Applications of λ-Closed Sets in Intuitionistic Fuzzy Topological Space

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ABSTRACT
In this paper we study the relationship between **λ**-closed sets and some other intuitionisic fuzzy sets already exists.We also define intuitionistic fuzzy λ-irresolute map and study some of its properties.

KEYWORDS
Intuitionistic fuzzy topology, intuitionistic fuzzy λ-closed sets, intuitionistic fuzzy λ - open sets, and intuitionistic fuzzy **λ**-irresolute maps.

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1. INTRODUCTION
After the introduction of fuzzy sets by L.A Zadeh [17] in 1965, there we have been a number of generalizations of this fundamental concept. The notion of intuitionistic fuzzy sets was introduced by Atanassov [1] in 1983. Using the notion of intuitionistic fuzzy sets, Coker [5] introduced the notion of intuitionistic fuzzy topology in 1997. This approach provides a wide field for investigation in the area of fuzzy topology and its application. The aim of this paper is to study the relations between intuitionistic fuzzy λ-closed sets and the other intuitionistic fuzzy sets already exists.Moreover we investigate intuitionistic fuzzy λ-irresolute map and study some of its properties

2. PRELIMINARIES
Definition 2.1: [1] Let X be a nonempty set. An intuitionistic fuzzy set (IFS in short) A in X is an object having the form A = {<x, μ_A (x), υ_A (x) > : x∈ X}, where the function $\mu_A : X \to [0,1]$ and $\upsilon_A : X \to [0,1]$ denotes the degree of membership $\mu_A(x)$ and the degree of non membership γ_A (x) of each element x∈ X to the set A respectively and $0 \le \mu_A(x) + \upsilon_A(x) \le 1$ for each x∈ X.

Definition 2.2 :[1]: Let A and B be intuitionistic fuzzy sets of the form

A = {<x, μ_A (x), υ_A(x) >: x ∈ X}, and form B= {<x, μ_B(x), υ_B (x) >: x∈ X}.Then

(a) A ⊆ B if and only if $\mu_A(x) \le \mu_B(x)$ and $\nu_A(x) \ge \nu_B(x)$ for all x ∈ X

(b) A = B if and only if A ⊆ B and B ⊆ A

(c) $A^c = \{\langle x, \nu_A(x), \mu_A(x) \rangle / x \in X\}$

(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) $A \cup B = \{\langle x, \mu_A(x) \vee \mu_B(x), \nu_A(x) \wedge \nu_B(x) \rangle / x \in X\}$.

The intuitionistic fuzzy sets $\underset{\sim}{0}$ = { <x, 0 ,1> x ∈ X } and $\underset{\sim}{1}$ ={ <x, 0 ,1> x ∈ X } are respectively the empty set and whole set of X .

Definition 2.3 :[1]: Let (α,β) ∈[0,1] with α + β ≤ 1, An intuitionistic fuzzy point (IFP), written as $p_{(\alpha,\beta)}$ is defined to be IFS of X given by

$$p_{(\alpha,\beta)}(x) = \begin{cases} (\alpha,\beta) & \text{if } x = p \\ (0,1) & \text{otherwise} \end{cases}$$

Definition 2.4 : [5]: An intuitionistic fuzzy topology (IFT) on X is a family of IFSs which satisfying the following axioms.

(i) $\underset{\sim}{0}$, $\underset{\sim}{1}$ ∈ τ

(ii) $G_1 \cap G_2 \in \tau$ for any G_1, G_2 ∈ τ

(iii) $\cup G_i \in \tau$ for any family $\{G_i / i \in I\} \subseteq \tau$

In this case the pair (X, τ) is called an intuitionistic fuzzy topological space(IFTS) and each intuitionistic fuzzy set in τ is known as an intuitionistic fuzzy open set (IFOS for short)in X.

The complement A of an IFOS in an IFTS (X, τ) is called an intuitionistic fuzzy closed set (IFCS) in (X, τ).

