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Intuitionistic Fuzzy G_δ-e-locally Function

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ABSTRACT
The purpose of this paper is introduce the concepts of an intuitionistic fuzzy G_δ-e-locally function, intuitionistic fuzzy strongly G_δ-e-locally function, intuitionistic fuzzy G_δ - e-locally homeomorphism, intuitionistic fuzzy G_δ-e-locally irresolute function, intuitionistic fuzzy G_δ-e-local T_2 space, intuitionistic fuzzy G_δ-e-local Urysohn space, intuitionistic fuzzy G_δ-e-local connected, intuitionistic fuzzy G_δ-e-local compact in intuitionistic fuzzy topological spaces. Also some interesting properties are established.

KEYWORDS AND PHRASES: intuitionistic fuzzy G_δ-e- locally function, intuitionistic fuzzy strongly G_δ-e- locally function, intuitionistic fuzzy G_δ-e-local homeomorphism, intuitionistic fuzzy G_δ-e-local connected, intuitionistic fuzzy G_δ-e-local compact.

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1 INTRODUCTION

The concept of fuzzy sets was introduced by Zadeh [12] and later Atanassov [1] generalized the idea to intuitionistic fuzzy sets. On the other hand, Coker [3] introduced the notions of an intuitionistic fuzzy topological spaces, intuitionistic fuzzy continuity and some other related concepts. The concept of an intuitionistic fuzzy e-closed set was introduced by Sobana et. al., [10]. Ganster and Relly used locally closed sets in[5] to define LC-continuity and LC-irresoluteness. Balasubramanian [2] introduced and studied the concept of fuzzy G_δ set in a fuzzy topological space. In this paper, the concepts of an intuitionistic fuzzy G_δ-e- locally function, intuitionistic fuzzy strongly G_δ-e-locally function, intuitionistic fuzzy G_δ-e-locally homeomorphism, intuitionistic fuzzy G_δ-e-locally irresolute function, intuitionistic fuzzy G_δ-e- local T_2 space, intuitionistic fuzzy G_δ-e- local Urysohn space, intuitionistic fuzzy G_δ-e- local connected, intuitionistic fuzzy G_δ-e- local compact are introduced and studied. Some interesting properties among these are discussed.

2 PRELIMINARIES

[1] Let X be a nonempty fixed set and I be the closed interval [0,1]. An intuitionistic fuzzy set (IFS) A is an object of the following form $A=\{\langle x,\mu_A(x),\gamma_A(x)\rangle : x\in X\}$ where the mapping $\mu_A: X\to I$ and $\gamma_A: X\to I$ denote the degree of membership (namely $\mu_A(x)$) and the degree of nonmembership (namely $\gamma_A(x)$) for each element $x\in X$ to the set A, respectively, and $0\le\mu_A(x)+\gamma_A(x)\le 1$ for each $x\in X$. Obviously, every fuzzy set A on a nonempty set X is an IFS of the following form, $A=\{\langle x,\mu_A(x),1-\mu_A(x)\rangle : x\in X\}$. For the sake of simplicity, we shall use the symbol $A=\langle x,\mu_A,\gamma_A\rangle$ for the intuitionistic fuzzy set $A=\{\langle x,\mu_A(x),\gamma_A(x)\rangle : x\in X\}$. [1]Let X be a nonempty set and the IFSs A and B in the form $A=\{\langle x,\mu_A(x),\gamma_A(x)\rangle : x\in X\}$, $B=\{\langle x,\mu_B(x),\gamma_B(x)\rangle : x\in X\}$. Then [(i)] $A\subseteq B$ if and only if $\mu_A(x)\le\mu_B(x)$ and $\gamma_A(x)\ge\gamma_B(x)$ for all $x\in X$;

