Some Applications Of Generalized Pre Regular Sets In Intuitionistic Fuzzy Topological Spaces

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Abstract
In this paper ,we introduce Intuitionistic Generalized Pre Reqular Sets in an Intuitionistic topological spaces with some basic properties and some applications with counter examples .

1 –Introduction
One of the generalization of a generalized closed sets which was defined by [5],in this paper we defined the notion of an Intuitionistic Generalized Pre Reqular Sets (IGPRS, for short).it follows easily from definitions that every IGC set is an IGPRCS . In this paper we define and study the properties of Intuitionistic Generalized Pre Reqular Closed Set (IGPRCS ,for short) which is weaker from of the above mentioned generalizations .Moreover , in this paper we defined Intuitionistic Generalized Pre Reqular D-Sets of some separation axioms and IGPR $T_1/_2$ in an Intuitionistic topological Spaces.

2- Preliminaries :
We recall some definitions and results which are used in this pape

Definition:2-1[1]
Let X be anon empty fixed set . An Intuitionistic fuzzy set (IFS ,for short) A is an object having the form A= $<x, A_1, A_2>$, which A_1 and A_2 are subset of X and satisfying the following $A_1 \cap A2 = \emptyset$.

Definition : 2-2 [2]
An Intuitionistic fuzzy topology (IFT ,for short)on a nonempty set X is a family T containing $\tilde{\phi} =< x, \phi, X >$ and $\tilde{X} =< x, X, \phi >$ under finite intersection and arbitrary union.

In this case the pair (X , T) is called an Intutionistic fuzzy topological spaces (IFTS , for short) and each IFS in T is known as an intuitionstic fuzzy open set (IFOS , for short) in X . The complement $\overline{A}$ of an IFOS A in an IFTS (X , T) is called an Intutionistic fuzzy closed set (IFCS , for short) , in X .

Definition **:** 2-3[4]
let X be anon empty set and let the IFS's A and B be in the form A=$< x , A_1 , A_2 >$, B = $< x , B_1 , B_2 >$ and let { Ai : i$\in$I } be an arbitrary family of IFS's in X .Then

i. $A \subseteq B \Leftrightarrow A_1 \subseteq B_1 \wedge A_2 \supseteq B_2$;
ii. $A = B \Leftrightarrow A \subseteq B \wedge B \subseteq A$;
iii. $\overline{A} = < x , A_2 , A_1 >$;
iv. $\cup Ai = < x , \cup A_1^i , \cap A_2^i >$; $\cap A_i = < x , \cap A_1^i , \cup A_2^i >$;
v. FA $=< x , A_1 , A_1^c >$, SA = $< x , A_2^c , A_2 >$

Definition **: 2-4[1]**
Let (X,T) be an IFS ,then

i. $T_{0,1}$ ={FA : A= $< x , A_1 , A_2 > \in T$} ;
ii. $T_{0,2}$ ={SA : A= $< x , A_1 , A_2 > \in T$} ;
iii. T^* = {A_1 : A= $< x , A_1 , A_2 > \in T$} ;
iv. T^{**}={A_2: A= $< x , A_1 , A_2 > \in T$} ;

Are Intuitionistic topologies on X

Definition **: 2-5[1]**
Let A be an IFS , then the interior and closure of an IF'S A is defined by ;
Int $A = \cup\{G : G \in T, G \subseteq A\}$
$ClA = \cap\{k : k \in T, A \subseteq k\}$
And Pint A=A $\cap$ Int (CLA) , PCl A=A $\cup$ CL(Int A) .

Definition : 2-6 [5]
A subset A of an IFTS (X ,T) is called :
i. Intuitionistic Reqular Open Set (IROS , for short) if A = Int (CLA) and an Intuitionistic Reqular Closed Set (IRCS , for short) if A =CL(Int A) .
ii. Intuitionistic Pre Open Set(IPOS , for short) if A $\subseteq$ Int(ClA) and Intuitionistic Pre Closed Set(IPCS ,for short) if CL(IntA) $\subseteq$ A.
iii. Intuitionistic Generalized Closed Set (IGCS ,for short) if CLA $\subseteq$ U whenever A $\subseteq$ U and U is Open Set
iv. Intuitionistic Generalized Pre Closed Set (IGPCS ,for short) if PCLA $\subseteq$ U whenever A $\subseteq$ U and U is Open.

