde{f}^{-1}((G,E)) \tilde{\cap} (A,E)$ is soft open in $\tilde{T}_{\tilde{A}}$,
so $\tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E)$ is soft continuous map, similarly for close case .

Example 4. 8.
Let $X = \{h_1, h_2, h_3\}$, $E = \{e_1, e_2\}$ and
$\tilde{T} = \{\tilde{\Phi}, \tilde{X}, \{(e_1, \{h_2\}), (e_2, \{h_1\})\}, \{(e_1, \{h_1, h_3\}), (e_2, \{h_2, h_3\})\}, \{(e_1, \{h_2\}), (e_2, X)\}, \{(e_1, \Phi), (e_2, \{h_1\})\},$
$\{(e_1, \{h_1, h_3\}), (e_2, X)\}, \{(e_1, \Phi), (e_2, \{h_2, h_3\})\}, \{(e_1, \Phi), (e_2, X)\}\}$ and
$\tilde{T}' = \{\tilde{\Phi}, \tilde{X}, (e_1, \{h_2\}), (e_2, \{h_1\})\}, \{(e_1, \{h_2, h_3\}), (e_2, \{h_1, h_2\})\}, \{(e_1, \{h_1, h_2\}), (e_2, X)\}, \{(e_1, \{h_2\}, (e_2, \{h_1, h_2\})\}$,
let $\tilde{f} : (X, \tilde{T}, E) \Rightarrow (X, \tilde{T}', E)$ be a mapping defined as
$\tilde{f}((e_i, h_j)) = (e_i, h_1)$, $i = 1,2$, $j = 1,2,3$. Then, $\tilde{f}$ is a soft continuous .
Let $\tilde{A} = \{(e_1, \Phi), (e_2, \{h_1\})\}$ be a soft subset of $\tilde{T}$.
Then, $\tilde{T}_{\tilde{A}} = \{ \{(e_1, \Phi), (e_2, \Phi)\}, \{(e_1, \Phi), (e_2, \{h_1\})\} \} = \{\tilde{\Phi}_A, \tilde{A}\}$
$\tilde{g}(\tilde{x}) = \tilde{f}(\tilde{x})\ \forall \tilde{x}$ in $((A,E), \tilde{T}_{\tilde{A}}, E)$.
Then, $\tilde{g} = \tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E) : ((A,E), \tilde{T}_{\tilde{A}}, E) \Rightarrow (X, \tilde{T}', E)$ is soft continuous map since
$\tilde{g}^{-1}(\tilde{\Phi}_A) = \tilde{\Phi}_A \in \tilde{T}_A$,
$\tilde{g}^{-1}(\tilde{X}) = \tilde{g}^{-1}(\{(e_1, X), (e_2, X)\}) = \{(e_1, X), (e_2, X)\} \tilde{\cap} \tilde{A} = \tilde{A} \in \tilde{T}_A$
$\tilde{g}^{-1}(\{(e_1, \{h_2\}), (e_2, \{h_1\})\}) = \{(e_1, \Phi), (e_2, X)\} \tilde{\cap} \tilde{A} = \tilde{A} \in \tilde{T}_A$
$\tilde{g}^{-1}(\{(e_1, \{h_2 h_3\}), (e_2, \{h_1 h_2\})\}) = \{(e_1, \Phi), (e_2, \{h_1\})\} \tilde{\cap} \tilde{A} = \tilde{A} \in \tilde{T}_A$
$\tilde{g}^{-1}(\{(e_1, \{h_1 h_2\}), (e_2, X)\}) = \{(e_1, \{h_1\}), (e_2, \{h_1\})\} \tilde{\cap} \tilde{A} = \tilde{A} \in \tilde{T}_A$
$\tilde{g}^{-1}(\{(e_1, \{h_2\}), (e_2, \{h_1 h_2\})\}) = \{(e_1, \Phi), (e_2, \{h_1\})\} \tilde{\cap} \tilde{A} = \tilde{A} \in \tilde{T}_A$