[(ii)] $\overline{A}=\{\langle x,\gamma_A(x),\mu_A(x)\rangle : x\in X\}$ [(iii)] $A\cap B=\{\langle x,\mu_A(x)\wedge\mu_B(x),\gamma_A(x)\vee\gamma_B(x)\rangle : x\in X\}$; [(iv)] $A\cup B=\{\langle x,\mu_A(x)\vee\mu_B(x),\gamma_A(x)\wedge\gamma_B(x)\rangle : x\in X\}$;[1]The IFS's $0_\sim$ and $1_\sim$ are defined by , $0_\sim=\{\langle x,0,1\rangle : x\in X\}$ and $1_\sim=\{\langle x,1,0\rangle : x\in X\}$.[3] An intuitionistic fuzzy topology (IFT) in Coker's sense on a nonempty set X is a family T of intuitionistic fuzzy sets in X satisfying the following axioms: [(i)] $0_\sim,1_\sim\in T$; [(ii)] $G_1\cap G_2\in T$, for any $G_1,G_2\in T$; [(iii)] $\cup G_i\in T$ for arbitrary family $\{G_i : i\in J\}\subseteq T$.In this paper by (X,T) or simply by X we will denote the Coker's intuitionistic fuzzy topological space (IFTS). Each IFS which belongs to T is called an intuitionistic fuzzy open set (IFOS) in X. The complement $\overline{A}$ of an IFOS A in X is called an intuitionistic fuzzy closed set (IFCS) in X. [3] Let (X,T) be an IFTS and $A=\{\langle x,\mu_A,\nu_A\rangle : x\in X\}$ be an IFS in X. Then the intuitionistic fuzzy closure and intuitionistic fuzzy interior of A are defined by [(i)] $IFcl(A)=\bigcap\{C : C$ is an IFCS in X and $C\supseteq A\}$;[(ii)] $IFint(A)=\bigcup\{D : D$ is an IFOS in X and $D\subseteq A\}$; [1] For any IFS A in (X,T) we have [(i)] $cl(\overline{A})=\overline{int(A)}$ [(ii)] $int(\overline{A})=\overline{cl(A)}$ [3]Let A, $A_i(i\in J)$ be IFSs in X, B, $B_j(j\in K)$ IFSs in Y and $f : X\to Y$ a function. Then [(i)] $A\subseteq f^{-1}(f(A))$ (If f is injective, then $A=f^{-1}(f(A))$). [(ii)] $f(f^{-1}(B))\subseteq B$ (If f is surjective, then $f(f^{-1}(B))=B$). [(iii)] $f^{-1}(\cup B_j)=\cup f^{-1}(B_j)$. [(iv)] $f^{-1}(\cap B_j)=\cap f^{-1}(B_j)$. [(v)] $f^{-1}(1_\sim)=1_\sim$. [(vi)] $f^{-1}(0_\sim)=0_\sim$. [(vii)] $f^{-1}(\overline{B})=\overline{f^{-1}(B)}$. [4] Let X be a nonempty set and $x\in X$ a fixed element in X. If $r\in I_0$, $s\in I_1$ are fixed real numbers such that $r+s\leq 1$, then the IFS $x_{r,s}=\langle x,x_r,1-x_{1-s}\rangle$ is called and intuitionistic fuzzy point (IFP) in X, where r denotes the degree of membership of $x_{r,s}$, s denotes the degree of non membership of $x_{r,s}$ and $x\in X$ the support of $x_{r,s}$. The IFP $x_{r,s}$ is contained in the IFS $A(x_{r,s}\in A)$ if and only if $r<\mu_A(x)$, $s>\gamma_A(x)$. [6] An IFS U of an IFTS X is called [(i)]neighborhood of an IFP $c(a,b)$, if there exists an $IFOS G$ in X such that $c(a,b)\in G\leq U$. [(ii)] q-neighborhood of an IFP $c(a,b)$, if there exists an $IFOS G$ in X such that $c(a,b)qG\leq U$. [3] Let X and Y be two nonempty sets and $f : X\to Y$ be a function. [(i)]If $B=\{\langle y,\mu_B(y),\gamma_B(y)\rangle : y\in Y\}$ is an IFS in Y, then the preimage of B under f (denoted by $f^{-1}(B)$) is defined by $f^{-1}(B)=\{\langle x,f^{-1}(\mu_B)(x),f^{-1}(\gamma_B)(x)\rangle : x\in X\}$ [(ii)]If $A=\{\langle x,\lambda_A(x),\nu_A(x)\rangle : x\in X\}$ is an IFS in X, then the image of A under f (denoted by $f(A)$) is defined by $f(A)=\{\langle y,f(\lambda_A(y)),(1-f(1-\nu_A))(y)\rangle : \in X\}$. [11] Let A be IFS in an IFTS (X,T). A is called an [(i)] intuitionistic fuzzy regular open set (briefly IFROS)*if* A = intcl(A) IFRCS)*if* A = clint(A) [(ii)] intuitionistic fuzzy regular closed set (briefly IFRCS)*if* A = clint(A). [2] Let (X,T) be a fuzzy topological space and λ be a fuzzy set in X. λ is called G_δ set if $\lambda=\bigwedge_{i=1}^{\infty}\lambda_i$ where each $\lambda_i\in T$. The complement of fuzzy G_λ is fuzzy F_σ. [5] A subset A of a space (X,T) is called locally closed (briefly lc)*if* $A=C\cap D$, where C is open and D is closed in (X,T). [11] Let (X,T) be an IFTS and $A=\langle x,\mu_A(x),\nu_A(x)\rangle$ be a IFS in X. Then the fuzzy δ closure of A are denoted and defined by $cl_\delta(A)=\cap\{K : K$ is an IFRCS in X and $A\subseteq K\}$ and

$int_{\delta}(A) = \cup\{G : G$ is an IFROS in X and $G \subseteq A\}$. [10] Let A be an IFS in an IFTS(X,T). A is calledan intuitionistic fuzzy e-open set (IFeOS, for short) in X if $A \subseteq clint_{\delta}(A) \cup intcl_{\delta}(A)$ } [8]Let (X,T) be an intuitionistic fuzzy topological space. Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X,T). Then A is said to be intuitionistic fuzzy e - locally closed set (in short, IF-e-lcs)*if* $A = C \cap D$, where $C = \{\langle x, \mu_C(x), \gamma_C(x)\rangle : x \in X\}$ is an intuitionistic fuzzy e-open set and $D = \{\langle x, \mu_D(x), \gamma_D(x)\rangle : x \in X\}$ is an intuitionistic fuzzy e-closed set in (X,T).[8]Let (X,T) be an intuitionistic fuzzy topological space. Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space X. Then A is said to be an intuitionistic fuzzy eG_{δ}- set if

$$A = \bigcap_{i=1}^{\infty} A_i,$$

where $A_i = \{\langle x, \mu_{A_i}(x), \gamma_{A_i}(x)\rangle : x \in X\}$ is an intuitionistic fuzzy e-open set in an intuitionistic fuzzy topological space (X,T).