Definition 2.5 : [5]: Let (X, τ) be an intuitionistic fuzzy topology and

A ={<x, μ_A (x), υ_B (x) >: x ∈ X}, be an intuitionistic fuzzy set in X. Then the intuitionistic fuzzy interior and intuitionistic fuzzy closure are defined by

Int (A) = ∪ {G/ G is an intuitionistic fuzzy open set in X and G ⊆ A}

Cl(A) = ∩{ K/ K in an intuitionistic fuzzy closed set in X and A ⊆ K }

Re**mark 2.6 :[5]:** For any intuitionistic fuzzy set A in (X, τ) , we have

(i) cl $(A^C) = [\text{int}(A)]^C$,

(ii) int $(A^C) = [\text{cl}(A)]^C$,

(iii) A is an intuitionistic fuzzy closed set in X ⇔ Cl (A) = A

(iv) A is an intuitionistic fuzzy open set in X ⇔ int (A) =A

Definition 2.7 :[6]: An intuitionistic fuzzy set A = {<x, μ_A (x), υ_B (x) >: x ∈ X} in an intuitionistic fuzzy topology space (X, τ) is said to be

(i) Intuitionistic fuzzy semi closed if int(cl (A) ⊆ A.

(ii) Intuitionistic fuzzy pre closed if cl(int(A))⊆ A.

Definition 2.8: An intuitionistic fuzzy set A of an intuitionistic fuzzy topological space (X,τ) called

(i)intuitionistic fuzzy generalized closed set [15] (intuitionistic fuzzy g – closed) if cl(A) ⊆ U whenever

A ⊆ U and U is intuitionistic fuzzy semi open

(ii)intuitionistic fuzzy g – open set[14], if the complement of an intuitionistic fuzzy g – closed set is called intuitionistic fuzzy g - open set.

(iii)intuitionistic fuzzy semi open (resp. intuitionistic fuzzy semi closed)[6] if there exists an intuitionistic fuzzy open (resp. intuitionistic fuzzy closed) such that U⊆A ⊆ Cl(U) (resp. int(U) ⊆ A ⊆ U).

Remark 2.9 : [15]: Every intuitionistic fuzzy closed set (intuitionistic fuzzy open set) is intuitionistic fuzzy g- closed (intuitionistic fuzzy g- open) set) but the converse may not be true

Definition 2.10 An intuitionistic fuzzy set A of an intuitionistic fuzzy topological space (X, τ) is called

(i) an intuitionistic fuzzy w-closed **[14]** if cl(A) ⊆ O whenever A ⊆O and O is intuitionistic fuzzy semi open.

(X, τ)

(ii) an intuitionistic fuzzy rw-closed set[16] if cl(A) ⊆ O whenever A ⊆O and O is intuitionistic fuzzy regular semi open. (X, τ)

(iii) an intuitionistic fuzzy rg-closed set[16] if cl(A) ⊆ O whenever A ⊆O and O is intuitionistic fuzzy regular open. (X, τ)

(iv)) an intuitionistic fuzzy generalized α-closed set [8] (IFGαCS if αcl(A) ⊆ O whenever A ⊆O and O is IFαOS in(X, τ)

(iv)) an intuitionistic fuzzy α-generalized closed set [12] (IFαGCS if αcl(A) ⊆ O whenever A ⊆O and O is IFOS in(X, τ)

Definition 2.11 :[12] An iuitionistic fuzzy set A of an intuitionistic fuzzy topological space (X,τ) called an

(i) intuitionistic fuzzy α-open set (IF αOS in short) if A⊆ int (cl (int (A)))

(ii)) intuitionistic fuzzy α-closed set (IF αCS in short) if cl (int(cl(A)) ⊆ A.

Definition 2.12 :[8] An iuitionistic fuzzy set A of an intuitionistic fuzzy topological space (X,τ) called intuitionistic fuzzy alpha generalised closed set (IFαGCS in short) if αcl(A) ⊆U and U is an IFOS in (X,τ).

Definition 2.13 : [5] Let X and Y are nonempty sets and f: X→Y is a function.

