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Soft $\mathcal{v}-Continuous$ Function

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ABSTRACT:

The present study investigates some new types of continuous functions known as soft $\mathcal{v}-continuous$ function . Also, we study soft $\mathcal{v}-open$ map , soft $\mathcal{v}-closed$ map . The notion that has been presented has been described, and an example has been shown.

KEYWORDS : Soft $\mathcal{v}-continuous$ function , Soft $\mathcal{v}-open$ map , Soft $\mathcal{v}-closed$ map

الدالة المستمرة الناعمة من النمط– $\mathcal{v}$

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الملخص

تبحث الدراسة الحالية في بعض الأنواع الجديدة من الدوال المستمرة المعروفة بالدالة المستمرة الناعمة من النمط– $\mathcal{v}$. كما قمنا بدراسة الدالة المفتوحة الناعمة من النمط – $\mathcal{v}$، والدالة المغلقة الناعمة من النمط – $\mathcal{v}$ وقد تم وصف الفكرة التي تم عرضها، وتم عرض مثال.

الكلمات المفتاحية : الدالة المستمرة الناعمة من النمط– $\mathcal{v}$ ، الدالة المفتوحة الناعمة من النمط – $\mathcal{v}$، الدالة المغلقة الناعمة من النمط – $\mathcal{v}$

INTRODUCTION: 1.

[1] Molodtsov was the first to propose the idea of soft sets in 1999 as a new mathematical instrument for Arockiarani and A. Arokialancy [3], who also carried out further research on weak versions of soft open sets in soft topological space. Later on, soft α-open was defined by Akdag and handling uncertainty in a variety of scientific areas. The concept of soft semi - open sets in soft topological spaces was studied by Chen in 2013 [2] . Soft β-open sets were defined by I. Ozkan [4]. Furthermore, Metin and Alkan introduce the soft b-open and soft b-continuous [5]. presented soft continuous mappings [6]. Many types of soft functions, such as semi continuous, irresolute, and semi open soft functions, were introduced and described by Mahanta and Das [7]. . Sameer and Luma introduced the idea of $\mathcal{v}$ -spaces in general topology [8].

2. PRELEMINARIES:

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Definition 2.1[1] Let Ҳ be an initial universe and let E be a set of parameters. Let $P(Ҳ)$ denote the power set of Ҳ and let $\mathcal{A}$ be a nonempty subset of E. A pair $(\mathrm{F},\mathcal{A})$ is called a soft set over Ҳ, where F is a mapping given by F : $\mathcal{A} \rightarrow P(Ҳ)$. In other words, a soft set over Ҳ is a parameterized family of subsets of the universe Ҳ. For $\varepsilon \in \mathcal{A}$, $\mathrm{F}(\varepsilon)$ may be considered as the set of $\varepsilon-approximate$ elements of the soft set $(\mathrm{F},\mathcal{A})$.

Definition 2.2 [9] soft set (F, E) over Ҳ where F $(\mathcal{E}) = \Phi$ for each $\mathcal{E} \in$ E is known as a null soft set, denoted by $\tilde{\Phi}$.

Definition 2.3 [9] An absolute soft set $\tilde{\mathcal{A}}$ is defined as a soft set $(\mathrm{F},\mathcal{A})$ over Ҳ where for every $\mathcal{E} \in \mathcal{A}$, F $(\mathcal{E}) =$ Ҳ.

The A-universal soft set, denoted by $\tilde{Ҳ}$, is known to as a universal soft set if $\mathcal{A} =$ E .

Definition 2.4[10] Let $\tilde{\ell}$ be the collection of soft sets over Ҳ, then $\tilde{\ell}$ is said to be a soft topology on Ҳ if it satisfies the following axioms:

