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Contra And Perfectly Contra T^*- Intuitionistic Generalized - Irresolute Maps On Intuitionistic Topological Spaces

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Abstract. In this paper,I introduce a new class of maps(contra T^*-intuitionistic generalized irresolute maps) in intuitionistic topological spaces,some of its properties and relations are studied .Through this concept I introduce a new class of maps(perfectly contra T*-intuitionistic generalized irresolute maps)in intuitionistic topological spaces .Also I introduce several kinds of perfectly contra T*-intuitionistic generalized irresolute map and Istudy some of their properties and relation among them .

Key words: Contra T^*-intuitionistic generalized irresolute maps in intuitionistic topological spaces, perfectly contra T^*-intuitionistic generalized irresolute maps in intuitionistic topological spaces .

I- Introduction

Dunham,W. [5] introduced generalized closure operator cl^* and defined a topology called T^* topology .Sakthive, K.[15] introduced and studied intuitionistic fuzzy Alpha generalized continuous maps and intuitionistic Alpha generalized irresolute maps. Pushpalatha, A. Eswaran, S. and Rajar,P.[10] studied and investigated T^*generalized –closed sets .Eswaran, S.and Pushpalatha, A.[6] introduced T^*generalized-continuous maps in topological spaces.Pushpalatha, A. and Eswaran, S. [11] defined two classes of maps called perfectly generalized-continuous maps and strongly T^*generalized-

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continuous maps respectively. Raouf, G. A. and Yaseen , Y. J. [12] studied contra and totally T^*- intuitionistic generalized continuous maps and some kinds in intuitionistic in intuitionistic topological spaces . Miguel ,Caldas , C. [9] have defined perfectly contra irresolute maps and studied weak and strong forms of irresolute . In this paper I introduce two new classes of maps between intuitionistic topological spaces(ITS) namely contra T^*-intuitionistic generalized- irresolute maps , perfectly contra T^*-intuitionistic generalized-irresolute maps in intuitionistic topological spaces and some kinds in intuitionistic topological spaces and study their properties .Throughout this paper $(X,T^*)$and (Y,T^*) (or simply X and Y)represent non- empty intuitionistic topological spaces (ITS) on which no separation axioms are assumed ,unless otherwise mentioned. Let A be an IS in (X, T^*), I denote the closure of A (respectively the generalized closure operator is defined by the intersection of all Ig-closed contining A ,and A^c represent closure of A and complement of A to an intuitionistic topological spaces (ITS) on $T^*$by cl (A)(respectively cl^* (A)) .

II- Preliminaries

I recall the following definitions which are needed in our work .

Let X be a non-empty set, and let A and B be IS having the form $A = \langle x, A_1, A_2 \rangle$; $B = \langle x, B_1, B_2 \rangle$ respectively. Furthermore, let $\{A_i : i \in I\}$ be an arbitrary family of IS in X, where $A_i = \langle x, {A_i}^{(1)}, {A_i}^{(2)} \rangle$, then:

1) $\widetilde{\emptyset} = \langle x, \emptyset, X \rangle$; $\widetilde{X} = \langle x, X, \emptyset \rangle$.
2) $A \subseteq B$, iff $A_1 \subseteq B_1$ and $A_2 \supseteq B_2$.
3) The complement of A is denoted by $\overline{A}$ and defined by $\overline{A} = \langle x, A_2, A_1 \rangle$.
4) $\cup A_i = \langle x, \cup A_i^{(1)}, \cap A_i^{(2)} \rangle, \cap A_i = \langle x, \cap A_i^{(1)}, \cup A_i^{(2)} \rangle$[3]. Let X and Y be two non-empty sets and $f: X \to Y$ be a function. If $B = \langle y, B_1, B_2 \rangle$ is IS in Y, then the preimage of B under f denoted by $f^{-1}(B)$ is IS in X defined by $f^{-1}(B) = \langle x, f^{-1}(B_1), f^{-1}(B_2) \rangle$ [3] . An intuitionistic topology (IT, for short) on a non-empty set X, is a family T of IS in X containing $\widetilde{\emptyset}, \widetilde{X}$ and closed under arbitrary unions and finitely intersections. The pair (X, T) is called an intuitionistic topological space (ITS, for short) [3]. Let (X,T) be ITS and A be asubset of X ,then the interior and closure of A are defined by int (A)=$\cup$ {Gi : Gi $\in$ T, Gi $\subseteq$ A}, cl(A)= $\cap\{K_i$: K_i is ICS in X and A $\subseteq K_i$ } [13] . A subset A of intuitionistic topological spaces(ITS,for short)$(X, T)$is said to be generalized closed(Ig-closed)in X if $Icl(A) \subseteq U$wheneverA $\subseteq$ U and Uis Iopen in X.Asubset A is called generalized open(Ig-open)in X if its complement $\overline{A}$ is Ig-closed every Iclosed set is Ig-closed [7]. Let (X,T) and (Y, τ) be two ITS and Let $f: X \to Y$ be afunction, then f is said to be continuous if $f^{-1}(V)$ is I-closed (or I-open) in X for every y I-closed set (or I-open set) V in Y[3]. Let (X,T) and (Y, τ) be two ITS and Let $f: X \to Y$ be afunction, then f is said to be irresolute if $f^{-1}(V)$ is Isemi-closed set in X for every Isemi-closed set V in Y [9]. Let (X,T) and (Y, τ) be two ITS and Let $f: X \to Y$ be afunction, then f is said to be semi-irresolute (resp. pre- irresolute ,semipre- irresolute and presemi- irresolute) if $f^{-1}(V)$ is Isemi-closed (resp. Ipre-closed, Isemipre-closed and Ipresemi-closed)set in X for every Isemi-closed (resp. Ipre-closed, Isemipre-closed and Ipresemi-closed set V in Y [9]. A subset A of ITS (X, T) is said to be:- 1) gs-closed (resp. $psg-$closed, $gsp-$closed, if $Iscl(A) \subseteq U$(resp. $I\,pscl(A) \subseteq U$ and $Ispcl \subseteq U$) whenever $A \subseteq U$ and U is I open set in X . 2) $sg-$closed(resp.$gps-$closed) if $I\ scl(A) \subseteq U$ (resp. $Ipsc(A) \subseteq U$ whenever U is Isemi-open (resp. I presemi-open) set in X [7]. A subset A of ITS (X, T) is said to be :-

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a) An intuitionistic presemi-closed (Ips-closed) if $I\,cl\Big(I\,int\big(I\,cl(A)\big)\Big) \subseteq A$.

b) An intuitionistic pre-closed (Ip-closed) if $I\,cl\big(I\,int(A)\big) \subseteq A$.

c) An intuitionistic semi-closed (Isemi-closed) if $I\,int\big(I\,cl(A)\big) \subseteq A$.