3- Basic Properties Of Generalized Pre Reqular Closed Set In Intuitionistic Topological Spaces .
We introduce the following definition

Definition **: 3-1**
A subset A of an IS (X,T) is called Intutionistic Reqular Closed Set (IGRCS ,for short) if PCL A $\subseteq$ U ,whenever A $\subseteq$ U and U is an Intuitionistic Reqular Open in (X,T).

Remark :3-2
The complement of IGPCS in X is called Intuitionistic Generalized Pre Open Set (IGPOS ,for short) .

Proposition : 3-3
Let (X,T) be an ITS , A is IGPROS in X if and only if for each reqular Closed Set F such that F $\subseteq$ A ,then F $\subseteq$ PintA
Proof :$\rightarrow$

Suppose that A is an IGPRO in X ,then A^c is an IGPRCS ,so for each IROS U in X ,$A^c \subseteq U$,then $PCLA^c \subseteq U$,put A^c =F and $U^c \subseteq$ PIntA .

←

Suppose that A is an IGPRCS in X ,then A is an IGPRO ,so for each F is IRCS in X and $F \subseteq A^c$,$F \subseteq PIntA^c$, put U =$PCLF^c$,then PCLA $\subseteq$ U

i.e for each A $\subseteq$ U ,PClA $\subseteq$ U .

Remark 3-4

i.Every Intuitionistic Closed Set(ICS ,for short) is an IGPRC Set ,but the converse is not true .

ii.Every Intuitionistic Open Set(IOS for short) is an IGPRO Set ,but the converse is not true .

Proof : i

Suppose that A is an ICS ,then for each IROS U ,A $\subseteq$ U ,but A =CLA so CLA $\subseteq$ U

Since ClA =CL(CLA) $\subseteq$ PCL(CLA) =PCLA ,so PCLA $\subseteq$ U so ais an IGPRC Set .

ii is the dual of i .

Example :3-5

Let X ={a,b,c} ,defined T by T ={ $\tilde{\phi}, \tilde{X}, A$ } where A =< x ,{a},{b,c}> so B =< x ,{c},{a,b}> ,is IGPRCS but not Closed Set , and C = < x ,{a,b},{c}> ,is IGPROS ,but not Open Set .

Proposition :3-6

If A is an IOS and IGPRCS ,then A is Pre Closed.

Proof :

Since A is an I open and IGPRCS ,then for all U is IGRO in X ,A $\subseteq$ U ,then PCLA $\subseteq$ U replacing U by A ,we have A $\subseteq$ U ,then PCLA $\subseteq$ A………………..©

Since PCLA=A $\cup$ CL(IntA) so A $\subseteq$ PCLA ………………….® From © and ® ,we get A =PCLA i.e A is Pre Closed Set .

Proposition : 3-7

If A is an IGPRCS in ITS (X,T) and A $\subseteq$ B $\subseteq$ PCLA ,then B is IGPRCS.

Proof :

For each U is IROS and B $\subseteq$ U ,we have to prove that PCLB $\subseteq$ U Suppose A is an IGPRCS ,then for each U is IROS in (X,T) ,A $\subseteq$ U ,then PCLA $\subseteq$ U ,but A $\subseteq$ B $\subseteq$ PCLA. Thus B $\subseteq$ PCLA ,and PCLB $\subseteq$ PCL(PCLA)=PCLA ,then PCLB $\subseteq$ PCLA $\subseteq$ U i.e B is IGPRCS .

Proposition : 3-8

i. Intersection of any family of IGPRCS is an IGPRCS .

ii. Any union of IGPROS is IGPROS .

Proof : i

Let A,B be two IGPRCS so for each U is an IROS in X ,A $\subseteq$ U ,then PCLA $\subseteq$ U ,and for each V is an IGPRCS in X ,B $\subseteq$ V ,then PCLB $\subseteq$ V ,so A $\cap$ B $\subseteq$ U $\cap$ V ,and PCL(A $\cap$ B) $\subseteq$ PCLA $\cap$ PCLB $\subseteq$ U $\cap$ V ,so A $\cap$ B is IGPRCS in X .

ii is the dual of i .

Proposition 3-9

Let (X,T) be an ITS ,then Every IGPCS is IGPRCS .

Proof :

Let A $\subseteq$ X be an IGPCS and A $\subseteq$ U ,where U is an IROS .Since every IROS is open and A is IGPCS ,PCLA $\subseteq$ U . Hence A is an IGPRCS .

Remark 3-10

The converse of the proposition 3-9 is not true in general ,and the following example shows this case .