[8]Let (X,T) be an intuitionistic fuzzy topological`space Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X,T). Then A is said to be an intuitionistic fuzzy eG_{δ}-locally closed set (in short,IF-eG_{δ}-lcs)*if* A=C$\cap D$, where $C = \{\langle x, \mu_C(x), \gamma_C(x)\rangle : x \in X\}$ is an intuitionistic fuzzy eG_{δ} set and $D = \{\langle x, \mu_D(x), \gamma_D(x)\rangle : x \in X\}$ is an intuitionisitic fuzzy e-closed set in (X,T).The complement of an intuitionistic fuzzy eG_{δ}-locally closed set is said to be an intuitionistic fuzzy eG_{δ}-locally open set (in short, IFeG_{δ}-los). [8]Let (X,T) be an intuitionistic fuzzy topological space. Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X,T). Then A is said to be an intuitionistic fuzzy G_{δ}-e-locally closed set (in short,IFG_{δ}-e-lcs)*if* A=B$\cap C$, where $B = \{\langle x, \mu_B(x), \gamma_B(x)\rangle : x \in X\}$ is an intuitionistic fuzzy G_{δ} set and $C = \{\langle x, \mu_C(x), \gamma_C(x)\rangle : x \in X\}$ is an intuitionisitic fuzzy e-closed set in (X,T) The complement of an intuitionistic fuzzy G_{δ}-e-locally closed set is said to be an intuitionistic fuzzy G_{δ}-e-locally open set (in short, IFG_{δ}-e-los) [8]Let (X,T) be an intuitionistic fuzzy topological space. Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X,T). The intuitionistic fuzzy G_{δ}-e-locally closure of A is denoted and defined by IFG_{δ}-e-$lcl(A) = \bigcap\{B : B = \langle x, \mu_B(x), \gamma_B(x)\rangle : x \in X$ is an intuitionistic fuzzy G_{δ}-e-locally closed set in X and $A \subseteq B\}$.[8]Let (X,T) be an intuitionistic fuzzy topological space. Let $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X,T). The intuitionistic fuzzy G_{δ}-e-locally interior of A is denoted and defined by IFG_{δ}-e-$lint(A) = \bigcup\{B : B = \{\langle x, \mu_B(x), \gamma_B(x)\rangle : x \in X\}$ is an intuitionistic fuzzy G_{δ}-e-locally open set in X and $B \subseteq A$. [8] Let (X,T) be an intuitionistic fuzzy topological space. For any two intuitionistic fuzzy sets $A = \{\langle x, \mu_A(x), \gamma_A(x)\rangle : x \in X\}$ and $B = \{\langle x, \mu_B(x), \gamma_B(x)\rangle : x \in X\}$ of an intuitionistic fuzzy topological space (X,T) then the following statements are true. (i) $IFG_{\delta} - e - lcl(0) = 0$ (ii) $A \subseteq B \Rightarrow IFG_{\delta} - e - lcl(A) \subseteq IFG_{\delta} - e - lcl(B)$ (iii)

$IFG_\delta - e - lcl(IFG_\delta - e - lcl(A)) = IFG_\delta - e - lcl(A)$ (iv) $IFG_\delta - e - lcl(A \cup B) = (IFG_\delta - e - lcl(A)) \cup (IFG_\delta - e - lcl(B)$

[8] [(i)] IFG_δ- e-$lcl(A) = A$ if and only if A is an intuitionistic fuzzy G_δ-e-locally closed set [(ii)] IFG_δ-$lint(A) \subseteq A \subseteq IFG_\delta$-$e$-$lcl(A)$ [(iii)] IFG_δ-e-$lint(1_\sim) = 1_\sim$ [(iv)] IFG_δ-$lint(0_\sim) = 0_\sim$ [(v)] IFG_δ-e-$lcl(1_\sim) = 1_\sim$ [3]Let (X,T) and (Y,S) be two IFT's and let $f : X \to Y$ be a function. Then f is said to be intuitionistic fuzzy continuous iff the preimage of each IFS in S is an IFS in T. [10]Let (X,T) and (Y,S) be two IFT's and let $f : X \to Y$ be a function. Then f is said to be intuitionistic fuzzy e-continuous iff the preimage of each IFS in S is an IFeOS in T.

3 Intuitionistic fuzzy G_δ-e- locally function

DEFINITION. 3.1 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. Let $f : (X,T) \to (Y,S)$ be an intuitionistic fuzzy mapping. Then f is said to be an [(i)]intuitionistic fuzzy G_δ-e- locally function, if for each intuitionistic fuzzy closed set A in an intuitionistic fuzzy topological space $(X,T), f(A)$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Y,S). [(ii)]intuitionistic fuzzy strongly G_δ-e-locally function, if for each intuitionistic fuzzy G_δ-e-closed set A in an intuitionistic fuzzy topological space $(X,T), f(A)$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Y,S).

THEOREM.3.1 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. Let $f : (X,T) \to (Y,S)$ be an intuitionistic fuzzy mapping. Then the following statements are equivalent (i) f is an intuitionistic fuzzy G_δ-e-locally function(ii]foreach intuitionistic fuzzy set A of an intuitionistic fuzzy topological space (Y,S) and each intuitionistic fuzzy closed set B of an intuitionistic fuzzy topological space (X,T) with $f^{-1}(A) \subseteq B$, there is an intuitionistic fuzzy G_δ-e-locally closed set C of an intuitionistic fuzzy topological space (Y,S) with $A \subseteq C$ such that $f^{-1}(C) \subseteq B$. (iii) $f^{-1}(IFG_\delta$-e-$lcl(A)) \subseteq IFcl(f^{-1}(A))$,

for each intuitionistic fuzzy set A of an intuitionistic fuzzy topological space (Y,S). (iv) $f(IFint(B)) \subseteq IFG_\delta$-$e$-$lint(f(B))$, for each intuitionistic fuzzy set B of an intuitionistic fuzzy topological space (X,T).