V. Conclusions

Any soft set (F,E) can be restricted in two ways :
First method - The restriction of soft set (F,E) on $A \subset E$ (E is the set of parameters),
as example we restricted a matrix of pixels which can be used in image processing in computer or printers .
Second method-The restriction of soft set (F,E) with respect to $A \subset X$ (X is the universal set)
as example suppose a soft set (F,E) represent a particle in a specific three dimension space moves through a specific three points in time .Then, the restriction of (F,E) with respect to a set $A \subset X$ will give the soft set (G,E) which is a particle in two dimension moves through the same three points in time t_1 , t_2 , t_3 .
For a soft map $\tilde{f} : (X, \tilde{T}_x, E) \Rightarrow (Y, \tilde{T}_Y, E)$ and $[((A,E), \tilde{T}_{\tilde{A}}, E)$ is subspace of $(X, \tilde{T}_x, E)]$, the restriction of $\tilde{f}$ with respect to (A,E) is the map :
$\tilde{g} = \tilde{f}|((A,E), \tilde{T}_{\tilde{A}}, E) : ((A,E), \tilde{T}_{\tilde{A}}, E) \Rightarrow (Y, \tilde{T}_Y, E)$, we prove that the restriction of soft open map over a soft open set is soft open map , the restriction of soft close map over a soft close set is soft close map and the restriction of soft continuous mapping over a soft open set (or soft close set) is soft continuous .

References

[1] Hussain S., Ahmad B., "Some properties of soft topological spaces" , Computers and Mathematics with Applications , Vol. 62 ,(2011) , pp. 4058–4067 .
file:///C:/Users/Zian/Downloads/1-s2.0-S0898122111008297-main.pdf

[2] Irfan Ali M., Feng F. , Liu X. , Min W.K., Shabir M." On some new operations in soft set theory , Computers and Mathematics with Applications " , Vol. 57 ,(2009), pp.1547–1553.
https://dl.acm.org/doi/10.1016/j.camwa.2008.11.009

[3] Mahmood M.H. , "On Soft Topological Spaces", LAP Lambert Academic Publishing ISBN-13 978-613-9-94966-3, (2018) .
https://www.lap-publishing.com/catalog/details/store/gb/book/978-613-9-94966-3/on-soft-topological-spaces

[4] Maji P.K.,Biswas R., Roy A. R., "Soft set theory", Computers and Mathematics with Applications, Vol.45, (2003) , pp.555-562 .
https://reader.elsevier.com/reader/sd/pii/S0898122103000166?token=C26B6C38AC667EB1B38F83FEF424E00526F8481E97205AE55191E3B4BE6286AC5F9B512D943FC3375C08ADC8AC9048E3

[5] Molodtsov D.,"Soft set theory – first results", Computers and Mathematics with Applications, Vol. 37, (1999), pp.19-31 .
https://core.ac.uk/download/pdf/82496757.pdf

[6] Noori S.,Yousif Y.Y. , "Soft Simply Compact Spaces" Iraqi Journal of Science, Special Issue, (2020), pp.108-113.
http://scbaghdad.edu.iq/eijs/index.php/eijs/article/view/2050

[7] OzturkT.Y.andKarademir M. , "Soft pair-wise b-continuity on soft bitopologicalspaces",AIP Conference Proceedings · April (2017) ,DOI: 10.1063/1.4981703 .
https://www.researchgate.net/publication/316486289_Soft_pair-wise_b-continuity_on_soft_bitopological_spaces

[8] Peyghan E. , B.Samadi , A.Tayebi, " About soft topological spaces ", Journal of New Results in Science, No.2, (2013) ,pp. 60-75 .https://www.researchgate.net/publication/266475237_About_soft_topological_spaces

[9] Saif Z. Hameed*, Adiya K. Hussein , " On Soft bc-Open Sets in Soft Topological Spaces" , Iraqi Journal of Science, (2020), Special Issue, pp. 238-242.
http://scbaghdad.edu.iq/eijs/index.php/eijs/article/view/2282

[10] Shabir M. , NazM.,"On soft topological spaces" ,Computers and Mathematics with Applications ,Vol. 61 ,(2011), pp. 1786–1799 .
https://people.sc.fsu.edu/~jburkardt/classes/sc_2015/plagiarism/shabir.pdf

[11] Wardowski D.,"On a soft mapping and its fixed points", Springer Open Journal ,Vol. 182 , (2013), pp.1-11 .
ttps://core.ac.uk/download/pdf/81814459.pdf

Majd Hamid Mahmood. "Restriction of Soft Sets and Soft Mappings and Some of its Real Life Applications." *IOSR Journal of Mathematics (IOSR-JM)*, 16(4), (2020): pp. 33-38.