Example 3-11

Let X ={a, b} and defined T ={ $\tilde{\phi}, \tilde{X}, A$,B} ,where A=< x ,{a},Ø> ,B =< x ,{a},{b}> .Then IGPO(X) =T $\cup$ {C,D,E} ,where C=< x ,Ø,Ø}> , D=< x ,{b},Ø> and E=< x ,Ø,{b}> ,so IGPC (x) ={ $\tilde{\phi}, \tilde{X}, A$,B,C,D,E } ,and IGPRC(X) =IGPC(X) $\cup$ {A,B} ,so A and B are IGPRC(X) ,but not IGPC(X) .

4– Ntutionistic Fuzzy Generalalized Pre Regular –D Sets And Associated Separation Axioms

In this section we recall the definitions of GPR-Di spaces where

i =0,1,2 which are some applications Of Intutionistic fuzzy Generalized Pre Reqular Sets .

Definition:4-1

A subset A of an IFTS X is called an IGPR-D set if there exists U and V are two IGPRO(X,T) such that U ≠X and A =U-V .

Observe that every IGPROS U different from X is an IGPR-D set if A =U and V=Ø

Definition : 4-2_ A sub set A of an IFTS (X,T) is called :

i. IGPR-D_0 set (IGPR-T_0set) if for any distinct pair of points x and y there exist an IGPR-D set(IGPRO set) of X containing x but not y or an IGPR-D set(IGPRO set) of X containing y but not x .

ii.IGPR-D_1set(IGPR-T_1 set) if for any distinct pair of points x and y there exist an GPR-D set(IGPRO set) of X containing x but not y and an IGPR-D set(IGPRO set) of X containing y but not x .

iii.IGPR-D_2 set(IGPR-T_2 set) if for any distinct pair of points x and y of X ,there exists disjoint IGPR-D set (IGPRO set) U and V of X containing x and y ,respectively .

Remark : 4-3

i.If (X,T) is an IGPR-Ti , then its an IGPR-Di ,where i=$_{1,2}$

ii.If (X,T) is an IGPR-Di ,then it is an IGPR-Di-$_1$,where i =$_{1,2}$

Theorem : 4-4

For an ITS (X,T) ,the following statements hold :

i.An ITS (X,T) is an IGPR-T_0 if and only if it is an IGPR-D_0 .
ii.An ITS (X,T) is an IGPR-D_2 if and only it if is an IGPR-D_1 .
Proof :

the sufficiency ,let (X ,T) be an IGPR-D_0 ,then for each Distinct pair x , y ∈X ,at least one of x , y ,say x belongs to an IGPR-D set $U=<x,U_1,U_2>$,where y ∈U ,let U =G1/G2 ,such that G1≠X and G1 ,G2 belongs to an IGPR-D(X,T) ,then x ∈G1 .For y∉U ,so either y∈G1 or y∉G1,then if y∉ $G1$ so $x \in G_1$ and y∈ G_2 ,but $x \notin G_2$.Hence (X,T)is an IGPR-T0 .

The sufficiency is stated in remark 4-3 i

ii by i

Remark : 4-5

If an ITS(X,T) is an IGPR-T0 ,then its not an IGPR-D1 ,so the following example show this case .

Example : 4-6

Let X={1,2} be an IS,defined T by T ={$\tilde{\phi},\tilde{X},A$} ,where A=< x ,{2},{1}> ,then IGPRO(X) ={$\tilde{\phi},\tilde{X},A$,B,C,D,E} ,where B=< x ,Ø,Ø}> ,C =< x ,{1},Ø >, D =< x ,Ø,{1}>, E =< x ,{2},Ø> ,so IGPR-D(x)= {$\tilde{\phi},\tilde{X},A$,B,D,G,H } ,where G=< x ,Ø,{2}> ,H = C =< x ,{3},{2} > ,clearly the space (X,T) is an IGPR-T0 ,but not an IGPR-D1 .

Theorem : 4-7

An ITS (X,T) is an IGPR-T0 if and only for each pair of distinct points x and y of X ,PCL({x}) ≠PCL({y}).

