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A NOTE ON INTUITIONISTIC FUZZY $\hat{\beta}$ GENERALIZED IRRESOLUTE MAPPINGS

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ABSTRACT: In this paper a new class of mapping called intuitionistic fuzzy $\hat{\beta}$ generalized irresolute mapping in intuitionistic fuzzy topological space is introduced and its properties are studied. Further the notion of intuitionistic fuzzy $\hat{\beta}_a T_{1/2}$space and intuitionistic fuzzy $\hat{\beta}_b T_{1/2}$ are introduced.

KEYWORDS: Intuitionistic fuzzy topology, intuitionistic fuzzy generalized closed set, intuitionistic fuzzy $\hat{\beta}$ generalized open set, intuitionistic fuzzy $\hat{\beta}$ generalized irresolute mapping, intuitionistic fuzzy contra $\hat{\beta}$ generalized irresolute mapping, intuitionistic fuzzy $\hat{\beta}_a T_{1/2}$ space and intuitionistic fuzzy $\hat{\beta}_b T_{1/2}$ space.

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I. INTRODUCTION

After the introduction of Fuzzy set (FS) by Zadeh [12] in 1965 and fuzzy topology by Chang [3] in 1967, several researches were conducted on the generalizations of the notions of fuzzy sets and fuzzy topology. The concept of intuitionistic fuzzy set (IFS) was introduced by Atanassov in 1983 as a generalization of fuzzy sets. In 1997 Coker [4] introduced the concept of intuitionistic fuzzy topological space. In this paper we introduce the notion of intuitionistic fuzzy $\hat{\beta}$ generalized irresolute mappings, inintuitionistic fuzzy contra $\hat{\beta}$ generalized irresolute mapping in intuitionistic fuzzy topological space and studied some of their properties. We provide some characterizations of intuitionistic fuzzy $\hat{\beta}$ generalized irresolute mappings, intuitionistic fuzzy contra $\hat{\beta}$ generalized irresolute mappings and established the relationships with other classes of early defined forms of intuitionistic fuzzy mappings.

II. PRELIMINARIES

Definition 2.1: [1] Let X be a non empty fixed set. An intuitionistic fuzzy set (IFS in short) A in X is an object having the form

$$A = \{\langle x, \mu A(x), \nu A(x) \rangle / x \in X\}$$

where the functions $\mu A(x): X \to [0, 1]$ and $\nu A(x): X \to [0, 1]$ denote the degree of membership (namely $\mu A(x)$) and the degree of non -membership (namely $\nu A(x)$) of each element $x \in X$ to the set A, respectively, and $0 \leq \mu A(x) + \nu A(x) \leq 1$ for each $x \in X$. Denote the set of all intuitionistic fuzzy sets in X by IFS (X).

Definition 2.2: [1] Let A and B be IFSs of the form $A = \{\langle x, \mu A(x), \nu A(x) \rangle / x \in X \}$ and $B = \{ \langle x, \mu B(x), \nu B(x) \rangle / x \in X \}$. Then

(a) $A \subseteq B$ if and only if $\mu A(x) \leq \mu B (x)$ and $\nu A(x) \geq \nu B(x)$ for all $x \in X$

(b) $A = B$ if and only if $A \subseteq B$ and $B \subseteq A$

(c) $Ac = \{ \langle x, \nu A(x), \mu A(x) \rangle / x \in X \}$

(d) $A \cap B = \{ \langle x, \mu A(x) \wedge \mu B (x), \nu A(x) \vee \nu B(x) \rangle / x \in X \}$

(e) $A \cup B = \{ \langle x, \mu A(x) \vee \mu B (x), \nu A(x) \wedge \nu B(x) \rangle / x \in X \}$

For the sake of simplicity, we shall use the notation $A = \langle x, \mu A, \nu A\rangle$ instead of $A = \{ \langle x, \mu A(x), \nu A(x) \rangle / x \in X \}$. Also for the sake of simplicity, we shall use the notation $A = \{ \langle x, (\mu A, \mu B), (\nu A, \nu B) \rangle \}$ instead of $A = \langle x, (A/\mu A, B/\mu B), (A/\nu A, B/\nu B) \rangle$.