(1) Φ , $\tilde{Ҳ}$ $\tilde{\in}$ $\tilde{\ell}$,
(2) If $(\mathrm{F}_1,\mathrm{E})$ and $(\mathrm{F}_2,\mathrm{E})$ $\tilde{\in}$ $\tilde{\ell}$, then $(\mathrm{F}_1,\mathrm{E})$ $\tilde{\cap}$ $(\mathrm{F}_2,\mathrm{E})$ $\tilde{\in}$ $\tilde{\ell}$,
(3) If any $\{(\mathrm{F}_i,\mathrm{E}) : i \in I\}$ $\tilde{\subseteq}$ $\tilde{\ell}$, then $\tilde{\cup}_{i\in I}$ $(\mathrm{F}_i,\mathrm{E})$ $\tilde{\in}$ $\tilde{\ell}$.
The triplet (Ҳ, $\tilde{\ell}$, E) is called a soft topological space over Ҳ and the soft sets in $\tilde{\ell}$ is called soft open sets in Ҳ . if its relative complement $(\mathrm{F},\mathrm{E})^c$ $\tilde{\in}$ $\tilde{\ell}$, then a soft set (F, E) over Ҳ is called a soft closed set in Ҳ .

Definition 2.5[11] Let (Ҳ, E) and (ɣ , $\mathcal{T}$) be soft classes. Let $\mathcal{U}$: Ҳ → ɣ and s: E → $\mathcal{T}$ be mappings. Then mapping ƒ: (Ҳ, E) → (ɣ , $\mathcal{T}$) is defined as : for a soft set $(\mathrm{F},\mathcal{A})$ in (Ҳ, E) , (ƒ$(\mathrm{F},\mathcal{A}),\mathcal{B})$, $\mathcal{B} = s(\mathcal{A}) \subseteq \mathcal{T}$ is a soft set in (ɣ , $\mathcal{T}$)

Given by ƒ$(\mathrm{F},\mathcal{A})(\beta) = \mathcal{U}\left(\begin{matrix}\cup\, \mathrm{F}(\alpha) \\ \alpha \in s^{-1}(\beta) \cap \mathcal{A}\end{matrix}\right)$ for $\beta \in \mathcal{T}$. (ƒ$(\mathrm{F},\mathcal{A}),\mathcal{B})$ is called a soft image of a soft set $(\mathrm{F},\mathcal{A})$. If $\mathcal{B} = \mathcal{T}$, then we will write (ƒ$(\mathrm{F},\mathcal{A}),\mathcal{T})$ as ƒ$(\mathrm{F},\mathcal{A})$.

Definition 2.6 [11] Let ƒ: (Ҳ, E) → (ɣ , $\mathcal{T}$) be a mapping from a soft class (Ҳ, E) to another soft class (ɣ , $\mathcal{T}$) , and $(G\ ,\ M)$ a soft set in soft class (ɣ , $\mathcal{T}$) , where $M \subseteq \mathcal{T}$. Let $\mathcal{U}$: Ҳ → ɣ and s: E → $\mathcal{T}$ be mappings. Then (ƒ$^{-1}(G\ ,\ M),\mathcal{D})$, $s^{-1}(M)$ is a soft set in soft classes (Ҳ, E) , defined as : ƒ$^{-1}(G\ ,\ M)(\alpha) = \mathcal{U}^{-1}\left(G\big(s(\alpha)\big)\right)$ for $\alpha \in \mathcal{D} \subseteq$ E . (ƒ$^{-1}(G\ ,\ M),\mathcal{D})$ is called a soft inverse image of $(G\ ,\ M)$. Hereafter , we shall write (ƒ$^{-1}(G\ ,\ M),\mathcal{D})$ as ƒ$^{-1}(G\ ,\ M)$.

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Definition 2.9 [4] A mapping $f: (X, \tilde{\ell}, E) \to (Y, \tilde{\mathcal{H}}, \mathcal{T})$ is called a soft mapping if $\mathcal{U}: X \to Y$ and $s: E \to \mathcal{T}$ are mappings , and $(X, \tilde{\ell}, E)$ and $(Y, \tilde{\mathcal{H}}, \mathcal{T})$ are soft topological space.

Definition 2.10 Let $\{\tilde{\ell}_k\}_{k\in J}$, $k \geq 2$, be collection of soft topologies on X and $(\mathcal{N}, E) \tilde{\subseteq} \tilde{X}$. Then $(\mathcal{N}, E)$ is called soft $\mathcal{v}$ -open set in X if there is $(\mathcal{T}, E) \tilde{\in} \tilde{\cap}_{\mathcal{T}\in J} \tilde{\ell}_{\mathcal{T}}$ such that $\tilde{\Phi} \neq (\mathcal{T}, E) \tilde{\subseteq} (\mathcal{N}, E)$ where $(\mathcal{N}, E) \neq \tilde{\Phi}$ and $(\mathcal{T}, E) = \tilde{\Phi}$ where $(\mathcal{N}, E) = \tilde{\Phi}$.