(a) If B = {< y, μ_B (y) ,υ_B (y) > : y ∈ Y } is an

intuitionistic fuzzy set in Y, then the pre image of B

under f denoted by f^{-1}(B) , is defined by

f^{-1}(B) ={<x ,f^{-1}(μ $_B$(x)),f^{-1}(υ_B(x)) > : x ∈ X}

(b) If A= {<{x, μ $_A$ (x) ,υ $_B$ (x),)> / x∈ X} is an intuitionistic fuzzy set in X, then the image of A under f denoted by f(A) is the intuitionistic fuzzy set in Y defined by

f(A) = {<y ,f (μ_A (y)), f (υ_A(y)) > : y ∈ Y} where f(υ_A) = 1-f(1-(υ_A)).

Definition 2.14: [10] An intuitionistic fuzzy set A of an intuitionistic topology space (X ,) is called an

(i) intuitionistic fuzzy λ-closed set (IF λ-CS) if A ⊒ cl(U) whenever A ⊒ U and U is intuitionistic fuzzy open set in X

(ii) intuitionistic fuzzy λ-open set (IF λ-OS) if the complement A^c of an intuitionistic fuzzy λ-closed set

Definition 2.15 :[13] 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 open mapping (IF open mapping) if f(A) is an IFOS in Y for every IFOS A in X.

(ii) intuitionistic fuzzy closed mapping (IF closed mapping) if f(A) is an IFCS in Y for every IFCS A in X.

Definition 2.16 :[11] : A mapping f: (X,τ) → (Y, σ) is said to be intuitionistic fuzzy **λ** –continuous if the inverse image of every intuitionistic fuzzy closed set of Y is intuitionistic fuzzy **λ** -closed in X

Definition 2.17 : [11]: A topological space (X, τ) is called intuitionistic fuzzy **λ** - T $_{1/2}$space

(IF **λ** -- $T_{1/2}$ space in short) if every intuitionistic fuzzy **λ** - closed set is intuitionistic

fuzzy closed in X.

3. APPLICATIONS OF INTUITIONISTIC FUZZY λ -CLOSED SET.

In this section we study the relations between Intuitionistic fuzzy λ -closed sets and some other Intuitionistic fuzzy sets already exists.

Definition3.1. Let A be an IFS in an IFTS (X, τ). Then the intuitionistic fuzzy **λ**- interior and intuitionistic fuzzy **λ**- closure of A are defined as follows.

λ-int(A) = ∪{G |G is an IF**λ**-OS in X and G⊆ A},

λ-cl(A) = ∩{K | K is an IF**λ**-CS in X and A ⊆ K }.

Theorem 3.2:Every IF preclosed set is IF λ -closed set .

Proof : Let A be a IF preclosed set. Let G is an IF open set such that A⊇ G. Then cl (int (A)) ⊇ cl (int(G)) ⊇ cl (G).Therefore cl (int (A)) ⊇ cl (G).Since A is IF preclosed set we have A ⊇ cl (int (A)) ⊇ cl (G).Thus A ⊇ cl (G).Therefore A is IF λ -closed set.

Remark 3.3 : The converse above theorem need not be true as seen from the following example.

Example3.4 : Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U= { < a, 0.5,0.5 >, < b, 0.3,0.6 > }.Then the intuitionistic fuzzy set

A={ < a,0.5,0.5>,<b, 0.8, 0.2 > } is IF λ-closed set but not pre closed set.

Remark 3.5 : IF λ – closed sets and IF w-closed sets are independent to each oter example

Example 3.6: Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U = { <a, 0.5, 0.5>, <b, 0.5,0.2>}. Then the intuitionistic fuzzy set A = {<a, 0.5, 0.5>, <b, 0.5, 0.4>} is not intuitionistic fuzzy IF λ-closed set but not IF w-closed set

Example 3.7: Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U= { < a, 0.5,0.5 >, < b, 0.4,0.6 > }.Then the intuitionistic fuzzy set

A={ < a,0.5,0.5>,<b, 0.5, 0.5> } is IF w-closed set not IF λ-closed set.