The intuitionistic fuzzy sets $0\sim = \{ \langle x, 0, 1 \rangle / x \in X \}$ and $1\sim = \{\langle x, 1, 0 \rangle / x \in X\}$ are respectively the empty set and the whole set of X.

Definition 2.3: [3] An intuitionistic fuzzy topology (IFT in short) on X is a family τ of IFSs in X satisfying the following axioms.

(i) $0\sim, 1\sim \in \tau$

(ii) $G1 \cap G2 \in \tau$ for any $G1, G2 \in \tau$

(iii) $\cup Gi \in \tau$ for any family $\{ Gi / i \in J \} \subseteq \tau$.

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In this case the pair (X, τ) is called an intuitionistic fuzzy topological space (IFTS in short) and any IFS in τ is known as an intuitionistic fuzzy open set (IFOS in short) in X.
The complement Ac of an IFOS A in IFTS (X, τ) is called an intuitionistic fuzzy closed set (IFCS in short) in X.

Definition 2.4:[3] Let (X, τ) be an IFTS and A = ⟨ x, μA, νA ⟩ be an IFS in X. Then the intuitionistic fuzzy interior and intuitionistic fuzzy closure are defined by
int(A) = ∪ { G / G is an IFOS in X and G ⊆ A },
cl(A) = ∩ { K / K is an IFCS in X and A ⊆ K }
Note that for any IFS A in (X, τ), we have cl(Ac) = $[int(A)]^c$ and $int(A^c) = [cl(A)]^c$.

Definition 2.5: [4] An IFS A = ⟨x, μA, νA⟩ in an IFTS (X, τ) is said to be a
(i) intuitionistic fuzzy semi closed set (IFSCS for short) if int(cl(A)) ⊆ A,
(ii) intuitionistic fuzzy pre-closed set (IFPCS for short) if cl(int(A)) ⊆ A,
(iii) intuitionistic fuzzy α-closed set (IFαCS for short) if cl(int(cl(A))) ⊆ A,
(iv) intuitionistic fuzzy γ-closed set (IFγCS for short) if cl(int(A)) int(cl(A))⊆ A
The respective complements of the above IFCSs are called their respective IFOSs.
The family of all IFSCSs, IFPCSs, IFαCSs and IFγCSs (respectively IFSOSs, IFPOSs, IFαOSs and IFγOSs) of an IFTS (X,τ) are respectively denoted by IFSC(X), IFPC(X), IFαC(X) and IFγC(X) (respectively IFSO(X), IFPO(X), IFαO(X) and IFγO(X)).

Definition 2.6:[11] Let A be an IFS in an IFTS (X, τ). Then
sint(A) = ∪ { G / G is an IFSOS in X and G ⊆ A },
scl(A) = ∩ { K / K is an IFSCS in X and A ⊆ K }.
Note that for any IFS A in (X, τ), we have $scl(A^c)=(sint(A))^c$ and $sint(A^c) = (scl(A))^c$.

Definition 2.7:[10] An IFS A in an IFTS (X, τ) is an intuitionistic fuzzy generalized closed set (IFGCS in short) if cl(A) ⊆ U whenever A ⊆ U and U is an IFOS in X.

Definition 2.8:[10] An IFS A in an IFTS (X, τ) is said to be an intuitionistic fuzzy generalized semi closed set (IFGSCS in short) if scl(A) ⊆ U whenever A ⊆ U and U is an IFOS in (X, τ).
Definition 2.9:[10] An IFS A is said to be an intuitionistic fuzzy generalized semi open set (IFGSOS in short) in X if the complement Ac is an IFGSCS in X.
The family of all IFGSCSs (IFGSOSs) of an IFTS (X, τ) is denoted by IFGSC(X) (IFGSO(X)).
Definition 2.10:[5] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y, σ). Then f is said to be intuitionistic fuzzy continuous (IF continuous in short) if f -1(B) ∈ IFO(X) for every B ∈σ**.**

Definition 2.11: [5] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y, σ). Then f is said to be an
(i) intuitionistic fuzzy semi continuous mapping (IFS continuous mapping for short) if f -1(B) ∈ IFSO(X) for every B ∈σ
(ii) intuitionistic fuzzy α-continuous mapping (IFα continuous mapping for short) if $f^{-1}(B)$ ∈ IFαO(X) for every B ∈σ
(iii) intuitionistic fuzzy pre continuous mapping (IFP continuous mapping for short) if $f^{-1}(B)$ ∈ IFPO(X) for every B ∈σ
(iv) intuitionistic fuzzy γ continuous mapping (IFγ continuous mapping for short) if $f^{-1}(B)$ ∈ IFγO(X) for every B ∈σ.