The collection of all soft $\mathcal{v}$ -open sets in X is denoted by $\mathcal{v}O_X$. The triplet $(X, S\mathcal{v}O_X, E)$ is called soft $\mathcal{v}$ –space in relation to the provided soft topologies .And denoted by $s\mathcal{v}$ –space .

3. Soft $\mathcal{v} - continuous$ function .

Definition 3.1 : Let $(X, S_{\mathcal{v}o_{\tilde{X}}}, E)$ and $(Y, S_{\mathcal{v}o_{\tilde{Y}}}, \mathcal{T})$ be $S\mathcal{v}$ –space and $f: X \to Y$ the soft function f is called soft $\mathcal{v} - continuous$ function if the inverse image for every $s\mathcal{v}$ –open in Y is a $s\mathcal{v} - open\ in\ X$. Denoted by $s\mathcal{v} - continuous$.

Example 3.2 :

Let $X = \{x_1, x_2\}$, $E = \{\mathcal{E}_1, \mathcal{E}_2\}$ and

$$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{X}, \{(\mathcal{E}_1, \{x_1\}), (\mathcal{E}_2, \{x_2\})\}\},$$

$$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{X}, \{(\mathcal{E}_1, \{x_1\}), (\mathcal{E}_2, \{x_2\})\}, \{(\mathcal{E}_1, \{x_1, x_2\}), (\mathcal{E}_2, \{x_2\})\}\}$$

$$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{X}, \{(\mathcal{E}_1, \{x_1\}), (\mathcal{E}_2, \{x_2\})\}\}$$

$$S_{\mathcal{v}o_{\tilde{X}}} =$$

$$\left\{\begin{matrix}\tilde{\Phi}, \tilde{X}, \{(\mathcal{E}_1, \{x_1\}), (\mathcal{E}_2, \{x_2\})\}, \{(\mathcal{E}_1, \{x_1, x_2\}), (\mathcal{E}_2, \{x_2\})\}, \\ \{(\mathcal{E}_1, \{x_1, x_2\}), (\mathcal{E}_2, \{x_1\})\}\end{matrix}\right\}$$

Let $Y = \{y_1, y_2\}$, $\mathcal{T} = \{t_1, t_2\}$ and

$$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{Y}, \{(t_1, \{y_1, y_2\}), (t_2, \{y_2\})\}, \{(t_1, \{y_1\}), (t_2, \{y_2\})\}\},$$

$$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Y}, \{(t_1, \{y_1\}), (t_2, \{y_2\})\}\}$$

$$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Y}, \{(t_1, \{y_1\}), (t_2, \{y_2\})\}\}$$

$$S_{\mathcal{v}o_{\tilde{Y}}} =$$

$$\left\{\begin{matrix}\widetilde{\Phi}, \tilde{\mathrm{y}}, \ \{(t_1,\{y_1, y_2\}),(t_2,\{y_2\})\}, \ \{(t_1,\{y_1\}),(t_2,\{y_2\})\}, \\ \{(t_1,\{y_1, y_2\}),(t_2,\{y_1\})\}\end{matrix}\right\}$$

Define $\mathfrak{f}: \mathrm{X} \rightarrow \mathrm{y}$ and $s: E \rightarrow \mathcal{T}$ as

$$\mathfrak{f}(x_1) = \{y_1\} \ ,\mathfrak{f}(x_2) = \{y_2\}$$

$$s(\mathcal{E}_1) = \{t_1\} \ ,s(\mathcal{E}_2) = \{t_2\}$$

$\mathfrak{f}: \left(\mathrm{X}, S_{vo_{\tilde{\mathrm{X}}}}, \mathrm{E}\right) \rightarrow \left(\mathrm{y}, S_{vo_{\tilde{\mathrm{y}}}}, \mathcal{T}\right)$ is $sv - continuous$ function.

Proposition 3.3 : A soft function $\mathfrak{f}$ is $sv - continuous$ then the inverse image of every $sv - closed$ set in y is a $sv - closed\ set\ in\ \mathrm{X}$.