d) An intuitionistic semipre-closed(Isp-closed) if $I\,int\Big(I\,cl\big(I\,int(A)\big)\Big) \subseteq A$[1] . For the subset A of ITS (X, T),the intuitionistic generalized closure operator $I\,cl^*$ is defined by the intersection of all I g-closed sets containing A[5] . For the subset A of ITS (X, T) , the Isemi-closure (resp.I semipre-closure ,I presemi-closure) of A is defined as the intersection of all I semi-closed set(resp. I semipre-closed set, I presemi-closed set containing A[5] . A map $f: (X, T) \to (Y, \tau)$ is called generalized - irresolute (Ig- irresolute) (resp. generalized semi- irresolute, semi generalized- irresolute, generalized presemi-irresolute, presemi generalized- irresolute and generalized semipre- irresolute)(resp. Igs – irresolute, Isg- irresolute,Igps- irresolute,Ipsg- irresolute and Igsp- irresolute) if $f^{-1}(V)$is Ig- closed(resp. Igs-closed,Isg-closed, Igps-closed,Ipsg-closed and Igsp-closed)set in X for every Ig- closed(resp. Igs-closed,Isg-closed, Igps-closed,Ipsg-closed and Igsp-closed)set V set in Y[9]. A map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called contra-continuous if $f^{-1}(V)$ is Iclosed set in X for each Iopen V set in Y[5]. A map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called contra irresolute if $f^{-1}(V)$ is Isemi-closed set in X for each Isemi $-$open V set in Y[9]. A map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called contra semipre-irresolute (resp. contra pre- irresolute and contra presemi-irresolute) (contra Isp- irresolute (resp. contra Ip- irresolute and contra Ips- irresolute) function if $f^{-1}(V)$is Isp-closed(resp. Ip-closed and Ips-closed) set in X for each Isp-open(resp.Ip-open and Ips-open) V set in Y[2] . A map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called contra generalized-irresolute (resp. contra gs- irresolute, contra sg- irresolute, contra psg-irresolute ,contra gps- irresolute and contra gsp- irresolute) function if $f^{-1}(V)$ is Ig-closed (resp. Igs-closed, Isg-closed, Ipsg-closed, Igps-closed and Igsp-closed) set in X for each Ig-open (resp. Igs-open, Isg-open, Ipsg-open, Igps-open and Igsp-open) set V in Y [2]. A subset A of ITS (X,T), the topology T^* is defined by $T^* = \{U: Icl^*(\overline{U}) = (\overline{U})\}$[10] . A subset A of ITS $(X, T)$is called T^*-generalized-closed sets(T^*-Ig-closed) if $Icl^*(A) \subseteq U$ whenever $A \subseteq U$ and U is T^*-I-open in X.The complement of T^*-Igeneralized-closed set is called the T^*-I generalized-open set (T^*-Ig-open) [10]. A collection $\{A_i: i \in I\}$ of Ig-open sets in a topological space (X, T) is called a Ig-open cover of a subset B if $B \subset \cup \{A_i: i \in I\}$[10]. A map $f: (X, T) \to (Y, \tau)$is called T^*-generalized-irresolute function if $f^{-1}(V)$ is T^*-Ig-closed set in X for every T^*-Ig-closed set V in Y[10].

A map $f: (X, T) \to (Y, \tau)$ is said to be contra generalized-continuous (contra Ig-continuous) if $f^{-1}(V)$ is Ig-closed set in X for every I-open set V in Y[2] . A map $f: (X, T) \to (Y, \tau)$ is said to be perfectly generalized-continuous (perfectly Ig-continuous) if $f^{-1}(V)$ is both Iopen and I-closed set in X for every Ig-closed set V in Y[11] . A map $f: (X, T) \to (Y, \tau)$ is called T^*-generalized continuous (T^*-Ig-continuous) if $f^{-1}(V)$ is T^*-Ig-closed set in X for every Ig-closed set in Y[11] . A map $f: (X, T) \to (Y, \tau)$is called called strongly T^*- generalized- continuous(strongly T^*-Ig-continuous) if $f^{-1}(V)$ is Ig-open (or

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Ig-closed) set in X of every T^*-Ig-open set (or T^*-Ig-closed set) in Y[11]. A map $f: (X, T) \to (Y, \tau)$ is called contra T^* generalized-continuous(contra T^*-Ig-continuous) if the inverse image of every Ig-open set in Y is T^*-Ig-closed set in X[12] . A map $f: (X, T) \to (Y, \tau)$ is called perfectly T^* generalized-continuous(perfectly T^*-Ig-continuous) if $f^{-1}(V)$ is both Ig-open and Ig-closed set in X for every is T^*-Ig-closed set V in Y [11] . A map $f: (X, T) \to (Y, \tau)$ is called totally T^* generalized-continuous(totally T^*-Ig-continuous) if $f^{-1}(V)$ is T^*-Ig-clopen set in X for every Ig-open set V in Y [12]. A map $f: (X, T) \to (Y, \tau)$ is called perfectly irresolute if $f^{-1}(V)$ is both Isemi-open and Isemi-closed set in X for every is Isemi-closed set V in Y [9]. A map $f: (X, T) \to (Y, \tau)$ is called perfectly contra-irresolute if $f^{-1}(V)$is both Isemi- open and Isemi-closed set in X for every is Isemi-open set Vin Y [2]. map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called perfectly contra semipre-irresolute (resp. perfectly contra semi- irresolute and contra pre- irresolute) (contra Isp- irresolute (resp. contra Is- irresolute and contra Ip -irresolute) function if $f^{-1}(V)$is both Isp-open and Isp-closed(resp.Is-open and Is-closed and Ip-open and Ip-closed)set in X for every Isp-open(resp.Is-open and Ip-open)set V in Y [2] . A map $f: (X, T) \to (Y, \tau)$ is called perfectly generalized-irresolute if $f^{-1}(V)$is both Ig- open and Ig-closed set in X for every is Ig-closed set V in Y [2]. A map $f: X \to Y$ from an intuitionistic topological space (X,T) in to an intuitionistic topological space (Y, τ) is called contra-continuous if $f^{-1}(V)$ is Iclosed set in X for each Iopen V set in Y [4].

Remark 2.1 [10] *It has been proved that :Every Iclosed set (Ig-closed and T^*-Iclosed) set is T^*-Ig-closed . The complement of T^*-Ig-closed set is T^*-Ig-open set.*

III- Contra T^*- intuitionistic generalized irresolute maps in Intuitionistic topological spaces

I define,in this section anew kinds of X maps called T^*-intuitionistic irresolute maps, T^*-intuitionistic generalized irresolute maps, contra T^*-intuitionistic irresolute and contra T^*-intuitionistic generalized irresolute maps an intuitionistic topological spaces and related to other kind of maps which are defined in this work .

I start this section by the following definitions.

Definition 3.1 *A map $f: (X, T) \to (Y, \tau)$, where (X, T) and (Y, τ) are ITS is called T^*- intuitionistic irresolute if the inverse image of every T^*- Iclosed set in Y is T^*-Iclosed set in X.*

Definition 3.2 *A map $f: (X, T) \to (Y, \tau)$, where (X, T) and (Y, τ) are ITS is called contra T^*- intuitionistic irresolute if the inverse image of every T^*- Iopen set in Y is T^*-Iclosed set in X.*

Definition 3.3 *A map $f: (X, T) \to (Y, \tau)$, where (X, T) and (Y, τ) are ITS is called T^*-intuitionistic generalized-irresolute (T^*-Ig-irresolute)if the inverse image of every T^*-Ig-closed set in Y is T^*-Ig-closed set in X.*

Next Iam going to generalize the definition of contra T^*- Ig- irreolute for ITS.

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Definition 3.4 *A map $f:(X,T) \to (Y,\tau)$, where (X,T) and (Y,τ) are ITS is called contra T^*-intuitionistic generalized-irresolute (contra T^*-Ig-irresolute)if the inverse image of every T^*-Ig-open set in Y is T^*-Ig-closed set in X.*

The following characterization can be proved in the following proposition.

Proposition 3.5 *Amapping $f: X \to Y$ from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is contra T^*- Ig- irresolute if and only if the inverse image of every T^* Ig-closed set in Y is T^*- Ig-open set in X.*

Proof *Assume that f is contra T^*-Ig-irresolute. Let B be any T^* Ig-closed set in Y, then B^c is T^* Ig-open set in Y. Since f is contra T^*-Ig-irresolute , $f^{-1}(B^c)$ is T^*-Ig-closed set in X. But $f^{-1}(B^c) = (f^{-1}(B))^c$ and so $f^{-1}(B)$ is T^*-Ig-open set in X.Hence the inverse image of every T^*-Ig-closed set in Y is T^*-Ig-open set in X.*
Assume that the inverse image of every is T^*-Ig-closed set in Y is T^*-Ig-open set in X. Let B be any T^*- Ig-open set in Y, then B^c is T^*- Ig-closed set in Y. By assumption, $f^{-1}(B^c)$ is T^*-Ig-open set in X. But $f^{-1}(B^c) = (f^{-1}(B))^c$ and so $f^{-1}(B)$ is T^*-Ig-closed se in X. Therefore f is contra T^*-Ig-irresolute.

The following proposition illustrates the relation between strongly T^*-Ig-continuous and contra T^*-Ig-irresolute.

Proposition 3.6 *Amapping $f: X \to Y$ from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is strongly T^*- Ig- continuous then it is contra T^*-Ig-irresolute.*

Proof *Let $f: X \to Y$ be strongly T^*- Ig- continuous. Let A be a T^*- Ig-open set in Y. Since f is strongly T^*- Ig- continuous ,then $f^{-1}(A)$ is Ig-closed set in X . By remark 2.1, $f^{-1}(A)$ is T^*-Ig-closed set in X . Hence f is contra T^*-Ig-irresolute .*
The converse of the a bove proposition need not be true as the following example shows.