Definition 2.12: [11] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y, σ). Then f is said to be an intuitionistic fuzzy generalized continuous mapping (IFG continuous mapping for short) if $f^{-1}(B)$∈IFGC(X) for every IFCS B in Y.

Definition 2.13: [11] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y, σ). Then f is said to be an intuitionistic fuzzy semi-pre continuous mapping (IFSP continuous mapping for short) if $f^{-1}(B)$ ∈ IFSPO(X) for every B∈σ.

Result 2.14:[8] Every IF continuous mapping is an IFG continuous mapping.

Definition 2.15:[8] A mapping f: (X, τ) → (Y,σ) is called an intuitionistic fuzzy generalized semi continuous (IFGS continuous in short) if $f^{-1}(B)$ is an IFGSCS in (X, τ) for every IFCS B of (Y, σ).

Definition 2.16: [8] An IFTS (X, τ) is said to be an intuitionistic fuzzy $\hat{\beta}$aT1/2 (IF$\hat{\beta}$aT1/2 in short) space if every IF$\hat{\beta}$GCS in X is an IFCS in X.
Definition 2.17: [8] An IFTS (X, τ) is said to be an intuitionistic fuzzy $\hat{\beta}$bT1/2 (IF$\hat{\beta}$bT1/2 in short) space if every IF$\hat{\beta}$GCS in X is an IFGCS in X.

Definition 2.18:[9] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y,σ). Then f is said to be an intuitionistic fuzzy irresolute (IF irresolute in short) if $f^{-1}(B)$ ∈ IFCS(X) for every IFCS B in Y.

Definition 2.19:[9] Let f be a mapping from an IFTS (X, τ) into an IFTS (Y,σ). Then f is said to be an intuitionistic fuzzy generalized irresolute (IFG irresolute in short) if $f^{-1}(B)$ ∈ IFGCS(X) for every IFGCS B in Y.

III. INTUITIONISTIC FUZZY GENERALIZED IRRESOLUTE MAPPINGS

In this section, we have introduced intuitionistic fuzzy generalized irresolute mappings and studied some of their properties.

Definition 3.1: A mapping f : (X, τ) → (Y, σ) is called an intuitionistic fuzzy generalized irresolute (IF$\hat{\beta}$G irresolute) mapping if $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in (X, τ) for every IF$\hat{\beta}$GCS A of (Y, σ).

Theorem 3.2: If f : (X, τ) → (Y, σ) is an IF$\hat{\beta}$G irresolute mapping, then f is an IF $\hat{\beta}$G continuous mapping but not conversely.

Proof: Assume that f is an IF$\hat{\beta}$G irresolute mapping. Let A be any IFCS in Y. Since every IFCS is an IF$\hat{\beta}$GCS, A is an IF GCS in Y. By hypothesis $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. Hence f is an IF$\hat{\beta}$G continuous mapping.

Example 3. 3: Let X = { a, b }, Y = { u, v } and G_1 = ⟨ x, (0.1, 0.3), (0.6, 0.3) ⟩, G_2 = ⟨ y, (0.3, 0.1), (0.5, 06) ⟩. Then τ = { $0_\sim$, G_1, $1_\sim$ } and σ = { $0_\sim$, G_2, $1_\sim$ } are IFTs on X and Y respectively. Define a mapping f : (X, τ) → (Y, σ) by f(a) = u and f(b) = v. Then f is an IF$\hat{\beta}$G continuous mapping. Let B = ⟨ y, (0.1, 0.1), (0.6, 0.4) ⟩ is an IF GCS in Y. But $f^{-1}(B)$ = ⟨ x, (0.1, 0.1), (0.6, 0.4) ⟩ is not an IF GCS in X. Therefore, f is not an IF G irresolute mapping.

Theorem 3.4: If f : (X, τ) → (Y, σ) is an IF$\hat{\beta}$G irresolute mapping, then f is an IFGS continuous mapping but not conversely.