Proof:

Let $\mathfrak{f}: \mathrm{X} \rightarrow \mathrm{y}$ is $sv - continuous$. Let $(\mathrm{F}, \mathcal{T})$ be a $sv - closed$ set n y . Then $\mathrm{y}/(\mathrm{F}, \mathcal{T})$ is $sv - open$ set in y. Since $\mathfrak{f}$ is $sv - continuous$, $\mathfrak{f}^{-1}\left(\mathrm{y}/(\mathrm{F}, \mathcal{T})\right)$ is $a\ sv - open$ set in X. But

$\mathfrak{f}^{-1}\left(\mathrm{y}/(\mathrm{F}, \mathcal{T})\right) = \mathrm{X}/\mathfrak{f}^{-1}\left((\mathrm{F}, \mathcal{T})\right)$.

Therefore $\mathfrak{f}^{-1}\left((\mathrm{F}, \mathcal{T})\right)$ is a $sv - closed$ set in X .

Conversely):

Suppose that the inverse image of every $sv - closed$ in y

is a $sv - closed\ in\ \mathrm{X}$.

Let $(\mathcal{S}, \mathcal{T})$ be an $sv - op\mathcal{E}n$ in Y. Then $\mathrm{y}/(\mathcal{S}, \mathcal{T})$ is a $v - closed\ set\ in\ \mathrm{y}$. By our assumption. $\mathfrak{f}^{-1}\left(\mathrm{y}/(\mathcal{S}, \mathcal{T})\right)$ $sv - closed\ in\ \mathrm{X}$ and $\mathfrak{f}^{-1}\left((\mathcal{S}, \mathcal{T})\right)$ is $a\ sv - open$ set in X. Therefore $\mathfrak{f}$ is $sv - continuous$.

Proposition 3.4 : A soft function $\mathfrak{f}: \mathrm{X} \rightarrow \mathrm{y}$ is $sv - continuous$. Then the following are equivalent:

1. $\mathfrak{f}$ is $sv - continuous$.

2. $\mathfrak{f}^{-1}\left(int(\mathcal{B}, \mathcal{T})\right) \cong svint\left(\mathfrak{f}^{-1}\left((\mathcal{B}, \mathcal{T})\right)\right)$, for every soft set $(\mathcal{B}, \mathcal{T})$ of y .

Proof:

$(1 \longrightarrow 2)$ let $\mathfrak{f}: \mathrm{X} \rightarrow \mathrm{y}$ is $sv - continuous$.

Let $(\mathcal{B}, \mathcal{T})$ is a soft set in y . Then $int(\mathcal{B}, \mathcal{T})$ is an soft open set in y , so it is $sv - open$. Since $\mathfrak{f}$ is $sv - continuous$.

$\therefore f^{-1}\left((\mathcal{B},\mathcal{T})\right)$ is $a\ s\mathcal{v}-open$ set in $\mathfrak{X}$.

Then $f^{-1}\left(int(\mathcal{B},\mathcal{T})\right)$ is $a\ s\mathcal{v}-open$ set in $\mathfrak{X}$.

Then $f^{-1}\left(int(\mathcal{B},\mathcal{T})\right)=s\mathcal{v}int\left(f^{-1}\left(int(\mathcal{B},\mathcal{T})\right)\right)\tilde{\subseteq}\ s\mathcal{v}int\left(f^{-1}\left((\mathcal{B},\mathcal{T})\right)\right)$

Let $(\mathcal{S},\mathcal{T})$ be an $s\mathcal{v}-open$ in $\mathfrak{Y}$. $(2\longrightarrow 1)$

Then $f^{-1}\left((\mathcal{S},\mathcal{T})\right)=f^{-1}\left(int(\mathcal{S},\mathcal{T})\right)\tilde{\subseteq}\ s\mathcal{v}int\left(f^{-1}\left((\mathcal{S},\mathcal{T})\right)\right)$

But $s\mathcal{v}int\left(f^{-1}\left((\mathcal{S},\mathcal{T})\right)\right)\tilde{\subseteq} f^{-1}\left((\mathcal{S},\mathcal{T})\right)$ $s\mathcal{v}int\left(f^{-1}\left((\mathcal{S},\mathcal{T})\right)\right)=f^{-1}\left((\mathcal{S},\mathcal{T})\right)$ and so $f^{-1}\left((\mathcal{S},\mathcal{T})\right)$ $a\ s\mathcal{v}-op\mathcal{E}n$ set .