Example 3.7 *Let X={1,2,3};T={$\tilde{\emptyset}$, $\tilde{X}$, A , B} where $A =< x, \{2\}, \{1,3\} >$ and $B =< x, \{2\}, \emptyset, >$ Let Y={a,b,c}; $\Psi = \{\tilde{\emptyset}, \tilde{Y}, C\}$ where $C =< y, \{a\}, \emptyset >$. $Define$ a $mapping$ $f: X \to Y$ by f(2)=a, f(3)=b and f(1)=c . I can see that f is T^*-Ig-irresolute , Since C is is T^*-Ig-open set in Y, then B= f^{-1} $(C) =< x, \{2\}, \emptyset >$ T^*-Ig-closed set in X. Becouse the only T^* in X that contain B is B and $Q_4 =< x, \{2,3\}, \emptyset >$,then I cl^* B=B $\subseteq$ B and Q_4 . But f is not strongly T^*- Ig- continuous,becouse B= f^{-1} (C) is not Ig-closed set in X , since the only IOS in X such that B $\subseteq$ B then IclB =X $\subsetneq$ B.*

In the following result I prove that contra T^*-irresolute. gives contra T^*-Ig-irresolute.

Proposition 3.8 *Amapping $f: X \to Y$ from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is contra T^*-I irresolute then it is contra T^*-Ig-irresolute.*

Proof *Let $f: X \to Y$ be contra T^*- irresolute . Let B be any T^*- Iopen set in Y. Since f is contra T^*- irresolute ,then $f^{-1}(B)$ is T^*-Iclosed set in X . By remark 2.1, $f^{-1}(B)$ is T^*-Ig-closed set in X Hence f is contra T^*-Ig-irresolute .*
The converse of the a bove proposition need not be true as the following example shows.

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Example 3.9 *Let X={a,b,c};T=*$\{\widetilde{\emptyset}, \tilde{X}, A, B, C\}$ *where* $A =< x, \{c\}, \{a, b\} >$, $B =< x, \{a\} \{b, c\} >$ *and* $c =< x, \{a, c\}, \{b\} >$*.Let Y={1,2,3};*$\Psi = \{\widetilde{\emptyset}, \tilde{Y}, D\}$*where* $D =< y, \{1\}, \emptyset >$. *Define a mapping* $f: X \to Y$ *by f(a)=1 and f(b) = f(c) = 2. It is easy to see that f is contra* T^**-Ig-irresolute , Since* $E =< y, \{3\}, \{1\} >$ *is* T^**-Iopen set in Y, then* $f^{-1}(E) =< x, \emptyset, \{a\} > \notin T^*$*-Iclosed set in X,so f is not contra* T^**-irresolute but f is contra* T^**-Ig-irresolute Since E is is* T^**-Ig-open set in Y and* $f^{-1}(E)$ *is* T^**-Ig-closed set in X, becouse the only* T^* *in X that contain* $Z_1 =< x, \{c\}, \{a\} >$, $Z_2 =< x, \{a, c\}, \emptyset >$ *and* $Z_3 =< x, \{c\}, \emptyset >$ *then* $I\,cl^*\ f^{-1}(E) = f^{-1}(E) \subseteq Z_1, Z_2$ *and* Z_3.

The following proposition proved that the composition of contra T^**-Ig-continuous and contra* T^**-Ig-irresolute is also contra* T^**-Ig-continuous.*

Proposition 3.*10* *If a mapping* $f: X \to Y$ *is contra* T^**-*Ig*-continuous and a mapping* $g: Y \to Z$ *is contra* T^**-*Ig*-irresolute then the composition* $g \circ f: X \to Z$ *is contra* T^**-*Ig*-continuous.*

Proof *Let A be any* Ig*-open set in* Z. *Since* g *is contra* T^**-*Ig*-continuous,* $g^{-1}(A)$ *is* T^**-*Ig*-closed set in* Y. *Since* f *is contra* T^**-*Ig*-irresolute ,* $f^{-1}(g^{-1}(A))$ *is* T^**_*Ig*-closed set in X. By remark 2.1 , So* $f^{-1}(g^{-1}(A))$ *is* T^**-*Ig*-closed set. But* $f^{-1}(g^{-1}(A)) = (g \circ f)^{-1}(A)$. *Therefore* $g \circ f$ *is contra* T^**-*Ig*-continuous.*
The following proposition puts a necessary condition on perfectly Ig-continuous to be contra T^**-Ig-irresolute.*

Proposition 3.11 *Amapping* $f: X \to Y$ *from an intuitionistic topological space* (X, T^*) *in to an intuitionistic topological space* (Y, τ^*) *is perfectly Ig-continuous then it is contra* T^**-Ig-irresolute.*

Proof *Let* $f: X \to Y$ *be perfectly Ig-continuous. Let A be a Ig-open set in Y. Since f is perfectly Ig-continuous , then* $f^{-1}(A)$ *is both Iopen and Iclosed set in X . By remark 2.1, A is* T^**-Ig-open and since every Iclosed set is* T^**-Ig-closed set ,* $f^{-1}(A)$ *is* T^**-Ig-closed set . Hence f is contra* T^**-Ig-irresolute .*
The converse of the a bove proposition need not be true as the following example shows.

Example 3.12 *Let* $X = \{1,2,3\}$; $T = \{\widetilde{\emptyset}, \tilde{X}, A, B\}$ *where A= <x,{3},{1,2}>*$A = \langle x, \{2\}, \{1,3\} \rangle$ *and B=*$< x,\{3\},\emptyset >$. *Let* $Y = \{a, b, c\}$, $\Psi = \{\widetilde{\emptyset}, \tilde{X}, C\}$ *where C=*$\{y,\{b\},\emptyset >$. *Define amapping* $f: X \to Y$ *by* $f(3) = b$, $f(2) = a$ *and* $f(1) = c$ *. It is easy to see that f is contra* T^**-Ig-irresolute .Since* $\beta_1 = < y, \{b\}, \{a\} >$ *is* T^**-Ig open set in Y,then* $\partial_2 = f^{-1}(\beta_1) =< x, \{3\}, \{2\} >$
$T^*Ig - closed\ set\ in\ X, becouse\ the\ only\ T^*\ that\ contain\ \partial_2\ is\ B\ ,\ \partial_2\ ,\ \partial_3 =< x, \{1,3\}, \emptyset >$ $and\ \partial_5 =< x, \{2,3\}, \emptyset >\ then\ I\,cl^*\ \partial_2 = \partial_2 \subseteq B\ ,\ \partial_2\ ,$
$\partial_3\ and\ \partial_5\ , but\ f\ is\ not\ perfectly\ Ig - continuous. Since\ \beta_1\ is\ Ig -$ $open\ set\ in\ Y$ *, but* $\partial_2 = f^{-1}(\beta_1)$ *is not Iopen and Iclosed set in X .*

Remark 3.13 *The following example shows that contra* T^**-Ig-irresolute map in ITS is independent from contra(Isp-irresolute, Isg-irresolute, Ips-irresolute ,Ipre-irresolute , Igs-irresolute, Igsp-irresolute Ipsg-irresolute and Igps-irresolute)maps.*
I start with example showing that:
1) contra T^**-Ig-irresolute , but not contra Isp-irresolute.*
2) contra T^**-Ig-irresolute , but not contra Ipre-iresolute.*