Proof: Assume that f is an IF$\hat{\beta}$ G irresolute mapping. Let A be any IFCS in Y. Since every IFCS is an IF$\hat{\beta}$GCS, A is an IF$\hat{\beta}$GCS in Y. By hypothesis $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. This implies $f^{-1}(A)$ is an IFGSCS in X. Hence f is an IFGS continuous mapping.

Example 3.5: Let X = { a, b }, Y = { u, v } and G_1 = ⟨ x, (0.1, 0.3), (0.3, 0.3) ⟩, G_2 = ⟨ y, (0.3, 0.1), (0.4, 0.4) ⟩. Then τ = { $0_\sim$, G_1, $1_\sim$ } and σ = { $0_\sim$, G_2, $1_\sim$ } are IFTs on X and Y respectively. Define a mapping f : (X, τ) → (Y, σ) by f(a) = u and f(b) = v. Then f is an IFGS continuous mapping. Let B = ⟨ y, (01, 0.1), (0.3, 0.4) ⟩ is an IF$\hat{\beta}$GCS in Y. But $f^{-1}(B)$ = ⟨ x, (0.1, 0.1), (0.3, 0.4) ⟩ is not an IF$\hat{\beta}$GCS in X. Therefore, f is not an IF G irresolute mapping.

Theorem 3.6: If f : (X, τ) → (Y, σ) is an IF$\hat{\beta}$G irresolute mapping in an IF$\hat{\beta}_a T_{1/2}$ space X , then f is an IF continuous mapping.

Proof: Let A be an IFCS in Y. Then A is an IF GCS in Y. Since f is an IF$\hat{\beta}$G irresolute, $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. Also, since X is an IF$\hat{\beta}_a T_{1/2}$ space, $f^{-1}(A)$ is an IFCS in X. Hence f is an IF continuous mapping.

Theorem 3.7: Let f : (X, τ) → (Y, σ) and g : (Y, σ) → (Z, η) be IF$\hat{\beta}$G irresolute mappings. Then g o f : (X, τ) → (Z, η) is an IF$\hat{\beta}$G irresolute mapping.

Proof: Let A be an IF$\hat{\beta}$GCS in Z. Then by hypothesis, $g^{-1}(A)$ is an IF$\hat{\beta}$GCS in Y. Since f is an IF$\hat{\beta}$G irresolute mapping, $f^{-1}(g^{-1}(A))$ is an IF$\hat{\beta}$GCS in X. Thus, $(g \circ f)^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. Therefore g o f is an IF$\hat{\beta}$G irresolute mapping.

Theorem 3.8: Let f : (X, τ) → (Y, σ) be an IF$\hat{\beta}$G irresolute mapping and g : (Y, σ) → (Z, η) be an IF$\hat{\beta}$G continuous mapping. Then g o f : (X, τ) → (Z, η) is an IF$\hat{\beta}$G continuous mapping.

Proof: Let A be an IFCS in Z. Then by hypothesis, $g^{-1}(A)$ is an IF GCS in Y. Since f is an IF$\hat{\beta}$G irresolute mapping, $f^{-1}(g^{-1}(A))$ is an IF$\hat{\beta}$GCS in X. Thus, $(g \circ f)^{-1}(A)$ is an IF$\hat{\beta}$GCS in X.
Therefore, g o f is an IF G continuous mapping.

Theorem 3.9: If f : (X, τ) → (Y, σ) is an IF$\hat{\beta}$G irresolute mapping in an IF $\hat{\beta}_b T_{1/2}$ space in X, then f is an IFG irresolute mapping.

Proof: Let A be an IFGCS in Y. Then A is an IF$\hat{\beta}$GCS in Y. Therefore $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in X, by hypothesis. Since X is an IF$\hat{\beta}_b T_{1/2}$ space, $f^{-1}(A)$ is an IFGCS in X. Hence f is an IFG irresolute mapping.

Theorem 3.10: Let f : (X, τ) → (Y, σ) be a mapping from an IFTS X into an IFTS Y. Then the following conditions are equivalent if X and Y are IF $\hat{\beta}_a T_{1/2}$ spaces:

(i) f is an IF$\hat{\beta}$G irresolute mapping
(ii) $f^{-1}(B)$ is an IF$\hat{\beta}$GOS in X for each IF$\hat{\beta}$GOS in Y
(iii) $cl(f^{-1}(B)) \subseteq f^{-1}(cl(B))$ for each IFS B of Y.