Then f is $s\mathcal{v}-continuous$ function .

<u>Theorem 3.5</u> : Every soft continuous function is $s\mathcal{v}-continuous$ function.

<u>Proof</u>

soft continuous function. Let $(\mathcal{S},\mathcal{T})$ be a soft open set in $\mathfrak{Y}$. Let $f\colon\mathfrak{X}\to\mathfrak{Y}$

Since f is soft continuous function

$f^{-1}\left((\mathcal{S},\mathcal{T})\right)$ is soft $open\ set\ in\ \mathfrak{X}$.

And so $f^{-1}\left((\mathcal{S},\mathcal{T})\right)$ is a $sv-open\ in\ \mathfrak{X}$.

Therefore , f is $s\mathcal{v}-continuous$ function.

<u>Proposition 3.6</u> : A soft function $f\colon\left(\mathfrak{X}, S_{\mathcal{v}o_{\tilde{\mathfrak{X}}}}, E\right)\to\left(\mathfrak{Y}, S_{\mathcal{v}o_{\tilde{\mathfrak{Y}}}}, \mathcal{T}\right)$ is $s\mathcal{v}-continuous$, and $g\colon\left(\mathfrak{Y}, S_{\mathcal{v}o_{\tilde{\mathfrak{Y}}}}, \mathcal{T}\right)\to\left(\mathfrak{Z}, S_{\mathcal{v}o_{\tilde{\mathfrak{Z}}}}, \mathcal{W}\right)$ is $s\mathcal{v}-continuous$. Then $g\circ f\colon\left(\mathfrak{X}, S_{\mathcal{v}o_{\tilde{\mathfrak{X}}}}, E\right)\to\left(\mathfrak{Z}, S_{\mathcal{v}o_{\tilde{\mathfrak{Z}}}}, \mathcal{W}\right)$ is $s\mathcal{v}-continuous$.

<u>Proof:</u>

Let $(\mathcal{H},\mathcal{W})$ be an soft $\mathcal{v}-open$ in $\mathfrak{Z}$.

Since g is $s\mathcal{v}-continuous$ function.

$g^{-1}\left((\mathcal{H},\mathcal{W})\right)$ be an $s\mathcal{v}-open$ in $\mathfrak{Y}$. f is $s\mathcal{v}-continuous$. $g^{-1}\left(f^{-1}\left((\mathcal{H},\mathcal{W})\right)\right)=(g\circ f)^{-1}\left((\mathcal{H},\mathcal{W})\right)$ is $s\mathcal{v}-open$ in $\mathfrak{X}$.

Therefore $g \circ f$ is $s\vartheta - continuous$ function from Ҳ to Ꝣ.

Remark 3.7 : The composition of two $s\vartheta - continuous$ need not be $s\vartheta - continuous$ which the example that follows shows.

Example 3.8 :

Let $Ҳ = \{x_1, x_2\}$, $E = \{\mathcal{E}_1, \mathcal{E}_2\}$ and

$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{Ҳ}, \{(\mathcal{E}_1,\{x_1\}),(\mathcal{E}_2,\{x_2\})\}\},$

$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ҳ}, \{(\mathcal{E}_1,\{x_1\}),(\mathcal{E}_2,\{x_2\})\}, \{(\mathcal{E}_1,\{x_1, x_2\}),(\mathcal{E}_2,\{x_2\})\}\}$

$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ҳ}, \{(\mathcal{E}_1,\{u_1\}),(\mathcal{E}_2,\{u_2\})\}\}$

$S_{\vartheta o_{\tilde{Ҳ}}} =$

$$\left\{\begin{matrix}\tilde{\Phi}, \tilde{Ҳ}, \{(\mathcal{E}_1,\{u_1\}),(\mathcal{E}_2,\{u_2\})\}, \{(\mathcal{E}_1,\{u_1, u_2\}),(\mathcal{E}_2,\{u_2\})\}, \\ \{(\mathcal{E}_1,\{u_1, x_2\}),(\mathcal{E}_2,\{x_1\})\}\end{matrix}\right\}$$