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Example 3.14 *Let X={a,b,c};*
T=$\{\widetilde{\emptyset},\ \tilde{X}, A\}$ *where* $A=<x,\{a\},\{b,c\}>$*, Let Y={1,2,3};* $\Psi=\{\widetilde{\emptyset},\tilde{Y},C,D\}$ *where* $C=<y,\{1\},\{2\}>$ *and* $D=<y,\{1,3\},\emptyset>$. *Define a mapping* $f:X\to Y$ *by f(a)=1, f(b)=f(c)=3*
ISPOX=IPOX=T$\cup$*{B,E,F,R,H,I,J,K,L,M,N,P,Q,S,V}where* $B=\langle x,\{a\},\emptyset\rangle$; $E=\langle x,\{a,c\},\emptyset\rangle$; $F=\langle x,\{a,c\},\{b\}\rangle$; $R=\langle x,\{a,b\},\emptyset\rangle$; $H=\langle x,\{b\},\emptyset\rangle$; $I=\langle x,\{c\},\emptyset\rangle$; $J=\langle x,\emptyset,\{b,c\}\rangle$; $K=\langle x,\emptyset,\{b\}\rangle$; $L=\langle x,\{b\},\{c\}\rangle$; $M=\langle x,,\emptyset,\{c\}\rangle$; $N=\langle x,\{c\},\{b\}\rangle$; $P=\langle x,\{b,c\},\emptyset\rangle$; $Q=\langle x,\{a,b\},\{c\}\rangle$; $S=\langle x,\{a\},\{b\}\rangle$ *and* $V=\langle x,\{a\},\{c\}\rangle$.
ISPOY=IPOY= $\Psi\cup\{Q_i\}_{i=1}^{17}$ *where* $Q_1=\langle y,\{1\},\emptyset\rangle$; $Q_2=\langle y,\{1\},\{3\}\rangle$; $Q_3=\langle y\{1\},\{2,3\}\rangle$; $Q_4=\langle y,\{1,3\},\{2\}\rangle$; $Q_5=\langle y,\{2,3\},\emptyset\rangle$; $Q_6=\langle y,\{2,3\},\{1\}\rangle$; $Q_7=\langle y,\{2\},\emptyset\rangle$; $Q_8=\langle y,\{2\},\{3\}\rangle$; $Q_9=\langle y,\{1,2\},\emptyset\rangle$; $Q_{10}=\langle y,\{1,2\},\{3\}\rangle$; $Q_{11}=\langle y,\{3\},\emptyset\rangle$; $Q_{12}=\langle y,\{3\},\{1\}\rangle$; $Q_{13}=\langle y,\{3\},\{2\}\rangle$; $Q_{14}=\langle y,\{3\},\{1,2\}\rangle$, $Q_{15}=\langle y,\emptyset,\{2\}\rangle$; $Q_{16}=\langle y,\emptyset,\{3\}\rangle$ *and* $Q_{17}=\langle y,\emptyset,\{2,3\}\rangle$, *from all above and definition of contra* T^**-Ig-irresolute function that f is contra* T^**-Ig-irresolute . Since C is* T^**-Ig-open set in Y, then B=*$f^{-1}(C)=<x,\{a\},\emptyset>$ *is* T^**-Ig-closed set in X , the only* T^* *in X that contain B is B ,then I* cl^* *B=B* $\subseteq$ *B. But f is not contra Isp-irresolute and not Ipre-irresolute.Since ISPOX and IPOX in X,then Iint Icl I int B =X* $\subsetneq$ *B and Icl Iint B=X* $\subsetneq$*B.*

I show in this example that there is a functions f such that :
1) f is contra Igs-irresolute and not contra T^**-Ig-irresolute.*
2) f is contra Igsp-irresolute and not contra T^**-Ig-irresolute.*
3) f is contra Isp-irresolute and not contra T^**-Ig-irresolute.*

Example 3.15 *Let X={a,b,c};T=*$\{\widetilde{\emptyset},\ \tilde{X}, A, B, C\}$ *where* $A=<x,\{c\},\{a,b\}>$, $B=<x,\{a\},\{b,c\}>$, $C=<x,\{a,c\},\{b\}>$. *Let Y={1,2,3};* $\Psi=\{\widetilde{\emptyset},\tilde{Y},D,E,F\}$ *where* $D=<y,\{1,3\},\{2\}>$, $E=<y,\{2\},\{3\}>$ *and* $F=<y,\emptyset,\{2,3\}>$. *Define a mapping* $f:X\to Y$ *by f(c)=2 , f(a)=f(b)=3. ISPOX=T*$\cup\{Z_i\}_{i=1}^{19}$ *where* $Z_1=\langle x,\{c\},\{a\}\rangle$; $Z_2=\langle x,\{a,c\},\emptyset\rangle$; $Z_3=\langle x,\{c\},\{b\}\rangle$; $Z_4=\langle x,\{a\},\{c\}\rangle$; $Z_5=\langle x,\{a,b\},\{c\}\rangle$; $Z_6=\langle x,\{c\},\emptyset\rangle$; $Z_7=\langle x,\{b,c\},\{a\}\rangle$; $Z_8=\langle x,\{a\},\{b\}\rangle$; $Z_9=\langle x,\{a\},\emptyset\rangle$; $Z_{10}=\langle x\{b,c\},\emptyset\rangle$; $Z_{11}=\langle x,\{a,b\},\emptyset\rangle$; $Z_{12}=\langle x,\{b\},\emptyset\rangle$; $Z_{13}=\langle x,\{b\},\{a\}\rangle$; $Z_{14}=\langle x,\{b\},\{c\}\rangle$, $Z_{15}=\langle x,\emptyset,\{a\}\rangle$; $Z_{16}=\langle x,\emptyset,\{b\}\rangle$; $Z_{17}=\langle x,\emptyset,\{c\}\rangle$; $Z_{18}=\langle x,\emptyset,\{a,b\}\rangle$ *and* $Z_{19}=\langle x,\emptyset,\{b,c\}\rangle$. *ISPOY=* $\Psi\cup\{\beta_i\}_{i=1}^{21}$ *where* $\beta_1=\langle y,\{1,3\},\emptyset\rangle$; $\beta_2=\langle y,\{2\},\emptyset\rangle$; $\beta_3=\langle y,\{2\},\{1\}\rangle$; $\beta_4=$

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$\langle y,\{2\},\{1,3\}\rangle$; $\beta_5=\langle y,\{2,3\},\emptyset\rangle$; $\beta_6=\langle y,\{2,3\},\{1\}\rangle$; $\beta_7=\langle y,\{1,2\},\emptyset\rangle$; $\beta_8=\langle y,\{1,2\},\{3\}\rangle$; $\beta_9=\langle y,\emptyset,\{1\}\rangle$; $\beta_{10}=\langle y,\emptyset,\{2\}\rangle$; $\beta_{11}=\langle y,\emptyset,\{3\}\rangle$; $\beta_{12}=\langle y,\emptyset,\{1,2\}\rangle$; $\beta_{13}=\langle y,\emptyset,\{1,3\}\rangle$; $\beta_{14}=\langle y,\{1\},\emptyset\rangle$, $\beta_{15}=\langle y,\{1\},\{2\}\rangle$; $\beta_{16}=\langle y,\{1\},\{3\}\rangle$; $\beta_{17}=\langle y,\{1\},\{2,3\}\rangle$, $\beta_{18}=\langle y,\{3\},\emptyset\rangle$; $\beta_{19}=\langle y,\{3\},\{1\}\rangle$; $\beta_{20}=\langle y,\{3\},\{2\}\rangle$ and $\beta_{21}=\langle y,\{3\},\{1,2\}\rangle$. It is easily to satisfy that f is contra Igs-irresolute(resp. contra Isp-irresolute and contra Igsp-irresolute . But not contra T^*-Ig-irresolute, since E is $T^*-Ig-open\ set\ in\ Y$,then A=$f^{-1}(E)=< x,\{c\},\{a,b\}>$that contain C, Z_1,Z_2 and Icl^*A=$< x\{c\},\{a\}>$is not contained on A or C.