Proof :→

Let (X,T) be an IGPR-T0 ,so there exists x, y ∈X , x ≠y and x ∈G = < x ,G_1, G_2> ,and y∉G,where G is an IGPRO set in (X,T) ,then G^c =< x ,G2,G1>,be an IGPRC set which x ∉G^c and y ∈ G^c .since PCL({y}) is the smallest IGPRCS containing y ,so PCL({y}) ⊆ G^c and there for x ∉ PCL({y}) .Hence PCL({y}) ≠ PCL({x }) ←

suppose that x,y ∈ X and PCL({y}) ≠ PCL({x }) and let z∈X,such that z∈ PCL({x }) so x∉ PCL({y}) . for if x ∈PCL({y}) ,then PCL({x}) ⊆ PCL({y}),which is contradiction, that is z ∉PCL({y}) ,so x ∈IGPROS ,so z∈$(PCL\{y\})^c$ to which y does not belong .

Theorem : 4-8

An ITS (X,T) is an IGPR-D_1 if and only if the singletons are IGPRCS .

Proof :

Let (X,T) be an IGPR-D_1 ,and x be any point of X ,and suppose that y∈{ x $\}^c$ .since (X,T)is an IGPR-D_1 ,so there exist two IGORO(X,T) ,U =< x,U_1,U_2> and V=< y,V_1,V_2> ,such that y ∈ V,but x ∉V .Since y ∈V⊆{ x $\}^c$,i.e { x $\}^c$ =∪{V|y∈{ x $\}^c$} Which is an IGPRO sets so { x } is an IGPRC set .

Conversely ,suppose {p},{z} are an IGPRCS ,for every p=< x,{p},$\{p\}^c$>,z=< x,{z},$\{z\}^c$> ∈X ,so $\{p\}^c$ and $\{z\}^c$ be an IGPRO in(X,T) ,such that p∉$\{p\}^c$,p∈$\{z\}^c$ and z∉$\{z\}^c$, z∈$\{p\}^c$,so (X,T) is an IGPR-D1 spaces .

Theorem : 4-9

If (X,T) be an ITS ,then the following are equivalent :
i. (X,T) is IGPR-D_1 ;
ii.(X,T*) is IGPR-D_1 ;
iii.(X,$T_{0,1}$) is IGPR-D_1

Proof :i→ii

Let x,y ∈X s.t x ≠y ,then there exist two IGPRO sets say U_x=< x,U_1,U_2> and V_y=< y,V_1,V_2> in (X,T) s.t x ∈ U_x and y ∈ V_y.and x ∉V_y ,y∉U_x thus x in U_1 and not in V_1 and y in V_1 not in U_1 ,therefore (X,T*)is IGPR-D_1 .

ii→iii

Since (X,T*) is IGPR-D_1 so there exist x, y ∈X s.t x ≠y and two IGPROS say {U1 :U_x=< x,U_1,U_2>} and { V_1 :V_y=< y,V_1,V_2>} and x inU_1 not in V_1 and y in V_1 not in U_1 ,so x in U_1 and x ∉U_1^c and y in V_1 ,y ∉V_1^c thus x ∈FU_x ,y∈FV_y ,x ∉FV_y and y∉FU_x ,so(X,$T_{0,1}$) is IGPR-

iii→i

let x,y ∈X such that x ≠y ,then there exist two IGPRO sets in (X,$T_{0,1}$) say FU_x=< x,A_1,A_1^c> and FV_y=< y,v_1,v_1^c> s.t x ∈FU_x ,y∈FV_y ,x ∉ FV_y

and $y \notin FU_x$ .Thus $x \in A_1$ and $x \notin A_1^c$ and $y \in v_1$ and $y \notin v_1^c$,also $x \notin v_1$,$y \notin A_1$.Since $U_x=< x, A_1, A_2>$ and $V_y=<y, v_1, v_2>$Then $x \in A_1$ and $x \notin A_2$,so $x \in U_x$,$x \notin FV_y$ implies that $x \notin v_1$ or $x \in v_1^c$.

If $x \notin v_1$,then $x \in v_2$,therefore $x \notin V_y$ and if $x \in v_1^c$,then $x \notin v_1$.

Since $v_1 \cap v_2=\emptyset$, so $x \in v_2$ .Thus $x \notin v_y$.

Similarly $y \in v_y$ and $x \notin v_y$,therefore (X,T) is IGPR-D_1.