Remark 3.8 : IF λ – closed sets and IF rw-closed sets are independent to each oter example

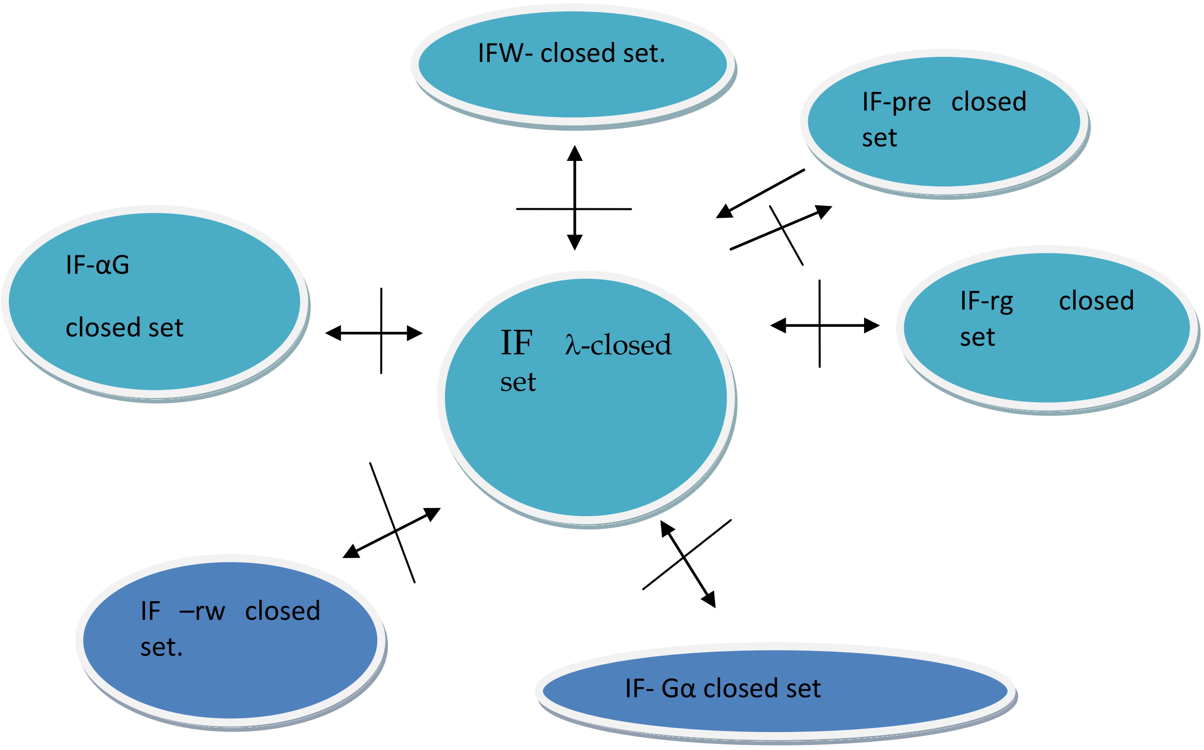
Example 3.9 Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U = { <a, 0.5, 0.5>, <b, 0.5,0.2>}. Then the intuitionistic fuzzy set A = {<a, 0.5, 0.5>, <b, 0.5, 0.4>} is not intuitionistic fuzzy IF λ-closed set but not IF rw-closed set

Example 3.10 : Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U= { < a, 0.7,0.2 >, < b, 0.6,0.3> }.Then the intuitionistic fuzzy set

A={< a, 0.7,0.2 >, < b, 0.6,0.3> } is IF rw-closed set but not IF λ -closed set.

Remark 3.11: IF λ – closed set and IF rg-closed set are independent to each oter example.

Example 3.12: Let X = { a,b} and $\tau = \{\tilde{0}, \tilde{1}, U\}$ be an intuitionistic fuzzy topology on X.where U = { <a, 0.5, 0.5>, <b, 0.5,0.2>}. Then the intuitionistic fuzzy set A = {<a, 0.5, 0.5>, <b, 0.5, 0.4>} is not intuitionistic fuzzy IF λ-closed set but not IF rg-closed set



Example 3.13: Let X = { a,b,c,d } and τ = { $\tilde{0}$, $\tilde{1}$, U,V,W } be an intuitionistic fuzzy topology on X.where U={ < a, 0.7,0.2 >, < b, 0.6,0.3> , < c, 0,1 >, < d,0,1> }