Proof:(i) ⇒ (ii): Obviously true.
(ii) ⇒ (iii): Let B be any IFS in Y. Clearly $B \subseteq cl(B)$. Then $f^{-1}(B) \subseteq f^{-1}(cl(B))$. Since cl(B) is an IFCS in Y, cl(B) is an IF$\hat{\beta}$GCS in Y. Therefore, $f^{-1}(cl(B))$ is an IF$\hat{\beta}$GCS in X, by hypothesis. Since X is an IF$\hat{\beta}_a T_{1/2}$ space, $f^{-1}(cl(B))$ is an IFCS

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in X. Hence $cl(f^{-1}(B)) \subseteq cl(f^{-1}(cl(B))) = f^{-1}(cl(B))$. That is $cl(f^{-1}(B)) \subseteq f^{-1}(cl(B))$.

(iii) ⇒ (i): Let B be an IF$\hat{\beta}$GCS in Y. Since Y is an IF$\hat{\beta}_aT_{1/2}$ space, B is an IFCS in Y and cl(B) = B. Hence $f^{-1}(B) = f^{-1}(cl(B)) \supseteq cl(f^{-1}(B))$, by hypothesis. But clearly $f^{-1}(B) \subseteq cl(f^{-1}(B))$. Therefore, $cl(f^{-1}(B)) = f^{-1}(B)$. This implies $f^{-1}(B)$ is an IFCS in X and hence it is an IF$\hat{\beta}$GCS in X. Thus f is an IF$\hat{\beta}$G irresolute mapping.

IV. Intuitionistic Fuzzy Contra Generalized Irresolute Mappings

In this section, we have introduced intuitionistic fuzzy contra $\hat{\beta}$ generalized irresolute mapping and studied some of its properties.

Definition 4.1: A mapping f : (X, τ) → (Y, σ) is called an intuitionistic fuzzy contra $\hat{\beta}$ generalized irresolute (IFC$\hat{\beta}$G irresolute in short) mapping if $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in (X, τ) for every IF$\hat{\beta}$GOS A of (Y, σ).

Theorem 4.2: If f : (X, τ) → (Y, σ) is an IFC$\hat{\beta}$G irresolute mapping, then f is an IFC$\hat{\beta}$G continuous mapping but not conversely.

Proof: Let f be an IFC$\hat{\beta}$G irresolute mapping. Let A be any IFCS in Y. Since every IFCS is an IF$\hat{\beta}$GCS, A is an IF$\hat{\beta}$GCS in Y. By hypothesis $f^{-1}(A)$ is an IF$\hat{\beta}$GOS in X. Hence f is an IFC$\hat{\beta}$G continuous mapping.

Example 4.3: Let X = {a, b}, Y = {u, v} and G_1 = ⟨ x, (0.1, 0.3), (0.6, 0.3)⟩, G_2 = ⟨ y, (0.5, 0.6), (0.3, 0.1) ⟩. Then τ = {$0_\sim$, G_1, $1_\sim$} and σ = { $0_\sim$, G_2, $1_\sim$} are IFTs on X and Y respectively. Define a mapping f : (X, τ) → (Y, σ) by f(a) = u and f(b) = v. Then f is an IFC G continuous mapping but f is not an IFC$\hat{\beta}$G irresolute mapping, since B = ⟨ y, (0.1, 0.1), (0.6, 0.4) ⟩ is an IF$\hat{\beta}$GOS in Y but $f^{-1}(B)$ = ⟨ x, (0.1, 0.1), (0.6, 0.4) ⟩ is not an IF$\hat{\beta}$GCS in X.

Theorem 4.4: Let f : (X, τ) → (Y, σ) be an IFC$\hat{\beta}$G irresolute mapping, then $f^{-1}(A)$ is an IFGSCS in X for every IFOS A in Y but not conversely.

Proof: Let f be an IFC G irresolute mapping. Let A be any IFOS in Y. Since every IFOS is an IF$\hat{\beta}$GOS, A is an IF$\hat{\beta}$GOS in Y. By hypothesis, $f^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. This implies $f^{-1}(A)$ is an IFGSCS in X.