Example 3.16 *Recall example 3.12 I can get the following:*

1) *f is contra T^*-Ig- irresolute , but not contra Isg-irresolute.*
2) *f is contra T^*-Ig- irresolute, but not contra Igs-irresolute.*
3) *f is contra T^*-Ig- irresolute, but not contra Ipsg-irresolute.*
4) *f is contra T^*-Ig- irresolute , but not contra Igps-irresolute.*
5) *f is contra T^*-Ig- irresolute, but not contra Igsp-irresolute.*
6) *f is contra T^*-Ig- irresolute, but not contra Ips-irresolute .*

ISOX=IPSOX=T∪{$\partial_1,\partial_2,\partial_3,\partial_4,\partial_5,\partial_6$ }where $\partial_1=\langle x,\{3\},\{1\}\rangle$; $\partial_2=\langle x,\{3\},\{2\}\rangle$, $\partial_3=\langle x,\{1,3\},\emptyset\rangle$; $\partial_4=\langle x,\{1,3\},\{2\}\rangle$; $\partial_5=\langle x,\{2,3\},\emptyset\rangle$and $\partial_6=\langle x,\{2,3\},\{1\}\rangle$.ISOY=IPSOY={$\Psi\cup\beta_1,\beta_2,\beta_3$ }where $\beta_1=\langle y,\{b\},\{a\}\rangle$; $\beta_2=\langle y,\{b\},\{c\}\rangle$and $\beta_3=\langle y,\{b\},\{a,c\}\rangle$.Let C is $T^*-Ig-open\ set\ in\ Y$,then B=$f^{-1}(C)=< x,\{3\},\emptyset>$ is $T^*-Ig-closed\ set\ in\ X$. So f is contra T^*-Ig-irresolute ,but not contra Isg-irresolute contra Igs-irresolute contra Igsp- irresolute and contra Ips-irresolute.Since C is Isg-open , Igs-open, Igsp-open, Ipsg-open, Igps-open and Ips-open set in Y, then B=$f^{-1}(C)$ is not Isg-cloesd , not Igs-closed not Igsp-closed, not Ipsg-closed, not Igps-closed and not Ips-closed set in X.

In the next example I show that:

1) *contra Ips-irresloute function , but not contra T^*-Ig-irresolute function.*
2) *contra Ipre-irresolute function , but not contra T^*-Ig-irresolute function.*

Example 3.17 *Let X={a,b,c};T={$\tilde{\emptyset}$, $\tilde{X}$, A , B} where $A=< x,\{c\},\{b\}>$ and $B=< x,\{a,c\},\emptyset,>$ Let Y={1,2,3}; $\Psi=\{\tilde{\emptyset},\tilde{Y},C,D,E\}$where $C=<$*

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$y,\{1,3\},\{2\}>, D=<y,\{2\},\{3\}>$ and $E=<y,\emptyset,\{2,3\}>$. *Define a mapping* $f: X \rightarrow Y$ *by f(c)=3and f(b)=f(a)=1.* *IPSOX*=$T \cup \{Q_1, Q_2, Q_3\}$ *where* $Q_1=\langle x,\{c\},\emptyset\rangle$; $Q_2=\langle x,\{a,c\},\{b\}\rangle$; $Q_3=\langle x,\{b,c\},\emptyset\rangle$. *IPOX*=$T \cup \{Q_i\}_{i=4}^{17}$ *where* $Q_4=\langle x,\{c\},\{a\}\rangle$; $Q_5=\langle x,\{c\},\{a,b\}\rangle$; $Q_6=\langle x,\{a\},\emptyset\rangle$; $Q_7=\langle x,\{a\},\{b\}\rangle$; $Q_8=\langle x,\{a\},\{c\}\rangle$; $Q_9=\langle x,\{a\},\{b,c\}\rangle$; $Q_{10}=\langle x,\{a,b\},\emptyset\rangle$; $Q_{11}=\langle x,\{a,b\},\{c\}\rangle$; $Q_{12}=\langle x,\{b\},\emptyset\rangle$; $Q_{13}=\langle x,\{b\},\{a\rangle$; $Q_{14}=\langle x,\emptyset,\{a\}\rangle$; $Q_{15}=\langle x,\emptyset,\{b\rangle$; $Q_{16}=\langle x,\emptyset,\{a,b\}\rangle$ *and* $Q_{17}=\langle x,\{b,c\},\{a\}\rangle$. *IPOY*= $\Psi \cup \{K_i\}_{i=1}^{9}$ *where* $K_1=\langle y,\{1,3\},\emptyset\rangle$; $K_2=\langle y,\{2\},\{1,3\}\rangle$; $K_3=\langle y,\{1,2\},\emptyset\rangle$; $K_4=\langle y,\{1,2\},\{3\}\rangle$; $K_5=\langle y,\{1\},\emptyset\rangle$; $K_6=\langle y,\{1\},\{2\}\rangle$; $K_7=\langle y,\{1\},\{3\}\rangle$; $K_8=\langle y,\{1\},\{2,3\}\rangle$ *and* $K_9=\langle y,\emptyset,\{3\}\rangle$. $IPSOY=\{\widetilde{\emptyset}, \tilde{Y}, C, D, E, K_1\}$*.It is very easy to see that f is contra Ips-irresolute and contra Ipre-irresolute .But not contra* T^**-Ig-irresolute, because D is* T^*-*Ig-open set in Y,then* $f^{-1}(D)=<x,\emptyset,\{c\}>$*that contain B, and Icl** $f^{-1}(D)$=$\langle x,\{b\},\{c\}\rangle \subsetneq B$.

Next I show that:
1) f is contra Ipsg-irresolute , but not contra T^**-Ig-irresolute.*
2) f is contra Igps-irresolute , but not contra T^**-Ig-irresolute.*
3) f is contra Isg-irresolute , but not contra T^**-Ig-irresolute.*

Example 3.18 *Let X={a,b,c};T=*$\{\widetilde{\emptyset}, \tilde{X}, A, B\}$ *where* $A=<x,\{c\},\{b\}>$ *and* $B=<x,\{a,c\},\emptyset>$*. Let Y={1,2,3};* $\Psi=\{\widetilde{\emptyset}, \tilde{Y}, C, D\}$*where* $C=<y,\{1,3\},\emptyset>$ *and* $D=<y,\{1\},\{3\}>$. *Define a mapping* $f: X \rightarrow Y$ *by f(a)=f(b)=1 and f(c)=2. ISOX=IPSOX=T*$\cup\{Z_1, Z_2, Z_3\}$*where* $Z_1=<x,\{c\},\emptyset>$, $Z_2=<x,\{a,c\},\{b\}>$ *and* $Z_2=<x,\{b,c\},\emptyset>$. *IPSOY= ISOY* $=\Psi \cup \{P_1, P_2, P_3\}$*where* $P_1=\langle y,\{1,2\},\emptyset\rangle$; $P_2=\langle y,\{1,2\},\{3\}\rangle$*and* $P_3=\langle y,\{1\},\emptyset\rangle$*. Since* $P_4=\langle y,\emptyset,\{2,3\}\rangle$ *is* T^*-*Ig-open set in Y,then* $\bar{Z}_1=f^{-1}(P_4)=\langle x,\emptyset,\{c\}\rangle \notin T^*-$*Ig-closed set in X, because the only* T^* *in X that contain B is B,then I cl** $\bar{Z}_1$= $\langle x,\{b\},\{c\}\rangle \subsetneq B$*.So f is not contra* T^**-Ig-irresolute, but f is contra Ipsg-irresolute , contra Igps-irresolute and contra Isg-irresolute, since* P_4 *is Ipsg-open , Igps-open and Isg-open set in Y and* $f^{-1}(P_4)$*is Ipsg-closed ,Igps-closed and Ipsg-closed in X.*

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The following result I prove that contra Ig-continuous gives contra T^*-Ig-irresolute.

Proposition 3.19 *Amapping $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is contra Ig-continuous then it is contra T^*-Ig-irresolute.*

Proof *Let $f: X \to Y$ be contra Ig-continuous. Let A be a I-open set in Y, then $f^{-1}(A)$ is Ig-closed set in X .Since every Iopen set is T^*-Ig-open set , A is T^*-Ig-open set in Y. By remark 2.1, $f^{-1}(A)$ is T^*-Ig-closed set . Therefore f is contra T^*-Ig-irresolute .*

However the converse is not true as shown by the following example.

Example 3.20 *Recall example 3.12 show that f is contra T^*-Ig-irresolute, but not contra Ig-continuous. Since C is Iopen in Y, then B=$f^{-1}(C)$ is not Ig-closed set in X .*

The following proposition illustrates the relation between totally T^*-Ig-continuous and contra T^*-Ig-irresolute.