Proposition : 4-10

Let (X,T) be an IGPR-D_1 ,then :

i.$(X,T_{0,2})$ is an IGPR-D_1 ;

ii.(X,T^{**}) is an IGPR-D_1

Proof :

Let (X,T) be an IGPR-D_1 and let x ,$y \in X$ and $x \neq y$,then there exists $U_x=< x, u_1, u_2>$ and $V_y=< y, v_1, v_2>$ are two IGPRO(X,T) s.t $x \in U_x$,$y \in V_y$,$x \notin V_y$ and $y \notin U_x$ .Thus $x \in u_1$ and $x \notin u_2$ and $y \in v_1$ and $y \notin v_2$, also $x \notin v_1$,$y \notin u_1$ .Since $Su_x =< x, u2^c, u2>$ and $Sv_y=<y, v_2^c, v_2>$,so $x \in u_2^c$ and $y \in v_2^c$,thus $x \in Su_x$ and $y \in Sv_y$ .Similarly $y \notin Su_x$ and $x \notin Sv_y$ Therefore $(X,T_{0,2})$ is IGPR–D_1 .

In similar way we can prove ii .

Remark : 4-11

The converse of proposition 4-10 is not true in general .The following example show the case .

Example : 4-12

Let X={a,b} and defined T={$\tilde{\phi}, \tilde{X}, A$,B} ,where B=< x ,Ø,{b}> ,A=< x ,{a},{b}> and the IGPRO(X) =T $\cup$ {C,D,$\bar{D}$} ,where C=< x ,Ø,Ø> ,D=< x ,Ø,{a}> and $\bar{D}$ =< x ,{a},Ø> ,then T**={Ø,X,{a},{b}} ,so (X,T**)is IGPR-D_1 ,but (X,T)is not . Also $T_{0,2}$={$\tilde{\phi}, \tilde{X}, A$,$\bar{A}$} ,is IGPR-$D_1$.

Proposition : 4-13

Let (X,T) be IGPR-D_2 ,then :

i.$(X,T_{0,1})$ is an IGPR-D_2 ;

ii.(X,T*) is an IGPR-D_2 ;

iii.$(X,T_{0,2})$ is an IGPR-D_2 ;

iv.(X,T**) is an IGPR-D_2

Proof : direct

Remark : 4-14

The converse of proposition 4-13 is not true in general ,the following examples show the cases .

Example : 4-15

i. Let X ={a , b} and defined T={$\tilde{\phi}, \tilde{X}, A$,B,C,D} ,where A=< x {a},Ø> , B=< x ,{b},Ø> ,C=< x ,{a},{b}> ,and D=< x ,Ø,Ø> . Hence an IGPRO(X) =T .Then the ITS$(X,T_{0,1})$,where $T_{0,1}$= {Ø˜,X˜,C,$\bar{C}$} and T_1= {Ø,X,{a},{b}} are IGPR–D_2 ,but (X,T) is not .

ii. Let X ={a , b} and defined T={$\tilde{\phi}, \tilde{X}, A$,B} ,where A =< x ,{a},{b}> , B =< x ,Ø,{b}> .Then the IGPRO(X) =T $\cup$ {C,D,$\bar{D}$} ,where C=< x ,Ø,Ø> and D =< x ,Ø,{a}> so T**={Ø,X,{a},{b}} and $T_{0,2}$ ={$\tilde{\phi}, \tilde{X}, A$,$\bar{A}$} ,are an IGPR-$D_2$,but (X,T) is not .

Proposition : 4-16

Let (X,T) be an ITS ,such that $(X,T_{0,1})((X,T_{0,2}))$ is an IGPR-D_2 ,then (X,T) is An IGPR-D_2 .

Proof :

Let $(X,T_{0,1})$ be an IGPR-D_2 ,then for each x, y in X and $x \neq y$,there exist A =< x ,A_1,A_2> and B =<y,B_1,B_2> in IGPR-D_2 ,such that $x \in FA$ and $y \in FB$ and $FA \cap FB=\emptyset$,so $x \in A$ and $y \in B$ and $A \cap B=$Ø˜ i,e (X,T) is IGPR-D_2 .

Similarly we can prove (X,T) is IGPR-D_2 ,when $(X,T_{0,2})$ is an IGPR-D_2 .

Proposition : 4-17

Let (X,T) be an IGPR-D_2 such that (X,T*),((X,T**)) is an IGPR-D_2 ,then (X,T) is an IGPR-D_2 .

Proof :

Let (X,T*) be an IGPR-D_2 ,then for each x , $y \in X$,there exist $U_x=< x, u_1, u_2>$ and $V_y=< y, v_1, v_2>$ are two IGPRO(X,T) s.t $x \in u_1$,$y \in v_1$ and $u_1 \cap v_1=\emptyset$,so $x \in U$ and $y \in V$ and $U \cap V=$Ø˜ i.e (X,T) is an IGPR-D_2 .