Example 4.5: Let X = {a, b}, Y = {u, v} and G_1 = ⟨ x, (0.1, 0.3), (0.3, 0.3) ⟩, G_2 = ⟨ y, (0.4, 0.4), (0.3, 0.1) ⟩. Then τ = {$0_\sim$, G_1, $1_\sim$} and σ = { $0_\sim$, G_2, $1_\sim$} are IFTs on X and Y respectively. Define a mapping f : (X, τ) → (Y, σ) by f(a) = u and f(b) = v. Then $f^{-1}(A)$ is an IFGSCS in X for every IFOS A in Y. But f is not an IFC G irresolute mapping, since B = ⟨ y, (0.3, 0.4), (0.1, 0.1) ⟩ is an IF$\hat{\beta}$GOS in Y but $f^{-1}(B)$ = ⟨ x, (0.3, 0.4), (0.1, 0.1)) ⟩ is not an IF GCS in X.

Theorem 4.6: If f : (X, τ) → (Y, σ) is an IFC G irresolute mapping, then f is an IF contra continuous mapping if X is an IF$\hat{\beta}_aT_{1/2}$ space.

Proof: Let A be an IFCS in Y. Then A is an IF$\hat{\beta}$GCS in Y. Therefore $f^{-1}(A)$ is an IF$\hat{\beta}$GOS in X, by hypothesis. Since X is an IF$\hat{\beta}_aT_{1/2}$ space, $f^{-1}(A)$ is an IFOS in X. Hence f is an IF contra continuous mapping.

Theorem 4.7: If f : (X, τ) → (Y, σ) and g : (Y, σ) → (Z, η) are IFC$\hat{\beta}$G irresolute mappings, then g o f : (X, τ) → (Z, η) is an IF$\hat{\beta}$G irresolute mapping.

Proof: Let A be an IF$\hat{\beta}$GCS in Z. Then $g^{-1}(A)$ is an IF$\hat{\beta}$GOS in Y. Since f is an IFC$\hat{\beta}$G irresolute mapping, $f^{-1}(g^{-1}(A))$ is an IF $\hat{\beta}$GCS in X. That is $(g \circ f)^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. Hence g o f is an IF$\hat{\beta}$G irresolute mapping.

Theorem 4.8: If f : (X, τ) → (Y, σ) is an IFC$\hat{\beta}$G irresolute mapping and g : (Y, σ) → (Z, η) is an IFC$\hat{\beta}$G continuous mapping, then g o f : (X, τ) → (Z, η) is an IF$\hat{\beta}$G continuous mapping.

Proof: Let A be an IFCS in Z. Then by hypothesis, $g^{-1}(A)$ is an IF$\hat{\beta}$GOS in Y. Since f is an IFC$\hat{\beta}$G irresolute mapping, $f^{-1}(g^{-1}(A))$ is an IF$\hat{\beta}$GCS in X. That is $(g \circ f)^{-1}(A)$ is an IF$\hat{\beta}$GCS in X. Hence g o f is an IF$\hat{\beta}$G continuous mapping.

Theorem 4.9: If f : (X, τ) → (Y, σ) is an IF$\hat{\beta}$G irresolute mapping and g : (Y, σ) → (Z, η) is an IFC$\hat{\beta}$G continuous mapping, then g o f : (X, τ) → (Z, η) is an IFC$\hat{\beta}$G continuous mapping.

Proof: Let A be an IFCS in Z. Then by hypothesis $g^{-1}(A)$ is an IF$\hat{\beta}$GOS in Y. Since f is an IF$\hat{\beta}$G irresolute mapping, $f^{-1}(g^{-1}(A))$ is an IF$\hat{\beta}$GOS in X. That is $(g \circ f)^{-1}(A)$ is an IF$\hat{\beta}$GOS in X. Hence g o f is an IFC$\hat{\beta}$G continuous mapping.

Theorem 4.10: Let f : (X, τ) → (Y, σ) and g : (Y, σ) → (Z, η) be any two mappings. If the mapping g o f is an IFC$\hat{\beta}$G irresolute mapping and X is an IF $\hat{\beta}_aT_{1/2}$ space, then

(i) $(g \circ f)^{-1}(B)$ is an IF$\hat{\beta}$GOS in X for each IF$\hat{\beta}$GCS in Z

(ii) $cl((g \circ f)^{-1}(int(B))) \subseteq (g \circ f)^{-1}(B)$ for each IFS B of Z.