Proposition 3.21 *Amapping $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is totally T^*-Ig-continuous then it is contra T^*-Ig-irresolute.*

Proof *Assume that f is totally T^*-Ig-continuous. Let B be any Ig-open set in Y, then $f^{-1}(B)$ is T^*-Ig-clopen set in X. Since every Ig-open is T^*-Ig-open, B is T^*-Ig-open , By remark 2.1, $f^{-1}(B)$ is T^*-Ig-closed set in X. Therefore f is contra T^*-Ig-irresolute.*

The converse of the a bove proposition need not be true as the following example shows.

Example 3.22 *Let X={a,b,c};T={$\tilde{\emptyset}$, $\tilde{X}, A, B, C$ } $where\ A =< x, \{a, b\}, \{c\} >, B =< x, \{b, c\}, \{a\} > and\ C =< x, \{b\}, \{a, c\} >$. Let Y={1,2,3}; $\Psi = \{\tilde{\emptyset}, \tilde{Y}, D, E\} where\ D =< y, \{1,3\}, \emptyset >$ and $E =< y, \{1\}, \{2\} >$. $Define\ a\ mapping\ f: X \to Y$ by f(a)=f(c)=3 and f(b)=2. Let F= $\langle y, \{3\}, \{2\}\rangle$ is $T^* -$Ig-open set in Y,then $f^{-1}(F) = \langle x, \{a, c\}, \{b\}\rangle$ is $T^* -$Ig-closed set in X, since the only T^* in X that contain X only .So f is contra T^*-Ig-irresolute , but not totally T^*-Ig-continuous , since F is Ig-open set in Y.Then $f^{-1}(F)$ is asubset T^* in X is $\bar{C}$ then $I\ cl^* f^{-1}(F) = X \subsetneq \bar{C}$ .So is T^*-Ig-closed . But not T^*-Ig-open set .*

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I end this section by the following remark .

Remark 3.23 *The notions contra T^*-Ig-irresolute function and T^*-Ig-irresolute function in ITS are independent notions. The following examples show the cases.*

Example 3.24 *Let X={a,b,c};T={$\widetilde{\emptyset}$, $\tilde{X}, A , B, C\}$ where $A =< x, \{a, b\}, \{c\} >, B =< x, \{b, c\}, \{a\} >$ and $C =< x, \{b\}, \{a, c\} >$. Let Y={1,2,3}; $\Psi = \{\widetilde{\emptyset} , \tilde{Y}, D, E, F\}$ where $D =< y, \{1,3\}, \emptyset >, E =< y, \{2,3\}, \{1\} >$ and $F =< y, \{3\}, \{1\} >$. Define a mapping $f: X \to Y$ by f(a)=f(c)=1and f(b)=3 .I can see that f is T^*-Ig-irresolute , Let $H =< y, \{1\}, \{3\} >$ is T^*-Ig-closed set in Y. Since the only T^* in Y that contain H is D, then $I\ cl^*$ H=H ⊆ D, then $f^{-1}\ (H) = \langle x, \{a, c\}, \{b\}\rangle \subseteq X$ only. But is not T^*-Ig-open set in Y, so f is not contra T^*-Ig-irresolute .*

Example 3.25 *Recall example 3.14 it is clear that f is contra T^*-Ig-irresolute, but not T^*-Ig-irresolute, Since C is T^*-Ig-open set in Y . But is not T^*-Ig-closed set in Y .*

IV-Perfectly contraT*-intuitionistic generalized irresolute map an Intuitionistic topological spaces

In this section ,I introduce a new class of maps called perfectly contra T^*-intuitionistic generalized irresolute maps which is included in the class of contra T^*-Ig-irresolute maps . I investigate some basic properties also . And I introduce a new kind of a map forms of intuitionistic irresolute maps and intuitionistic topological spaces namely perfectly contra Ig-irresolute(resp. perfectly contra Igs-irresolute, perfectly contra Ipsg-irresolute, perfectly contra Igps-irresolue, perfectly contra Igsp-irresolute and perfectly contra Isg-irresolute). And illustrate the relation a mong other kinds of perfectly contra T^*- intuitionistic generalized irresolute maps an intuitionistic topological spaces. As well as I give counter example for not true implications.

I start this section by the following definitions.

Definition 4.1 *A map $f: (X, T) \to (Y, \tau)$, where (X, T) and (Y, τ) are ITS is called perfectly T^*- intuitionistic generalized-irresolute (perfectly T^* -Ig-irresolute) if the inverse image of every T^*-Ig-closed set in Y is both T^*-Ig-open and T^*-Ig-closed set in X.*

Definition 4.2 *A map $f:(X,T)\to(Y,\tau)$, where (X,T) and (Y,τ) are ITS is called perfectly contra T^*- intuitionistic-irresolute (perfectly contra T^*-irresolute) if the inverse image of every T^*-Iopen set in Y is both T^*-Iopen and T^*-Iclosed set in X.*

Definition 4.3 *A map $f:(X,T)\to(Y,\tau)$, where (X,T) and (Y,τ) are ITS is called perfectly contra generalized-irresolute (resp. perfectly contra Igs-irresolute, perfectly contra Isg-irresolute, perfectly contra Ipsg-irresolute , perfectly contra Igps-irresolute, and perfectly contra Igsp-irresolute) function if $f^{-1}(V)$ is both Ig-closed and Ig-open (resp. Igs-closed and Igs-open,Isg-closed and Isg-open , Ipsg-closed and Ipsg-open , Igps-closed and Igps-open , Igsp-closed and Igsp-open) set in X for every Ig-open (resp. Igs-open , Isg-open , Ipsg-open , Igps-open and Igsp-open) set V in Y.*

Next Iam going to generalize the definition of perfectly contra T^*-Ig-irresolute for ITS.

Definition 4.4 *A map $f:(X,T)\to(Y,\tau)$, where (X,T) and (Y,τ) are ITS is called perfectly contra T^*- intuitionistic generalized-irresolute (perfectly contra T^*-Ig-irresolute) if the inverse image of every T^*-Ig-open set in Y is both T^*-Ig-open and T^*-Ig-closed set in X.*

In the following proposition there is characterization an intuitionistic perfectly contra T^*-Ig-irresolute function.

Proposition 4.5 *Amap $f:X\to Y$from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is perfectly contra T^*-Ig-irresolute if and only if the inverse image of every T^*-Ig-open set in Y is both T^*-Ig-closed and T^*-Ig-open in X.*

Proof *Assume that f is perfectly contra T^*-Ig-irresolute. Let A be any T^*-Ig-open set in Y,then A^c is T^*-Ig-closed set in Y.Since f is perfectly contra T^*-Ig-irresolute ,$f^{-1}(A^c)$ is both T^*-Ig-open and T^*-Ig-closed set in X. But $f^{-1}(A^c)=(f^{-1}(A))^c$ and so $f^{-1}(A)$ is both T^*-Ig-open and T^*-Ig-closed set in X.*

Assume that the inverse image of every T^*-Ig-open set in Y is both T^*-Ig-open and T^*-Ig-closed, set in X. Let V be any T^*-Ig-closed set in Y, then V^c is T^*-Ig-open set in Y. By assumption , $f^{-1}(V^c)=(f^{-1}(V))^c$ and so $f^{-1}(V)$ is both T^*-Ig-open and T^*-Ig-closed set in X . Therefore f is perfectly contra T^*-Ig-irresolute .

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The following proposition puts a necessary condition on perfectly contra T^*-Ig-irresolute to be contra T^*-Ig-irresolute .

Proposition 4.6 *Amapping $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is perfectly contra T^*-Ig-irresolute then f is contra T^*-Ig-irresolute.*

Proof *Assume that f is perfectly contra T^*-Ig-irresolute . Let A be any T^*-Ig-open set in Y, since f is perfectly contra T^*-Ig-irresolute , $f^{-1}(A)$ is T^*-Ig-closed set in X . Therefore f is contra T^*-Ig-irresolute .*

The converse of proposition is not true in general as the following example shows.

Example 4.7 *Recall example 3.22 I can see that f is contra T^*-Ig-irresolute, but not perfectly contra T^*-Ig-irresolute. Becouse $f^{-1}(F) = \langle x, \{a, c\}, \{b\} \rangle$ is $T^* -$Ig-closed set in X, but not T^*-Ig-open set .*

The following proposition gives simple relation between perfectly contra Ig-irresolute and perfectly contra T^*-Ig-irresolute.