V= { < a, 0.9,0.1 >, < b, 0.8,0.1 > , < c, 0,1 >, < d,0,1> },

W = { < a, 0.7,0.2 >, < b, 0.6,0.3> , < c, 0,1 >, < d,0,1> }

Then the intuitionistic fuzzy set A={ < a,0 ,1>,< b,0, 1>,<c, 0.7,0.2>, < d,0,1>} is IF rg-closed set but not IF λ-closed set

Remark3.14: Gα closed sets and IF closed sets are independent to each other for example

Example 3.15: Let X = { a,b} and τ = { $\tilde{0}$, $\tilde{1}$, U }be an intuitionistic fuzzy topology on X.where U={< a, 0.2,0.8>, < b, 0.3,0.7>}.Then the intuitionistic fuzzy set A={ < a,0.6,0.4>,<b, 0.7, 0.3> } is IF Gαclosed set but not IF λ-closed set.

Example 3.16: Let X = { a, b } and let and τ = { $\tilde{0}$, $\tilde{1}$, U }be an intuitionistic fuzzy topology on X.where U={< a, 0.8,0.2 >, < b, 0.8, 0.1 >}. Then the intuitionistic fuzzy set. A={ < a,0.9,0.1 > ,<b, 0.7, 0.3> } is IF λ-closed set but is not IF Gαclosed set .

Remark :3.17 αG closed sets and IF closed sets are independent to each other for example

Example 3.18: Let X = { a,b} and τ = { $\tilde{0}$, $\tilde{1}$, U }be an intuitionistic fuzzy topology on X.where U={< a, 0.2,0.6 >, < b, 0.2,0.7>}.Then the intuitionistic fuzzy set A={ < a,0.4,0.6 >,<b, 0.2, 0.7 > } is IF αG closed set but not IF λ-closed set.

Example 3.19: Let X = { a,b} and τ = { $\tilde{0}$, $\tilde{1}$, U }be an intuitionistic fuzzy topology on X.where U={< a, 0.2,0.4 >, < b, 0.3,0.5 >}.Then the intuitionistic fuzzy set A={ < a,0.5,0.1 >,<b, 0.6, 0> } is IF λ-closed set but not IF αG −closed set.

Remark 3.20 : From above examples and remarks we get following diagram of implications.

In this diagram A ⟶ B means that A implies B

A ⟶̸ B means that B does not imply A

A ⟷̸ B means that A and B are independent to each other.

4. λ- irresolute mappings in intuitionistic fuzzy topological spaces.

In this section we introduce intuitionistic fuzzy λ- irresolute mapping and study some of its properties.

Definition 4.1: A mapping f: (X, τ) → (Y, σ) is called intuitionistic fuzzy λ- irresolute (IF- λ- irresolute) if

f^{-1} (V) is IF λ- closed set is in (X, τ) for every IF λ-closed set V of (Y, σ)

Theorem 4.2: If a mapping f :(X, τ) → (Y, σ) is called IF λ- irresolute mapping then it is IF λ-continuous mapping but not conversely.

Proof : Let V be any closed set in Y. since every closed set is IF λ- closed set, V is IF λ- closed set in Y. By assumption f^{-1}(V) is IF λ-closed set in X. Thus f is IF λ-continuous.

The converse of the above theroem need not be true as seen in the following example:

Example 4.3: Let X= Y = {a, b}, and intuitionistic fuzzy sets U and V are defined as follows.

U={ <a,0.5,0.5>,<b,0.2,0.7 > },

V={<a,0.5,0.5>,<b,0.6,0.4 > } be the intuitionistic fuzzy sets respectively and Let τ ={ $\tilde{0}$, $\tilde{1}$, U } and σ ={ $\tilde{0}$, $\tilde{1}$, V} be intuitionistic fuzzy topologies on X and Y respectively. And let f :(X, τ) → (Y, σ) be the identity mapping. Clearly f is IF λ- continuous mapping. f^{-1}({<a,0.5,0.5>,<b,0.4,0.6>} ={<a,0.5,0.5>,<b,0.4, 0.6 >} in not IF λ-closed set in X.Therefore f is not IF λ- irresolute mapping.