Proof:(i): Let B be an IF$\hat{\hat{\beta}}$GCS in Z. Then B^c is an IF$\hat{\hat{\beta}}$GOS in Z. By hypothesis, B^c is an IF$\hat{\hat{\beta}}$GCS in X. This implies B is an IF$\hat{\hat{\beta}}$GOS in X. Hence $(g \circ f)^{-1}(B)$ is an IF$\hat{\hat{\beta}}$GOS in X.

(ii): Let B be any IFS in Z and $int(B) \subseteq B$. Then $(g \circ f)^{-1}(int(B)) \subseteq (g \circ f)^{-1}(B)$. Since int(B) is an IFOS in Z, int(B) is an IF$\hat{\hat{\beta}}$GOS in Z. Therefore $(g \circ f)^{-1}(int(B))$ is an IF$\hat{\hat{\beta}}$GCS in X, by hypothesis. Since X is an IF$\hat{\hat{\beta}}_aT_{1/2}$ space, $(g \circ f)^{-1}(int(B))$ is an IFCS in X. Hence $cl((g \circ f)^{-1}(int(B))) = (g \circ f)^{-1}(int(B)) \subseteq (g \circ f)^{-1}(B)$. Therefore, $cl((g \circ f)^{-1}(int(B))) \subseteq (g \circ f)^{-1}(B)$ for each IFS B of Z.

V. CONCLUSION

In this paper we introduced the notion of intuitionistic fuzzy $\hat{\hat{\beta}}$ generalized irresolute mappings, inintuitionistic fuzzy contra $\hat{\hat{\beta}}$ generalized irresolute mapping in intuitionistic fuzzy topological space and studied some of their properties.

VI. REFERENCES

[1] Atanassov. K., Intuitionistic fuzzy sets, 1986 ,Fuzzy Sets and Systems, 20,(Pg. 87-96).

[2] Chang, C., Fuzzy topological spaces, 1968, J. Math. Anal. Appl., 24, , (Pg. 182-190).

[3] Coker, D., 1997, An introduction to fuzzy topological space, Fuzzy sets and systems, 88, (Pg.81-89).

[4] El-Shafhi, M.E., and A. Zhakari., 2007, Semi generalized continuous mappings in fuzzy topological spaces, J. Egypt. Math. Soc. 15, (Pg.157-67).

[5] Gurcay, H., Coker, D., and Haydar, 1997, A., On fuzzy continuity in intuitionistic fuzzy topological spaces, jour. of fuzzy math., (Pg.5365-3780).

[6] Hanafy, I.M., 2009, Intuitionistic fuzzy continuity, Canad. Math Bull. XX (Pg.1-11).

[7] Joung Kon Jeon, Young Bae Jun, and Jin Han Park, 2005, Intuitionistic fuzzy alpha continuity and intuitionistic fuzzy pre continuity, International Journal of Mathematics and Mathematical Sciences, 19, (Pg. 3091-3101).

[8] R.Kulandaivelu, S.Maragathavalli and K.Ramesh,2019, Intuitionistic fuzzy $\hat{\hat{\beta}}$ generalized Continuous mappings, Int. journal of mathematics Trends and Technology, 65, (Pg.84 – 89).

[9] K.Sakthivel,2010, ″Intuitionistic Fuzzy Alpha Generalized Continuous Mappings and Intuitionistic Alpha Generalized Irresolute Mappings″, Applied Mathematical Sciences 4, (Pg.1831-1842).

[10] Seok Jong Lee and Eun Pyo Lee, 2000, The category of intuitionistic fuzzy topological spaces, Bull. Korean Math. Soc. , (Pg. 63-76).

[11] Young Bae Jun and Seok- Zun Song, 2005,Intuitionistic fuzzy semi-pre open sets and Intuitionistic semi-pre continuos mappings, jour. of Appl. Math and computing, 19, (Pg.467-474).

[12] Zadeh, L. A., 1965, Fuzzy sets, Information and control, 8, (Pg. 338-353).

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