Proposition 4.8 *If $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is perfectly contra Ig-irresolute then it is perfectly contra T^*-Ig-irresolute.*

Proof *Let $f: X \to Y$ be perfectly contra Ig-irresolute . Let A be any Ig-open set in Y,then $f^{-1}(A)$ is both Ig-closed and Ig-open set in X .Since every Ig-open is $T^* -$Ig-open set , A is $T^* -$Ig-open set in Y. By , remark 2.1, $f^{-1}(A)$ is T^*-Ig-open and T^*-Ig-closed set in X. Therefore f is perfectly contra T^*- Ig-irresolute .*

The converse of proposition is not true in general as the following example shows.

Example 4.9 *Recall example 3.12 since B=$f^{-1}(C)$= $\langle x, \{3\}, \emptyset \rangle \notin$ Ig-closed set in X, so f is not perfectly contra Ig-irresolute. But f is perfectly contra T^*- Ig-irresolute.*

The following result I prove that perfectly contra Ig-irresolute gives contra T^*-Ig-continuous.

Proposition 4.10 *Amapping $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is perfectly contra Ig-irresolute then it is contra T^*-Ig-continuous.*

Proof *Let $f: X \to Y$ be perfectly contra Ig-irresolute map. Let B be any Ig-open set in Y. Since f is perfectly contra Ig-irresolute ,then $f^{-1}(B)$ is*

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both Ig-closed and Ig-open set in X . By remark 2.1, $f^{-1}(B)$ is T^*-Ig-closed set in X . Hence f is contra T^*-Ig- continuous .

The converse of the a bove proposition need not be true as the following example shows.

Example 4.11 *Recall example 3.22 show that f is contra T^*-Ig-continuous ,but not perfectly contra Ig-irresolute. Since F=$\langle y,\{3\},\{2\}\rangle$ is Ig-open set in Y,then $f^{-1}(F)$= $\langle x,\{a,c\},\{b\}\rangle$ is not Ig-open set in X.So f is not perfectly contra Ig-irresolute.*

The following result I prove that is perfectly contra T^*-irresolute gives perfectly contra T^*- Ig-irresolute.

Proposition 4.12 *Amapping $f: X \to Y$ from an intuitionistic topological space (X, T^*) in to an intuitionistic topological space (Y, τ^*) is perfectly contra T^*-irresolute then it is perfectly contra T^*- Ig-irresolute.*

Proof *Let $f: X \to Y$ be perfectly contra T^*-irresolute. Let A be any T^*-Iopen set in Y. Since f is perfectly contra T^*-irresolute , then $f^{-1}(A)$ is both T^*-Iclosed and T^*-Iopen set in X . By remark 2.1 , $f^{-1}(A)$ is both T^*-Ig-closed and T^*-Ig-open set in X. Hence f is perfectly contra T^*-Ig-irresolute .*

However the converse is not true as shown by the following example.

Example 4.13 *Recall example 3.9 it clear that f is perfectly contra T^*-Ig-irresolute, Since F=$\langle y,\{2\},\{3\}\rangle$ is T^*-Ig-open set in Y,then $f^{-1}(F)$= $\langle x,\{b,c\},\emptyset\rangle$ is T^*-Ig-open and T^*-Ig-closed set in X. But f is not perfectly contra T^*-irresolute , becouse $F \subseteq T^*$ -Iopen set in Y and $f^{-1}(F)$ is not T^*-Iclosed and not T^*-Iopen set in X .*

Remark 4.14 *The following example shows that perfectly contra T^*-Ig-irresolute map in ITS is independent from perfectly contra (Isp.irresolute, Isg-irresolute, Isemi-irresolute ,Ipre-irresolute , Igs-irresolute, Igsp-irresolute Ipsg-irresolute and Igps-irresolute) maps.*

I conclude from this example that :

1) f is perfectly contra T^*-Ig- irresolute , but not perfectly contra Igs-irresolute .

2) f is perfectly contra T^*-Ig- irresolute, but not perfectly contra Isg-irresolute .

3) f is perfectly contra T^*-Ig- irresolute, but not perfectly contra Ipsg-irresolute .

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4) f is perfectly contra T^{*}-Ig- irresolute, but not perfectly contra Igps-irresolute .
5) f is perfectly contra T^{*}-Ig- irresolute, but not perfectly contra Igsp-irresolute .
6) f is perfectly contra T^{*}-Ig- irresolute, but not perfectly contra Isemi-irresolute .

Example 4.15 *Recall example 3.12 I can see that f is perfectly contra T^{*}-Ig- irresolute , but f is not perfectly contra Igs-irresolute (resp. perfectly contra Isg-irresolute, perfectly contra Ipsg-irresolute, perfectly contra Igps –irresolute , perfectly contra Igsp-irresolute and perfectly contra Isemi-irresolute).Since C is Igs-open (resp. Isg-open , Ipsg-open , Igps-open , Igsp-open and Isemi-open) set in Y,then* $B = f^{-1}(C) = \langle x, \{3\}, \emptyset \rangle$ *is not Igs-closed (resp. Isg-closed, Ipsg-closed, Igps-closed, Igsp-closed and Isemi-closed)set in X .*
Recall example 3.22 it clear that f is perfectly contra Igs-irresolute , but not perfectly contra T^{*}-Ig-irresolute .

Example 4.16 *Recall example 3.14 I can get the following :*
1) f is perfectly contra T^{*}-Ig- irresolute , but not perfectly contra Isp-irresolute .
2) f is perfectly contra T^{*}-Ig- irresolute, but not perfectly contra Ipre-irresolute .
It clear that f is perfectly contra T^{*}-Ig- irresolute, but f is not perfectly contra Isp-irresolute and perfectly contra Ipre-irresolute .Since ISPOX and IPOX in X, then Iint IclIint B =X $\subsetneq$ B and Icl Iint B= X $\subsetneq$ B.

I show in this example that there is afunction f such that :
1) f is perfectly contra Igsp-irresolute , but not perfectly contra T^{*}-Ig-irresolute.
2) f is perfectly contra Isp-irresolute , but not perfectly contra T^{*}-Ig-irresolute.

Example 4.17 *Recall example 3.15 from all above and definition of perfectly contra Igsp-irresolute and perfectly contra Isp-irresolute function that f is perfectly contra Igsp-irresolute and perfectly contra Isp-irresolute , f is not perfectly contra T^{*}-Ig- irresolute, since E is T^{*}-Ig-open set in Y . But its inverse image is not T^{*}-Ig-closed set in X .*

In the next example I show that :

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1) f is perfectly contra Isg-irresolute , but not perfectly contra T^*-Ig-irresolute.
2) f is perfectly contra Ipsg-irresolute , but not perfectly contra T^*-Ig-irresolute.
3) f is perfectly contra Igps-irresolute , but not perfectly contra T^*-Ig-irresolute.

Example 4.18 *Recall example 3.18 I can see that f is perfectly contra Isg-irresolute, perfectly contra Ipsg-irresolute and perfectly contra Igps-irresolute function. Since $P_4 = \langle y, \emptyset, \{2,3\}\rangle$ is Isg-open , Ipsg-open and Igps-open set in Y,then $\overline{Z}_1 = f^{-1}(P_4) = \langle x, \emptyset, \{c\}\rangle$ is Isg-closed , Ipsg-closed and Igps-closed set in X . But f is not perfectly contra T^*-Ig-irresolute.*

The following example shows that there is a perfectly contra Isemi-irresolute function , which is not perfectly contra T^*-Ig-irresolute function .