Let $Ɣ = \{y_1, y_2\}$, $\mathcal{T} = \{t_1, t_2\}$ and

$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{Ɣ}, \{(t_1,\{y_1, y_2\}),(t_2,\{y_2\})\}, \{(t_1,\{y_1\}),(t_2,\{y_2\})\}\},$

$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ɣ}, \{(t_1,\{y_1\}),(t_2,\{y_2\})\}\}$

$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ɣ}, \{(t_1,\{y_1\}),(t_2,\{y_2\})\}\}$

$S_{\vartheta o_{\tilde{Ɣ}}} =$

$$\left\{\begin{matrix}\Phi, \tilde{Ɣ}, \{(t_1,\{y_1, y_2\}),(t_2,\{y_2\})\}, \{(t_1,\{y_1\}),(t_2,\{y_2\})\}, \\ \{(t_1,\{y_1, y_2\}),(t_2,\{y_1\})\}\end{matrix}\right\}$$

Define $f: Ҳ \to Ɣ$ and $s: E \to \mathcal{T}$ as

$$f(x_1) = \{y_1\}, f(x_2) = \{y_2\}$$

$$s(\mathcal{E}_1) = \{t_1\}, s(\mathcal{E}_2) = \{t_2\}$$

$f: \left(Ҳ, S_{\vartheta o_{\tilde{Ҳ}}}, E\right) \to \left(Ɣ, S_{\vartheta o_{\tilde{Ɣ}}}, \mathcal{T}\right)$ is soft $\vartheta - continuous$ function.

Let $Ꝣ = \{z_1, z_2\}$, $W = \{w_1, w_2\}$ and □□

$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{Ꝣ}, \{(w_1,\{z_1\}),(w_2,\{z_2\})\}\},$

$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ꝣ}, \{(w_1,\{z_1\}),(w_2,\{z_2\})\}, \{(w_1,\{z_1, z_2\}),(w_2,\{z_2\})\}\}$

$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{Ꝣ}, \{(w_1,\{z_1\}),(w_2,\{z_2\})\}\}$

$S_{\vartheta o_{\tilde{Z}}} =$

$$\left\{\begin{matrix} \tilde{\Phi},\ \tilde{Z},\ \{(W_1,\{z_1\}),(W_2,\{z_2\})\},\ \{(W_1,\{z_1,z_2\}),(W_2,\{z_2\})\}, \\ \{(W_1,\{z_1,z_2\}),(W_2,\{z_1\})\} \end{matrix}\right\}$$

Define $g: X \to Y$ and $\mathfrak{x}: \mathcal{T} \to W$ as

$$g(y_1) = \{z_1\},\ g(y_2) = \{z_2\}$$

$$\mathfrak{x}(t_1) = \{W_1\},\ \mathfrak{x}(t_2) = \{W_2\}$$

Then $g: (Y, S_{\vartheta o_{\tilde{Y}}}, \mathcal{T}) \to (Z, S_{\vartheta o_{\tilde{Z}}}, W)$ is soft $\vartheta - continuous$. $g \circ f$ is not need to be $s\vartheta - continuous$ function from X to Z .

4 .Soft $\vartheta - open$ map and Soft $\vartheta - closed$ map

Definition 4.1 : A mapping $f: X \to Y$ is said to be soft $\vartheta - open$ map if the image of each $s\vartheta - open$ in X is $s\vartheta - open$ set in Y , denoted by $s\vartheta - open$ map.

Definition 4.2 :A mapping $f: X \to Y$ is said to be soft $\vartheta - closed$, map if the image of each $s\vartheta - closed$ in X is $s\vartheta - closed$ set in Y denoted by $s\vartheta - closed$ map.