Proof. (i)$\Rightarrow$(ii): Suppose f is an intuitionistic fuzzy G_δ-e-locally function. Let A be any intuitionistic fuzzy set A in an intuitionistic fuzzy topological space (Y,S). Let B be any intuitionistic fuzzy closed in an intuitionistic fuzzy topological space (X,T) such that $f^{-1}(A) \subseteq B$. Let $C = \overline{f(\bar{B})}$. Then C is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Y,S) and $A \subseteq C$. We have, $f^{-1}(C) = f^{-1}(\overline{f(\bar{B})}) = \overline{f^{-1}(f(\bar{B}))} \subseteq B$. Therefore, $f^{-1}(C) \subseteq B$.(ii)$\Rightarrow$(i): Let D be an intuitionistic fuzzy open set in an intuitionistic fuzzy topological space (X,T). Put $A = \overline{f(D)}$ and $B = \bar{D}$. Thus $f^{-1}(A) = f^{-1}(\overline{f(\bar{D})}) = \overline{f^{-1}(f(\bar{D}))} \subseteq \bar{D}$. By hypothesis, there exists an intuitionistic fuzzy topological space (Y,S) with $A \subseteq C$ such that $f^{-1}(C) \subseteq B = \bar{D}$. Then, $\overline{f^{-1}(C)} \supseteq D \Rightarrow D \subseteq f^{-1}(\bar{C})$. Hence, $f(D) \subseteq f(f^{-1}(\bar{C})) \subseteq \bar{C}$ (3.1) Also, since $A \subseteq C$, we have $\overline{f(D)} \subseteq C$. This implies $f(D) \supseteq \bar{C}$. (3.2) From (3.1) and (3.2), we get $f(D) = \bar{C}$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Y,S). Hence f is an intutionistic fuzzy G_δ-e-locally function.(ii)$\Rightarrow$ (iii): Let A be an intuitionistic

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fuzzy set in an intuitionistic fuzzy topological space (Y,S). Since $IFcl(f^{-1}(A))$ is an intuitionistic fuzzy closed set in an intuitionistic fuzzy topological space (X,T) with $f^{-1}(A) \subseteq IFcl(f^{-1}(A))$. Then by (ii), there is an intuitionistic fuzzy G_δ-e-locally closed set C in an intuitionistic fuzzy topological space (Y,S) with $A \subseteq C, f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A)) \subseteq IFG_\delta\text{-}e\text{-}lcl(C) \subseteq f^{-1}(C) \subseteq IFcl(f^{-1}(A))$.

Therefore, $f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A)) \subseteq IFcl(f^{-1}(A))$.(iii)$\Rightarrow$(iv): $f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A)) \subseteq IFcl(f^{-1}(A))$, for each intuitionistic fuzzy set A of an intuitionistic fuzzy topological space (Y,S).

Putting $A = \overline{f(B)}$, $f^{-1}(IFG_\delta\text{-}e\text{-}lcl(\overline{f(B)})) \subseteq IFcl(f^{-1}(\overline{f(B)}))) \subseteq$ $IFcl(f^{-1}(f(\bar{B}))) \subseteq IFcl(\bar{B}) \subseteq \overline{IFint(B)}$, .

$f^{-1}\overline{(IFG_\delta - e - lint(f(B)))} \subseteq \overline{IFint(B)}$

Taking complement on both sides, $\overline{f^{-1}\overline{(IFG_\delta - e - lint(f(B)))}} \subseteq \overline{\overline{IFint(B)}}$,

$f^{-1}(IFG_\delta - e - lint(f(B))) \supseteq IFint(B)$.

Therefore, $f(IFint(B)) \subseteq IFG_\delta\text{-}e\text{-}lint(f(B))$.(iv)$\Rightarrow$ (i): It is obvious.

DEFINITION.3.2 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. Let $f:(X,T) \to (Y,S)$ be an intuitionistic fuzzy mapping. Then f is said to be an intuitionistic fuzzy G_δ-e-locally homeomorphism if f is one to one, onto, intuitionistic fuzzy G_δ-e-locally irresolute function and intuitionistic fuzzy strongly G_δ-e-locally function.

THEOREM.3.2 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. If $f:(X,T) \to (Y,S)$ is an intuitionistic fuzzy G_δ-e-locally homeomorphism. Then the following statements are valid. (i)For any intuitionistic fuzzy set A in an intuitionistic fuzzy topological space (X,T), $IFG_\delta\text{-}e\text{-}lcl(f(A)) = f(IFG_\delta\text{-}e\text{-}lcl(A))$. (ii)For any intuitionistic fuzzy set A in an intuitionistic fuzzy topological space (X,T), $f(\overline{IFG_\delta 0e0lint((\bar{A}))}) = \overline{IFG_\delta 0e0lint(f(\bar{A}))}$
(iii)For any intuitionistic fuzzy set A in an intuitionistic fuzzy topological space (Y,S), $IFG_\delta\text{-}e\text{-}lcl(f^{-1}(A)) = f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A))$. (iv)For any intuitionistic fuzzy set A in an intuitionistic fuzzy topological space (Y,S),

$f^{-1}(\overline{IFG_\delta 0e0lint((\bar{A}))}) = \overline{IFG_\delta 0e0lint(f^{-1}(\bar{A}))}$

Proof. (i) Let A be any intuitionistic fuzzy set in an intuitionistic fuzzy topologial space (X,T). Since f is an intuitionistic fuzzy G_δ-e-locally irresolute function. By (ii) and (iii) of Theorem 3.5[9]

$f(IFG_\delta - e - lcl(A)) \subseteq IFG_\delta - e - lcl(f(A))$ (3.3)

$IFG_\delta - e - lcl(f(A)) \subseteq f(IFG_\delta - e - lcl((A))$ (3.4)

From (3.3) and (3.4) implies that $IFG_\delta\text{-}e\text{-}lcl(f(A)) = f(IFG_\delta\text{-}e\text{-}lcl((A))$.(ii) Let A be any intuitionistic fuzzy set in an intuitionistic fuzzy topological space (X,T). Since f is an intuitionistic fuzzy G_δ-e-locally homeomorphism. Then by above condition (ii), $IFG_\delta\text{-}e\text{-}lcl(f(A)) = f(IFG_\delta\text{-}e\text{-}lcl((A))$.Now,

$\overline{IFG_\delta - e - lint(\overline{f(A)})} = \overline{f(IFG_\delta - e - lint(\bar{A}))}$,

$f(\overline{IFG_\delta - e - lint(\bar{A})}) = \overline{IFG_\delta - e - lint(f(\bar{A}))}$.