Example 4.19 *Let X={a,b,c};T={$\widetilde{\emptyset}$, $\tilde{X}, A, B, C$ } where $A =< x, \{c\}, \{a, b\} >$, $B =< x, \{a\}, \{b, c\} >$ and $C =< x, \{a, c\}, \{b\} >$. Let Y={1,2,3}; $\Psi = \{\widetilde{\emptyset}, \tilde{Y}, D, E\}$ where $D =< y, \{1\}, \{2,3\} >$ and $E =< y, \{2,3\}, \{1\} >$. Define a mapping $f: X \to Y$ by f(a)=f(b)=3 and f(c)=1. ISOX=T ∪{R_1 ,R_2 ,R_3 , R_4 ,R_5 } where $R_1 = < x , \{c\}, \{a\} >$, $R_2 =< x, \{a, c\}, \emptyset >$, $R_3 = < x , \{b, c\}, \{a\} >$, $R_4 =< x, \{a\}, \{c\} >$ and $R_5 =< x, \{a, b\}, \{c\} >$. $ISOY = \Psi$. It is easily to satisfy that f is perfectly contra Isemi-irresolute , but f is not perfectly contra T^*-Ig-irresolute , since the only IOS in T^* of X , that contain $A = f^{-1}(D) = \langle x, \{c\}, \{a, b\}\rangle$ is A and C , but I cl^* $A = \langle x, \{c\}, \{a\}\rangle$ is not contained on A or C .*

In the following example I show perfectly contra Ipre -irresolute function , but not perfectly contra T^*-Ig-irresolute function .

Example 4.20 *Let X={a,b,c};T={$\widetilde{\emptyset}$, $\tilde{X}, A , B$} where $A =< x, \{a\}, \{b\} >$ and $B =< x, \{a, b\}, \emptyset, >$ Let Y={1,2,3}; $\Psi = \{\widetilde{\emptyset}, \tilde{Y}, C, D, E\}$ where $C =< y, \emptyset, \{1,3\} >$, $D =< y, \{1\}, \{2,3\} >$ and $E =< y, \{1\}, \{3\} >$. Define a mapping $f: X \to Y$ by f(a)=1 and f(b)=f(c)=3. IPOX=T ∪ $\{P_i\}_{i=1}^{16}$ where $P_1 = \langle x, \{a\}, \emptyset\rangle$; $P_2 = \langle x, \{a\}, \{c\}\rangle$; $P_3 = \langle x, \{a, b\}, \{c\}\rangle$; $P_4 = \langle x, \{a, c\}, \emptyset \rangle$; $P_5 = \langle x, \{c\}, \{a, b\} \rangle$; $P_6 = \langle x, \{b\}, \emptyset\rangle$; $P_7 = \langle x, \{a, c\}, \{b\}\rangle$; $P_8 = \langle x, \{a\}, \{b, c\}\rangle$; $P_9 = \langle x, \{b, c\}, \emptyset \rangle$; $P_{10} = \langle x, \{b, c\}, \{a\} \rangle$; $P_{11} = \langle x, \{c\}, \emptyset, \rangle$; $P_{12} = \langle x, \{c\}, \{a\}\rangle$; $P_{13} = \langle x, \{c\}, \{b\}\rangle$; $P_{14} = \langle x, \emptyset, \{b, c\}\rangle$; $P_{15} = \langle x, \emptyset, \{b\}\rangle$ and $P_{16} = \langle x, \emptyset, \{c\}\rangle$. IPOY= Ψ ∪ $\{Q_i\}_{i=1}^{5}$ where $Q_1 = \langle y, \{2\}, \emptyset\rangle$; $Q_2 = \langle y, \{2\}, \{3\}\rangle$; $Q_3 =$*

$\langle y,\{1,2\},\emptyset\rangle$; $Q_4=\langle y,\{1,2\},\{3\}\rangle$ and $Q_5=\langle y,\{2,3\},\emptyset\rangle$ .Let D is Ipre-open set in Y , then $P_8=f^{-1}(D)=<x,\{a\},\{b,c\}>$ is both Ipre-open and Ipre-closed set in X . So f is perfectly contra Ipre -irresolute , but not perfectly contra T^*-Ig-irresolute , because D is T^* −Ig-open set in Y,then $P_8\subseteq A$,B , P_8 and P_4 , I cl^* $P_8=\langle x,\{a,c\},\{b\}\rangle\subsetneq A,B$ and P_8.

The following result I prove that perfectly Ig -continuous gives perfectly contra T^*-Ig-irresolute .

Proposition 4.21 *Amapping $f:X\to Y$ from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is perfectly Ig-continuous then it is perfectly contra T^*- Ig-irresolute.*

Proof *Let $f:X\to Y$ be perfectly Ig-continuous . Let A be any Ig-open set in Y, then $f^{-1}(A)$ is both Iclosed and Iopen set in X . Since every Ig-open is T^*-Ig-open set , A is T^*-Ig-open set in Y. By remark 2.1 , $f^{-1}(A)$ is both T^*-Ig-closed and T^*-Ig-open set in X. Hence f is perfectly contra T^*-Ig-irresolute .*

However the converse is not true as shown by the following example.

Example 4.22 *Recall example 3.12 I can see that f is perfectly contra T^*-Ig-irresolute,but not perfectly Ig-continuous.Since C is Ig-open set in Y,then$B=f^{-1}(C)$is Iopen but not Iclosed set in X*

The following proposition puts a necessary condition on totally T^*-Ig-continuous to be perfectly contra T^*-Ig-irresolute .

Proposition 4.23 *Amapping $f:X\to Y$ from an intuitionistic topological space (X,T^*) in to an intuitionistic topological space (Y,τ^*) is totally T^*-Ig-continuous then f is perfectly contra T^*-Ig-irresolute.*

Proof *Assume that f is totally T^*-Ig-continuous .Let A be any Ig-open set in Y . By remark 2.1 , A is T^*-Ig-open set in Y. Since f is totally T^*-Ig-continuous , $f^{-1}(A)$ is T^*-Ig-clopen set in X . Therefore f is perfectly contra T^*-Ig-irresolute .*

The converse of proposition is not true in general as the following example shows.

Example 4.24 *Recall example 3.7 . I can see that f is perfectly contra T^*-Ig-irresolute , but not totally T^*-Ig-continuous .Since $\overline{C}=\langle y,\emptyset,\{a\}\rangle$ is not Ig-open set in Y.*

I end this section by the following remark .

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Remark 4.25 *The notions perfectly contra T^*-Ig-irresolute function and perfectly T^*-Ig-irresolute function in ITS are independent notions. The following examples show the cases.*

Example 4.26 *Recall example 3.14 it is clear that f is perfectly contra T^*-Ig-irresolute. Let C is T^*-Ig-open set in Y . then B=$f^{-1}(C) = \langle x,\{a\},\emptyset\rangle$ is T^*-Ig-closed and T^*-Ig-open set in X .But is not perfectly T^*-Ig-irresolute because C is not T^*-Ig-closed set in Y.Since the only T^* in Y that contain C is C , D and $Q_4 = \langle y,\{1,3\},\{2\}\rangle$,but I cl^* C= $\langle y,\{1,2\},\emptyset\rangle \subsetneq C, D$ and Q_4 .*

Example 4.27 *Let X={a,b,c};T={$\tilde{\emptyset}$, $\tilde{X}, A, B\}$ where $A =< x,\{c\},\{a,b\} >$ and $B =< x,\{c\},\emptyset >$ Let Y={1,2,3}; $\Psi = \{\tilde{\emptyset}, \tilde{Y}, D, E\}$ where $D =< y,\{1,3\},\emptyset >$ and $E =< y,\{1\},\{2\} >$ Define a mapping $f: X \to Y$ by f(a)=2 , f(b)=3 and f(a)=1 . I can see that f is perfectly T^*-Ig-irresolute , but not perfectly contra T^*-Ig-irresolute . Since $\overline{E} = \langle y,\{2\},\{1\}\rangle$ is T^*-Ig-closed set in Y. But is not T^*-Ig-open set in Y.*

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تعميم الدوال الغير قابلة للحل الحدسية العكسية من النمط - T^* وتعميم الدوال الغير قابلة للحل الحدسية العكسية ألتامة من النمط - T^* في الفضاءات التبولوجية الحدسية.

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في هذا البحث قدمت صنفاً جديداً من الدوال وهي تعميم الدوال الغيرقابلة للحل الحدسية العكسية من النمط - T^* في الفضاءات التبولوجية الحدسية وبعض خصائصها وعلاقاتها قد درست . من خلال هذا ألمفهوم قدمت صنفاً جديداً من الدوال هي تعميم الدوال الغير قابلة للحل الحدسية التامة من النمط - T^* في الفضاءات التبولوجية الحدسية . ايضاً قدمت عدة أنواع من هذه الدوال الغير قابلة للحل ودرست علاقتها مع بعضها وعلاقتها بالمفهوم الذي تم دراسته في هذا البحث.