Example 4.3 :

Let $X = \{x_1, x_2\}$, $E = \{\mathcal{E}_1, \mathcal{E}_2\}$ and

$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{X},\ \{(\mathcal{E}_1,\{x_2\}),(\mathcal{E}_2,\{x_1\})\},\ \{(\mathcal{E}_1,\{x_2\}),((\mathcal{E}_2,\{x_1,x_2\}))\}\}$,

$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{X},\ \{(\mathcal{E}_1,\{x_2\}),(\mathcal{E}_2,\{x_1\})\},\ \{(\mathcal{E}_1,\{x_1,x_2\}),(\mathcal{E}_2,\{x_1\})\}\}$

$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi},\ \tilde{X},\ \{(\mathcal{E}_1,\{x_2\}),(\mathcal{E}_2,\{x_1\})\}\}$

$S_{\vartheta o_{\tilde{X}}} =$

$$\left\{\begin{matrix} \tilde{\Phi},\ \tilde{X},\ \{(\mathcal{E}_1,\{x_2\}),(\mathcal{E}_2,\{x_1\})\},\ \{(\mathcal{E}_1,\{x_2\}),((\mathcal{E}_2,\{x_1,x_2\}))\}, \\ \{(\mathcal{E}_1,\{x_1,x_2\}),(\mathcal{E}_2,\{x_1\})\} \end{matrix}\right\}$$

$s\vartheta - closed$ sets

$$\left\{\begin{matrix} \tilde{\Phi}, \tilde{X},\ \{(\mathcal{E}_1,\{x_1\}),(\mathcal{E}_2,\{x_2\})\},\ \{(\mathcal{E}_1,\{x_1\}),((\mathcal{E}_2,\Phi))\}, \\ \{(\mathcal{E}_1,\Phi),(\mathcal{E}_2,\{x_2\})\} \end{matrix}\right\}$$

Let $Y = \{y_1, y_2\}$, $\mathcal{T} = \{t_1, t_2\}$ and

$\tilde{\ell}_1 = \{\tilde{\Phi}, \tilde{\mathrm{y}}, \{(t_1,\{y_1, y_2\}),(t_2,\{y_1\})\}\}$

$\tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{\mathrm{y}}, \{(t_1,\{y_2\}),(t_2,\{y_1, y_2\})\}, \{(t_1,\{y_2\}),(t_2,\{y_1\})\}\}$.

$\tilde{\ell}_1 \tilde{\cap} \tilde{\ell}_2 = \{\tilde{\Phi}, \tilde{\mathrm{y}}, \{(t_1,\{y_2\}),(t_2,\{y_1\})\}\}$

$S_{vo_{\tilde{\mathrm{y}}}} =$

$$\left\{\begin{matrix} \tilde{\Phi}, \tilde{\mathrm{y}}, \{(t_1,\{y_2\}),(\mathcal{E}_2,\{y_1\})\}, \{(t_1,\{y_2\}),(t_2,\{y_1, y_2\})\}, \\ \{(t_1,\{y_1, y_2\}),(t_2,\{y_1\})\} \end{matrix}\right\}$$

$sv - closed$ sets

$$\left\{\begin{matrix} \tilde{\Phi}, \tilde{\mathrm{X}}, \{(t_1,\{y_1\}),(t_2,\{y_2\})\}, \{(t_1,\{y_1\}),((t_2,\Phi))\}, \\ \{(t_1,\Phi),(t_2,\{y_2\})\} \end{matrix}\right\}$$

Define $\mathfrak{f}: \mathrm{X} \to \mathrm{y}$ and $s: \mathrm{E} \to \mathcal{T}$ as

$$\mathfrak{f}(x_1) = \{y_1\}, \mathfrak{f}(x_2) = \{y_2\}$$

$$s(\mathcal{E}_1) = \{t_1\}, s(\mathcal{E}_2) = \{t_2\}$$

$\mathfrak{f}$ is s$v - open$ function then $\mathfrak{f}$ is s$v - closed$ function .

5.Conclusions

1. A soft function $\mathfrak{f}$ is soft $v - continuous$ function if and only if the inverse image for each sv –open in y is a $sv - open\ in$ X.
2. Every soft continuous function is $sv - continuous$ function.
3. A soft function $\mathfrak{f}$ is $sv - open$ map if and only if the $\mathfrak{f}\left(int(\mathcal{B},\mathrm{E})\right) \tilde{\subseteq}\ svint\left(\mathfrak{f}\left((\mathcal{B},\mathrm{E})\right)\right)$ for every soft set $(\mathcal{B},\mathrm{E})$ of X.

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