(iii) Let A be any intuitionistic fuzzy set in an intuitionistic fuzzy topological space (Y,S). Since f is an intuitionistic fuzzy G_δ-e-locally homeomorphism. Since f is an intuitionistic fuzzy strongly G_δ-e-locally function. Also f^{-1} is an intuitionistic fuzzy G_δ-e-locally irresolute function. By (ii) and (iii) of Theorem 3.5[9]

$IFG_\delta - e - lcl(f^{-1}(A)) \subseteq f^{-1}(IFG_\delta - e - lcl(A))$ (3.5)

$f^{-1}(IFG_\delta - e - lcl(A)) \subseteq IFG_\delta - e - lcl(f^{-1}(A))$ (3.6)

From (3.5) and (3.6) implies that $IFG_\delta\text{-}e\text{-}lcl(f^{-1}(A)) = f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A))$.(iv) Let A be any intuitionistic fuzzy set in an intuitionistic fuzzy topological space (Y,S). Since f is an intuitionistic fuzzy G_δ-e-locally homeomorphism. Then by above condition (iii), IFG_δ-e-$lcl(f^{-1}(A)) = f^{-1}(IFG_\delta\text{-}e\text{-}lcl(A))$ .Taking complement on bothsides,

$$\overline{IFG_\delta - e - lint(\overline{f^{-1}(A)})} = \overline{f^{-1}(IFG_\delta - e - lint(\bar{A}))},$$

$$f^{-1}(\overline{IFG_\delta - e - lint(\bar{A})}) = \overline{IFG_\delta - e - lint(f^{-1}(\bar{A}))}$$

.

THEOREM.3.3 Let (X,T), (Y,S) and (Z,R) be any three intuitionistic fuzzy topological spaces. If $f:(X,T)\to(Y,S)$ and $g:(Y,S)\to(Z,R)$ be any two intuitionistic fuzzy mappings. Then the following statements are valid. [(i)]If f is an intuitionistic fuzzy G_δ-e-locally irresolute function and g is an intuitionistic fuzzy G_δ-e-locally continuous function, then $g\circ f$ is an intuitionistic fuzzy G_δ-e-locally continuous function. [(ii)]If f is an intuitionistic fuzzy G_δ-e-locally continuous function and g is an intuitionistic fuzzy weakly G_δ-e-locally continuous function, then $g\circ f$ is an intuitionistic fuzzy G_δ-e-locally irresolute function.

Proof. (i) Let A be any intuitionistic fuzzy closed set in an intuitionistic fuzzy topological space (Z,R). Since g is an intuitionistic fuzzy G_δ-e-locally continuous function. $g^{-1}(A)$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Y,S). Since f is an intuitionistic fuzzy G_δ-e-locally irresolute function. $f^{-1}(g^{-1}(A))$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (X,T). Now, $(g\circ f)^{-1}(A) = f^{-1}(g^{-1}(A))$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (X,T). Hence, $g\circ f$ is an intuitionistic fuzzy G_δ-e-locally continuous function.(ii) Let A be any intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (Z,R). Since g is an intuitionistic fuzzy weakly G_δ-e-locally continuous function, $g^{-1}(A)$ is an intuitionistic fuzzy closed set in an intuitionistic fuzzy topological space (Y,S). Since f is an intuitionistic fuzzy G_δ-e-locally continuous function, $f^{-1}(g^{-1}(A))$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (X,T). Now $(g\circ f)^{-1}(A) = f^{-1}(g^{-1}(A))$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (X,T). Hence, $g\circ f$ is an intuitionistic fuzzy G_δ-e-locally irresolute function.

DEFINITION.3.3 An intuitionistic fuzzy topological space (X,T) is said to be an intuitionistic fuzzy G_δ-e-local T_2 space if and only if for every intuitionistic fuzzy points $c_{r,s}$ and $d_{m,n}$ in an intuitionistic fuzzy topological space (X,T) and $c\neq d$ there exists an intuitionistic fuzzy G_δ-e-locally open sets $G=\langle x,\mu_G,\gamma_G\rangle, H=\langle x,\mu_H,\gamma_H\rangle$ with $\mu_G(c)=0,\gamma_G(c)=1,\mu_H(d)=1,\gamma_H(d)=0$ and $G\cap H=0_\sim$.

PROPOSITION.3.1 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. Let $f:(X,T)\to(Y,S)$ be an intuitionistic fuzzy injective mapping and intuitionistic fuzzy G_δ-e-locally continuous function. If (Y,S) is an intuitionistic fuzzy T_2 space, then (X,T) is an intuitionistic fuzzy G_δ-e-local T_2 space.

Proof. Let $c_{r,s}$ and $d_{m,n}$ be an intuitionistic fuzzy points in an intuitionistic fuzzy topological space (X,T) and $c\neq d$. By intuitionistic fuzzy injective function of f, we have $f(c)\neq f(d)$. Since, (Y,S) is an intuitionistic fuzzy T_2 space, there exists an intuitionistic fuzzy open sets $G=\langle y,\mu_G,\gamma_G\rangle, H=\langle y,\mu_H,\gamma_H\rangle$ of S with

$\mu_G(f(c))=0, \gamma_G(f(c))=1, \mu_H(f(d))=1,$
$\gamma_H(f(d))=0$
and $G\cap H=0_\sim$. Since f is an intuitionistic fuzzy G_δ-e-locally continuous function. This implies $f^{-1}(G)=\langle x, f^{-1}(\mu_G), f^{-1}(\gamma_G)\rangle$, $f^{-1}(H)=\langle x, f^{-1}(\mu_H), f^{-1}(\gamma_H)\rangle$ and $N^{IFG_\delta-e-lq}(c_{r,s})$ and $N^{IFG_\delta-e-lq}(d_{m,n})$ respectively. That is, $f^{-1}(G)$ and $f^{-1}(H)$ are intuitionistic fuzzy G_δ-e-locally open sets.
Now
$f^{-1}(\mu_G)(c_{r,s})=\mu_G(f(c))=0, f^{-1}(\gamma_G)(c_{r,s})=$
$\gamma_G(f(c))=1, f^{-1}(\mu_H)(d_{m,n})=\mu_H(f(d))=1,$
$f^{-1}(G)\cap f^{-1}(H)=f^{-1}(G\cap H)=f^{-1}(0_\sim)=0_\sim$
. Hence, (X,T) is an intuitionistic fuzzy G_δ-e-local T_2 space.

