PRE-IDENTIFICATION

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Abstract:

In this paper, we introduced and investigated the notion of pre-identification using the notion of preopen sets introduced by Mashhour [2], and work of Al-kutaibi [1].

1.Introduction:

In 1980, MASHHOUR, A. S., *et al.;* [2] have introduced the notions of preopen (weak preopen) sets, precontinuous, weak precontinuous, preopen and weak preopen mapping in topological spaces. Also, they have investigated the connection of these notions with other existing topological concepts .In this paper contains two sections, section one includes the concepts: preopen sets, preclosed sets, precontinuous functions , M-preopen and M-precontinuous functions [2]. In section two we give the definition of pre-identification and five theorems about it. Through this paper X, Y and Z will denote topological spaces.

1.Fundamental Concepts:

In this section we recall the basic definitions needed in this work.

1.1 Definition: [3]

A subset V of X is called $preopen$ if $V \subset intcl(V)$, and

the complement of $preopen$ set in X is called $preclosed$ in X.

1.2 Definition:

A function $f: X \longrightarrow Y$ is called:

(i) $precontinuous$ if the inverse image of each $open$ set in Y is $preopen$ set in X.[2]

1. (ii) $M - preopen$ $(resp. M - preclosed)$, if the image of each $preopen$ $(resp. preclosed)$ set in X is $preopen$ (resp. preclosed) set in Y.[3]

(iii) $M - precontinuous$ if the inverse image of each $preopen$ set in Y is $preopen$ set in X.[3]

2. Results:

In this section we introduce the concept of pre-identification and some results about it.

2.1 Definition

A function $f: X \longrightarrow Y$ is called pre-identification if and only if: (i) f is onto and

(ii) V *is preclosed in* Y if and only if $f^{-1}(V)$ *is preclosed in* X.

2.2 Theorem:

An onto function $f: X \longrightarrow Y$ is pre-identification if and only if V *is preclosed in* Y if and only if $f^{-1}(V)$ *is preclosed in* X.

Proof:

($\Longrightarrow$) Let V *be preclosed in* Y, then V^c *is preopen in* Y, but f is pre-identification, then f is onto and, $f^{-1}(V^c) = (f^{-1}(V))^c$ *is preopen in* X.Thus, $f^{-1}(V)$ *is preclosed in* X. Similarly, if $f^{-1}(V)$ *is preclosed in* X, *then* $(f^{-1}(V))^c = f^{-1}(V^c)$ *is preopen in* X, and since f is pre-identification, then V^c *is preopen in* Y and hence V *is preclosed in* Y ■

($\Longleftarrow$) Let V *be preopen in* Y, then V^c *is precloed in* Y, then $f^{-1}(V^c) = (f^{-1}(V))^c$ *is preclosed in* X.That is, $f^{-1}(V)$ *is preopen in* X. Similarly, if $f^{-1}(V)$ *is preopen in* X, *then* $(f^{-1}(V))^c = f^{-1}(V^c)$ *is preclosed in* X, and then V^c *is preclosed* and hence V *is preopen in* Y. Since f is onto then f is pre-identification ■

2.3 Theorem:

If $f: X \longrightarrow Y$ is onto, $M-$*preopen* and $M-$*precontinuous*, then f is pre-identification.

Proof:

Let V be a subset of Y such that $f^{-1}(V)$ *is preopen in* X .Since f is onto, we have $f\left(f^{-1}(V)\right) = V$, since $f^{-1}(V)$ *is preopen in* X and f *is* $M-$*preopen* then V *is preopen in* Y. Now, let V be a *preopen set in* Y.Since f *is* $M-$*precontinuous,* then $f^{-1}(V)$ *is preopen in* X.That is, f is pre-identification ■

2.4 Corollary:

A function $f: X \longrightarrow Y$ is pre-identification, if it is onto, $M-$*preclosed* and $M-$*precontinuous*.

Proof: Clear.

2.5 Theorem:

If $f: X \longrightarrow Y$ and $g: Y \longrightarrow Z$ are pre-identification, then $gof: X \longrightarrow Z$ is pre-identification.

Proof:

Clear that, the composition of two onto function is onto .Now, let B be any *preopen in* Z, since g is pre-identification, then $g^{-1}(B)$ is *preopen in* Y and since f is pre-identification, we have $f^{-1}(g^{-1}(B)) = (gof)^{-1}(B)$ ■

Similarly, if $(gof)^{-1}(B) = f^{-1}(g^{-1}(B))$ is *preopen in* X, since f is pre-identification, then $g^{-1}(B)$ is *preopen in* Y and since g is pre-identification, then B *is preopen in* Z *.Thus* gof *is pre-identification* ■

2.6 Theorem:

Let $f: X \longrightarrow Y$ be a pre-identifacation and $g: Y \longrightarrow Z$ be a functions. Then the following statements are valid:

(i) If gof *is precontinuou* , then g *is precontinuous*.

(ii) If gof *is* $M-$ *precontinuous* , then g *is* $M-$ *precontinuous*.

Proof:

Assume that, $h = gof$.

(i) Let W be $open\ set\ in\ Z$, put $V = g^{-1}(W)\ and\ U = f^{-1}(V)$. Since $h = gof$, we have $h^{-1}(W) = f^{-1}[g^{-1}(W)] = U$. Since W is $open\ in\ Z$ and $h\ is\ \ precontinuou$, then $h^{-1}(W)\ is\ preopen\ in\ X$. This means that $f^{-1}(V)\ is\ preopen\ in\ X$. But f is pre-identification, then $V\ is\ preopen\ in\ Y$. That is, $g^{-1}(W)\ is\ preopen\ in\ Y$. Thus $g\ is\ \ precontinuous$ ■

(ii) Let W be $preopen\ set\ in\ Z$. Let $V = g^{-1}(W)\ and\ U = f^{-1}(V)$. Since $h = gof$, we have $h^{-1}(W) = f^{-1}[g^{-1}(W)] = U$. But $h\ is\ M - precontinuous$, then $h^{-1}(W)\ is\ preopen\ in\ X$. That is $U\ is\ preopen\ in\ X$. Since $U = f^{-1}(V)$, then $f^{-1}(V)\ is\ preopen\ in\ X$. But f is pre-identification, then $V\ is\ preopen\ in\ Y$. That is, $g^{-1}(W)\ is\ preopen\ in\ Y$. Thus $g\ is\ M - precontinuous$ ■

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الملخص:

في هذا البحث نقدم مفهوم دالة قبل الهوية مع خمسة نظريات باستخدام مفهوم المجموعات قبل المفتوحة التي قدمت من قبل مشهور[2] وكذلك المفاهيم التي قدمها الكتبي [1].