To prove (X,T) is an IGPR-D_2 ,when (X,T**) is an IGPR-D_2 ,let x, $y \in X$ and $x \neq y$,so There exist $U_x=< x, u_1, u_2>$ and $V_y=< x, v_1, v_2> \in$IGPR(X) s.t $x \in u_2^c$,$y \in v_2^c$ and $u_2^c \cap v_2^c=\emptyset$,then $u_2 \cup v_2=X$ and we have $u_1 \cap u_2=\emptyset$ and $v_1 \cap v_2=\emptyset$,then $((u_1 \cap u_2) \cap v_1)) \cup ((u_1 \cap u_2) \cap v_2))=\emptyset$,from this we can use set theory operation to get $u_1 \cap v_1=\emptyset$ so $U \cap V=$Ø˜ i.e (X,T) is an IGPR-D_2 .

Remark : 4-18

An IGPR-D_2 property is independent between (X,T*) and (X,T**) ,is showing by the examples .

Example : 4-19

i. Take the example 4-12 ,we see that (X,T**) is an IGPR-D_2 ,but (X,T*) is not .

ii. let X={a,b} and defined T={$\tilde{\phi},\tilde{X},A$,B,C,D} where A=< x {a},Ø> , B=< x ,{b},Ø> ,C=< x ,{a},{b}> ,and D=< x ,Ø,Ø> .Hence an IGPR(X) =T ,then T*={Ø,X,{a},{b} is an IGPR-D_2 ,but T**={Ø,X,{a}} is not .

Remark : 4-20

Every IGPR-D_2 spaces is an IGPR-D_1 spaces ,but the converse is not true in general , and the following example in 4-12 show this case .

5- Pre Reqular T½ Spaces

In this section we introduce another application of IGPRO sets namely Intuitionist Pre Reqular T½ Spaces .

Definition : 5-1

Let (X,T) be an ITS ,so its called Intuitionistic Pre Reqular T½ Space (IPR-T½ S for Short) , if every Intuitionistic Generalized Pre Reqular Closed Set is Intuitionistic pre Closed set .

Remark : 5-2

If A is an IGPRCS in (X,T) ,then PCLA-A does not contain any non empty Reqular Closed set .

Theorem : 5-3

For any ITS (X,T) ,X is Pre Reqular T½ if and only if every singleton of X is either Reqular closed or pre open .

Proof :→

Let x ∈X and suppose that { x}=< x,{ x},{ x}^{c}} is not reqular closed ,then X-{ x } is not reqular open and trivially generalized pre reqular closed ,but $\tilde{x} =< x, X , \phi >$ is pre reqular T½ so it is pre closed and thus { x } is pre open .

←

Let A =< x ,A_1,A_2> ,be generalized pre Reqular Closed and let x ∈PCLA ,we will Show that x ∈A i.e x ∈A_1 and x ∉A_2 ,so either the set {x} is pre open or reqular Closed,since x ∈PCLA so {x}∈PCLA thus x ∈A.

Remark :5-4

In any ITS (X,T) , IPO(X) ⊆ IGPRO(X) ,by an IGPRO(X) ,we mean the family of all IGPRO subset of the IS(X,T) .

Theorem : 5-5

An IS (X,T) is an Intuitionistic Pre Reqular T½ if and only if IPO (X)=IGPRO(X) .

Proof :→

Let A =< x ,A_1,A_2> be an Intuitionistic pre open set ,then A^c =< x ,A_2,A_1> is an I Pre closed Set so an IGPRC ,this implies A is an IGPRO . Hence an IPO(X) ⊆ IGPRO(X) .

← let IPO(X) =IGPRO(X)

Suppose A =< x ,A_1,A_2> be an IGPRCS ,then $\overline{A}$ =< x ,A_2,A_1> is an IGPROS .Hence $\overline{A}$ ∈ IPO(X) .Thus A is an IPCS ,so (X,T) is an I pre Reqular T½ space .

In the next paper we try to study the properties and relations between an I pre Reqular T½ and Intuitionistic Generalized Pre Regular with other kind of separation axioms .

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بعض التطبيقات للمجموعات المعممة المنتظمة أوليا في الفضاءات التبولوجية الحدسية

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الملخص

إن الهدف من هذا البحث هو دراسة المجموعات المعممة المنتظمة أوليا ودراسة بعض التطبيقات على هذه المجموعات وبعض الخواص والعلاقات بين هذه التطبيقات مع بعض الأمثلة التوضيحية.