PROPOSITION.3.2 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. Let $f:(X,T)\to(Y,S)$ be an intuitionistic fuzzy injective mapping and intuitionistic fuzzy weakly G_α-e-locally continuous function. If (Y,S) is an intuitionistic fuzzy G_α-e-local T_2 space, then (X,T) is an intuitionistic fuzzy T_2 space.

Proof. Let $c_{r,s}$ and $d_{m,n}$ be an intuitionistic fuzzy points in an intuitionistic fuzzy topological space (X,T) and $c\neq d$. By intuitionistic fuzzy injective function of f, we have $f(c)\neq f(d)$. Since, (Y,S) is an intuitionistic fuzzy G_δ-e-local T_2 space, there exists an intuitionistic fuzzy G_δ-e-locally open sets $G=\langle y,\mu_G,\gamma_G\rangle, H=\langle y,\mu_H,\gamma_H\rangle$ of S with $\mu_G(f(c))=0, \gamma_G(f(c))=1, \mu_H(f(d))=1, \gamma_H(f(d))=0$ and $G\cap H=0_\sim$. Since f is an intuitionistic fuzzy weakly G_δ-e-locally continuous function. This implies $f^{-1}(G)=\langle x, f^{-1}(\mu_G), f^{-1}(\gamma_G)\rangle$, $f^{-1}(H)=\langle x, f^{-1}(\mu_H), f^{-1}(\gamma_H)\rangle$ are $N(c_{r,s})$ and $N(d_{m,n})$ respectively. That is $f^{-1}(G)$ and $f^{-1}(H)$ are intuitionistic fuzzy open sets. Now,
$f^{-1}(\mu_G)(c_{r,s})=\mu_G(f(c))=0,$
$f^{-1}(\gamma_G)(c_{r,s})=\gamma_G(f(c))=1,$
$f^{-1}(\mu_H)(d_{m,n})=\mu_H(f(d))=1,$
$f^{-1}(\gamma_H)(d_{m,n})=\gamma_H(f(d))=0$ and
$f^{-1}(G)\cap f^{-1}(H)=f^{-1}(G\cap H)=f^{-1}(0_\sim)=0_\sim$
. Hence, (X,T) is an intuitionistic fuzzy T_2 space.

DEFINITION.3.4 An intuitionistic fuzzy topological space (X,T) is said to be an intuitionistic fuzzy G_δ-e-local Urysohn space if and only if for every intuitionistic fuzzy points $c_{r,s}$ and $d_{m,n}$ in an intuitionistic fuzzy topological space (X,T) and $c\neq d$ there exists an intuitionistic fuzzy G_δ-e-locally open sets $G=\langle x,\mu_G,\gamma_G\rangle, H=\langle x,\mu_H,\gamma_H\rangle$ with
$\mu_G(c)=0, \gamma_G(c)=1, \mu_H(d)=1, \gamma_H(d)=0$
and IFG_δ-e-$lcl(G)\cap IFG_\delta$-e-$lcl(H)=0_\sim$.

PROPOSITION.3.3 Every intuitionistic fuzzy G_δ-e-local Urysohn space is an intuitionistic fuzzy G_δ-e-local T_2 space.

Proof. Let (X,T) be an intuitionistic fuzzy G_δ-e-local Urysohn space. Then for every intuitionistic fuzzy points $c_{r,s}$ and $d_{m,n}$ in an intuitionistic fuzzy topological space (X,T) and $c\neq d$ there exists an intuitionistic fuzzy G_δ-e-locally open sets $G=\langle x,\mu_G,\gamma_G\rangle, H=\langle x,\mu_H,\gamma_H\rangle$ with
$\mu_G(c)=0, \gamma_G(c)=1, \mu_H(d)=1, \gamma_H(d)=0$
and IFG_δ-e-$lcl(G)\cap IFG_\delta$-e-$lcl(H)=0_\sim$. Since $G\subseteq IFG_\delta$-e-$lcl(G)$ and $H\subseteq IFG_\delta$-e-$lcl(H)$. Then $G\cap H\subseteq IFG_\delta$-$e$-$lcl(G)\cap IFG_\delta$-$e$-

$lcl(H)$. This implies $G \cap H = 0$. Hence (X,T) is an intuitionistic fuzzy G_δ-e-local T_2 space..

Interraltion

DEFINITION.4.1 Let (X,T) and (Y,S) be two IFT's and let $f : X \to Y$ be a function. Then f is said to be an [(i)]intuitionistic fuzzy e-locally continuous iff the preimage of each IFCS in S is an intuitionistic fuzzy e-locally closed set in T. [(ii)]intuitionistic fuzzy G_δ-e-locally continuous iff the preimage of each IFCS in S is an intuitionistic fuzzy G_δ-e-locally closed set in T. [(iii)]intuitionistic fuzzy eG_δ-locally continuous iff the preimage of each IFCS in S is an intuitionistic fuzzy eG_δ-locally closed set in T.

PROPOSITION.4.1 Let (X,T) and (Y,S) be two intuitionistic fuzzy topological spaces. Let $f:(X,T) \to (Y,S)$ be an intuitionistic fuzzy G_δ-locally continuous function. Then f is an intuitionistic fuzzy G_δ-e-locally continuous function.