Theorem 4..4 : Let X,Y,and Z be any topological space. For any IF λ-irresolute map f: (X, τ) → (Y, σ) and IF λ-continuous map g :(Y, σ) →(Z, υ) .The composition

g ∘ f :(X, τ) → (Z, υ) is IF λ-continuous.

Proof : Let V be any closed set in Z. since g is IF λ-continuous map,g $^{-1}$ (V) is IF λ-closed in Y. Since IF λ-f is irresolute map f^{-1} (g^{-1} (V)) is IF λ-closed in X.But

f^{-1} (g^{-1} (V)) = (g ∘ f) $^{-1}$ (V) which is λ-closed in X.Thus g ∘ f is IF λ-continuous map.

Theorem 4.5 :If f: (X, τ) → (Y, σ) is IF open mapping and IF continuous then f is IF λ- irresolute map.

Proof : Let A be a λ-closed set in Y. Let f^{-1} (A) ⊇ O where O is open in X. since f is IF open,

f (O) is open in Y. Thus we have A⊇ f (O) . This implies A⊇ Cl (f(O)). But cl (f(O) ⊇ f (cl(O) because f is IF continuous.Therefore A ⊇f(cl(O)).Hence f^{-1}(A) is IF λ-closed set in X. Therefore f IF λ- is irresolute.

Theorem:4. 6 :If X, Y and Z are topological spaces.and f : (X, τ) → (Y, σ) and

g :(Y, σ) →(Z, υ) are IF λ-irresolute then composition g ∘ f : (X, τ) → (Z, υ) is IF λ-irresolute map.

Proof : Let V be a IF λ-closed set in Z. Since g is IF λ-irresolute map , g^{-1} (V) is IF λ-closed set in (Y, σ).Also we are given that f is IF λ-irresolute and therefore f^{-1} g^{-1} (V) is

IF λ-closed set in (X, τ) .But f^{-1} (g^{-1} (V)) = (g ∘ f) $^{-1}$ (V). Hence (g ∘ f) is IF λ-irresolute map from X to Z.

Theorem 4.7: Let f: (X, τ) → (Y, σ) be an IF λ- irresolute, then f is an IF irresolute

mapping if X is an IF λ-$T_{1/2}$ space.

Proof: Let A be an IFCS in Y. Then A is an IFλ-CS in Y. Therefore f^{-1} (A) is an

IF λ-CS in X, by hypothesis. Since X is an IF λ-$T_{1/2}$ space, f^{-1} (A) is an IFCS in X. Hence.

f is an IF irresolute mappings.

Theorem 4.8: 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 λ-$T_{1/2}$ spaces.

(i) f is an IFλ- irresolute mapping

(ii) f^{-1} (B) is an IFλ-OS in X for each IFλ-OS in Y

(iii) cl(f^{-1} (B)) ⊆ f^{-1} (cl(B)) for each IFS B of Y.

Proof: (i) ⟹ (ii): It can be proved by using complement and definition 4.1.

(ii) ⟹ (iii): Let B be any IFS in Y and B ⊆ cl(B). Then f^{-1} (B) ⊆ f^{-1} (cl(B)). Since cl(B)

is an IFCS in Y, cl(B) is an IFλ-CS in Y. Therefore f^{-1} (cl(B)) is an IFλ-CS in X,

by hypothesis. Since X is IF λ-$T_{1/2}$ space. f^{-1} (cl(B)) is an IFCS in X. Hence

cl(f^{-1}((B)) ⊆ cl f^{-1} (cl(B))) = f^{-1} (cl(B). That is cl f^{-1} (B)) ⊆ f^{-1} (cl(B)).

(iii) ⟹ (i): Let B be an IF λ-CS in Y. Since Y is an IF λ- $T_{1/2}$ space , B is an IFCS in Y and

cl(B) = B. Hence f^{-1} (B) = f^{-1} (cl(B)) ⊆ cl(f^{-1} (B)). But clearly f^{-1} (B) ⊇ cl(f^{-1} (B)).