Proof. Let A be an intuitionistic fuzzy closed set in an intuitionistic fuzzy topological space (Y,S). Since f is an intuitionistic fuzzy G_δ-locally continuous function, $f^{-1}(A)$ is an intuitionistic fuzzy G_δ-e-locally closed set in an intuitionistic fuzzy topological space (X,T). Since every intuitionistic fuzzy G_δ-locally closed set is an intuitionistic fuzzy G_δ-e-locally closed set, $f^{-1}(A)$ is also an intuitionistic fuzzy G_δ-e-locally closed set. Hence f is an intuitionistic fuzzy G_δ-e-locally continuous function.

EXAMPLE.4.1 Let $X = \{a,b\} = Y$,

$A = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$

$B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \vee B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \wedge B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$C = \left\langle x, (\frac{a}{1}, \frac{b}{1}), (\frac{a}{0}, \frac{b}{0.1}) \right\rangle$. Now, the family $T = \{0_\sim, 1_\sim, A, B, A \vee B, A \wedge B\}$ of IFS's in X is an IFT on X and the family $S = \{0_\sim, 1_\sim, C\}$ of IFS's in Y is an IFT on Y. If we define the function $f : X \to Y$ be the identity function, then $f^{-1}(\bar{C})$ is an IFG_δ-locally continuous but not IFe-locally continuous.

EXAMPLE.4.2 Let $X = \{a,b\} = Y$,

$A = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \vee B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \wedge B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$D = \left\langle x, (\frac{a}{0.7}, \frac{b}{0.7}), (\frac{a}{0}, \frac{b}{0.1}) \right\rangle$. Now, the family $T = \{0_\sim, 1_\sim, A, B, A \vee B, A \wedge B\}$ of IFS's in X is an IFT on X and the family $S = \{0_\sim, 1_\sim, D\}$ of IFS's in Y is an IFT on Y. If we define the function $f : X \to Y$ be the identity function, then $f^{-1}(\bar{D})$ is an IFG_δ-e-locally continuous but not IFG_δ-locally continuous.

EXAMPLE.4.3 Let $X = \{a,b\} = Y$,

$A = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \vee B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \wedge B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$E = \left\langle x, (\frac{a}{0.5}, \frac{b}{0.5}), (\frac{a}{0}, \frac{b}{0.1}) \right\rangle$. Now, the family $T = \{0_\sim, 1_\sim, A, B, A \vee B, A \wedge B\}$ of IFS's in X is an IFT on X and the family

$S=\{0_\sim,1_\sim,E\}$ of IFS's in Y is an IFT on Y. If we define the function $f:X\to Y$ be the identity function, then $f^{-1}(\bar{E})$ is an IFe-locally continuous but not IFG_δ-e-locally continuous.

EXAMPLE.4.4 Let $X=\{a,b\}=Y$,

$A=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\vee B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\wedge B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$F=\left\langle x,(\frac{a}{0.6},\frac{b}{0.6}),(\frac{a}{0.1},\frac{b}{0.1})\right\rangle$. Now, the family $T=\{0_\sim,1_\sim,A,B,A\vee B,A\wedge B\}$ of IFS's in X is an IFT on X and the family $S=\{0_\sim,1_\sim,F\}$ of IFS's in Y is an IFT on Y. If we define the function $f:X\to Y$ be the identity function, then $f^{-1}(\bar{E})$ is an IFG_δ-e-locally continuous but not IF-e-locally continuous.

EXAMPLE.4.5 Let $X=\{a,b\}=Y$,

$A=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\vee B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\wedge B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$G=\left\langle x,(\frac{a}{0.9},\frac{b}{0.9}),(\frac{a}{0},\frac{b}{0.1})\right\rangle$. Now, the family $T=\{0_\sim,1_\sim,A,B,A\vee B,A\wedge B\}$ of IFS's in X is an IFT on X and the family $S=\{0_\sim,1_\sim,G\}$ of IFS's in Y is an IFT on Y. If we define the function $f:X\to Y$ be the identity function, then $f^{-1}(\bar{G})$ is an $IFeG_\delta$-locally continuous but not IFG_δ-e-locally continuous.

EXAMPLE.4.6 Let $X=\{a,b\}=Y$,

$A=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\vee B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\wedge B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$G=\left\langle x,(\frac{a}{0.9},\frac{b}{0.9}),(\frac{a}{0},\frac{b}{0.1})\right\rangle$. Now, the family $T=\{0_\sim,1_\sim,A,B,A\vee B,A\wedge B\}$ of IFS's in X is an IFT on X and the family $S=\{0_\sim,1_\sim,G\}$ of IFS's in Y is an IFT on Y. If we define the function $f:X\to Y$ be the identity function, then $f^{-1}(\bar{G})$ is an $IFeG_\delta$-locally continuous but not IFG_δ-locally continuous.

EXAMPLE.4.7 Let $X=\{a,b\}=Y$,

$A=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\vee B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

$A\wedge B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$H=\left\langle x,(\frac{a}{0.6},\frac{b}{0.6}),(\frac{a}{0.3},\frac{b}{0.1})\right\rangle$. Now, the family $T=\{0_\sim,1_\sim,A,B,A\vee B,A\wedge B\}$ of IFS's in X is an IFT on X and the family $S=\{0_\sim,1_\sim,H\}$ of IFS's in Y is an IFT on Y. If we define the function $f:X\to Y$ be the identity function, then $f^{-1}(\bar{H})$ is an IFG_δ-locally continuous but not $IFeG_\delta$-locally continuous.

EXAMPLE.4.8 Let $X=\{a,b\}=Y$,

$A=\left\langle x,(\frac{a}{0.3},\frac{b}{0.3}),(\frac{a}{0.6},\frac{b}{0.6})\right\rangle$,

$B=\left\langle x,(\frac{a}{0.3},\frac{b}{0.1}),(\frac{a}{0.5},\frac{b}{0.4})\right\rangle$,

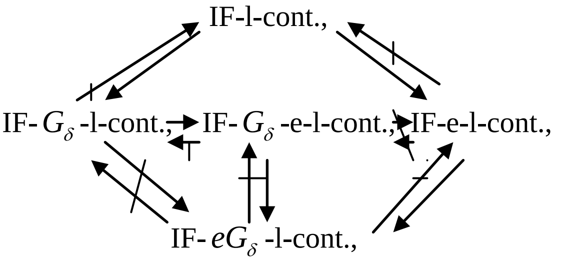
$A \vee B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.3}), (\frac{a}{0.5}, \frac{b}{0.4}) \right\rangle$,

$A \wedge B = \left\langle x, (\frac{a}{0.3}, \frac{b}{0.1}), (\frac{a}{0.6}, \frac{b}{0.6}) \right\rangle$,

$I = \left\langle x, (\frac{a}{0.5}, \frac{b}{0.4}), (\frac{a}{0}, \frac{b}{0.1}) \right\rangle$ Now, the family $T = \{0_{\sim}, 1_{\sim}, A, B, A \vee B, A \wedge B\}$ of IFS's in X is an IFT on X and the family $S = \{0_{\sim}, 1_{\sim}, I\}$ of IFS's in Y is an IFT on Y. If we define the function $f : X \to Y$ be the identity function, then $f^{-1}(\overline{I})$ is an Ife-locally continuous but not IF-locally continuous.

REMARK.4.1 Every intuitionistic fuzzy locally continuous is an intuitionistic fuzzy G_δ-locally continuous but the converse need not be true as shown in [7]

REMARK.4.2 Clearly the following diagram holds.



DEFINITION.4.2 An intuitionistic fuzzy topological space (X,T) is said to be intuitionistic fuzzy G_δ-e-local connected if and only if the only intuitionistic fuzzy sets which are both intuitionistic fuzzy G_δ-e-locally open set and intuitionistic fuzzy G_δ-e-locally closed set are $0_{\sim}$ and $1_{\sim}$.

PROPOSITION.4.2 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. If $f:(X,T) \to (Y,S)$ is an intuitionistic fuzzy G_δ-e-locally continuous surjective function and (X,T) is an intuitionistic fuzzy G_δ-e-local connected space then (Y,S) is an intuitionistic fuzzy connected space.

Proof. Let (X,T) be an intuitionistic fuzzy G_δ-e-local connected space. Suppose that (Y,S) is not an intuitionistic fuzzy connected space. Then there exists a proper intuitionistic fuzzy set A such that A is both intuitionistic fuzzy open set and intuitionistic fuzzy closed set in (Y,S). Since f is an intuitionistic fuzzy G_δ-e-locally continuous surjective function, then $f^{-1}(A)$ is both intuitionistic fuzzy G_δ-e-locally open set and intuitionistic fuzzy G_δ-e-locally closed set in (X,T), which is contradiction. Hence, (Y,S) is an intuitionistic fuzzy connected space.

DEFINITION.4.3 Let (X,T) be an intuitionistic fuzzy topological space. If a family $\{\left\langle x, \mu_{G_j}, \gamma_{G_j} \right\rangle : j \in J\}$ of an intuitionistic fuzzy G_δ-e-locally open sets in X satisfies the condition $\bigcup\{\left\langle x, \mu_{G_j}, \gamma_{G_j} \right\rangle : j \in J\}\} = 1_{\sim}$ then it is called as an intuitionistic fuzzy G_δ-e-locally open cover of an intuitionistic fuzzy topological space (X,T).

DEFINITION.4.4 An intuitionistic fuzzy topological space (X,T) is said to be intuitionistic fuzzy G_δ-e-local compact if every intuitionistic fuzzy G_δ-e-locally open cover of $\{A_j : j \in J\}$ of an intuitionistic fuzzy topological space (X,T), there exists a finite subfamily $J_0 \subset J$ such that $1_{\sim} = \bigcup\{A_j : j \in J_0\}$

PROPOSITION.4.3 Let (X,T) and (Y,S) be any two intuitionistic fuzzy topological spaces. If $f:(X,T) \to (Y,S)$ is an intuitionistic fuzzy G_δ-e-locally continuous bijective function and (X,T) is an intuitionistic fuzzy G_δ-e-local compact space then (Y,S) is an intuitionistic fuzzy G_δ-e-local compact space.

Proof Let $\{A_j : j \in J\}$ be an intuitionistic fuzzy open cover of an intuitionistic fuzzy topological space (Y,S) such that $1_{\sim} = \bigcup_{j \in J} A_j$ Since f is an intuitionistic fuzzy G_δ-e-locally continuous bijective function, $\{f^{-1}(A_j) : j \in J\}$ is an intuitionistic fuzzy

G_δ-e-locally open cover of an intuitionistic fuzzy topological space (X,T).From, (\ref{6e}) $f^{-1}=f^{-1}(\bigcup_{j\in J} A_j),1_\sim=\bigcup_{j\in J} f^{-1}(A_j)$. Now $\{f^{-1}(A_j): j\in J\}$ is an intuitionistic fuzzy G_δ-e-locally open cover of an intuitionistic fuzzy topological space (X,T). Since (X,T) is an intuitionistic fuzzy G_δ-e-local compact space, then there exist a finite subcover $\{f^{-1}(A_j): j=1,2,3,\ldots n\}$ of $\{f^{-1}(A_j): j\in J\}$ is an intuitionistic fuzzy topological space (X,T). Then, $1_\sim=\bigcup_{j=1}^{n} f^{-1}(A_j)$. Now, $f(1_\sim)=f(\bigcup_{j=1}^{n} f(A_j))$. Since f is an intuitionistic fuzzy surjective function, $1_\sim=\bigcup_{j=1}^{n} f(f^{-1}(A_j))=\bigcup_{j=1}^{n} A_j$ implies that (Y,S) is an intuitionistic fuzzy G_δ-e-local compact space.

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