Therefore cl(f^{-1} (B)) = f^{-1} (B). This implies f^{-1} (B) is an IFCS and hence it is an IFλ-CSin X. Thus f is an IFλ-irresolute mapping.

Theorem 4.9: Let f : (X, τ) → (Y, σ) be a an IFλ- irresolute mapping from an IFTS X into an IFTS Y. Then f^{-1} (B) ⊆ λ-int(f^{-1} (cl(int(cl(B))))) for every IFλ-OS B in Y, if X and Y are IF λ- $T_{1/2}$ spaces.

Proof: Let B be an IFλ-OS in Y. Then by hypothesis f^{-1} (B) is an IF λ-OS in X. Since X is an IF λ-$T_{1/2}$ space, f^{-1} (B) is an IFOS in X. Therefore λ- int((B)) = (B). since Y is an IFλ-$T_{1/2}$ space, B is an IFλ-OS in Y and B ⊆ cl(int(cl(B))). Now f^{-1} (B) =λ- int(f^{-1} (B)) implies,

f^{-1} (B) ⊆ λ-int(f (cl(int(cl(B)))).

Theorem 4.10: If a mapping f : X → Y is intuitionistic fuzzy λ--irresolute mapping, then

f (λ-cl(B)) ⊆ λ- cl(f (B)) for every IFS B of X.

proof : Let B be an IFS of X. Since cl(f (B)) is an IFλ-CS in Y , by our assumption

f^{-1} (cl(f (B))] is an IFλ-CS in X. Furthermore B ⊆f^{-1}(f (B)) ⊆ f^{-1}(cl(f (B))) and hence

λ-cl(B) ⊆ f^{-1}[cl(f (B))] and consequently f [λ-cl(B)] ⊆ f [f^{-1}[cl(f (B))]] ⊆ cl(f (B)).

Theorem4.11 : If any union of IFλ-CS is an IFλ-CS, then a mapping f : X →Y from an IFTS

X into an IFTS Y is intuitionistic fuzzy λ- -irresolute if and only if for each IFP $p_{(\alpha,\beta)}$ in X and IFλ-CS B in Y such that f ($p_{(\alpha,\beta)}$)∈ B, there exists an IFλ-CS A in X such that $p_{(\alpha,\beta)}$ ∈ A and

f (A) ⊆ B.

Proof : Let f be any intuitionistic fuzzy-irresolute mapping, $p_{(\alpha,\beta)}$ an IFP in X and B be any IFλ-CS in Y , such that f ($p_{(\alpha,\beta)}$)∈ B. Then$p_{(\alpha,\beta)}$ ∈ f^{-1}(B) =λ-cl[f^{-1}(B)]. We take

A =λ-cl[f^{-1}(B)]. Then A is an IFλ-CS in X, containing IFP $p_{(\alpha,\beta)}$ and

f (A) = f [λ-cl(f^{-1}(B))] ⊆ f [f^{-1}(B)] ⊆ B.

Conversely assume that B be any IFλ-CS in Y and IFP $p_{(\alpha,\beta)}$ (x) in X, such that

$p_{(\alpha,\beta)}$ ∈ f^{-1}(B). By assumption there exists IFλ-CS A in X such that $p_{(\alpha,\beta)}$ ∈ A and f (A) ⊆ B. Therefore $p_{(\alpha,\beta)}$ (x) ∈ A ⊆ f^{-1}(B) and $p_{(\alpha,\beta)}$ ∈ A =λ-cl(A) ⊆ λ- cl[f^{-1}(B)]. Since$p_{(\alpha,\beta)}$ is an arbitrary IFP and f^{-1}(B) is union of all IFP contained in f^{-1}(B), f^{-1}(B) is an IFλ-CS in X, so f is an intuitionistic fuzzy λ-irresolute mapping.

Corollary 4.12. A mapping f : X → Y from an IFTS X into an IFTS Y is intuitionistic fuzzy

λ-irresolute if and only if for each IFP $p_{(\alpha,\beta)}$ in X and IFλ-CS B in Y such thatf($p_{(\alpha,\beta)}$)

∈ B, there exists an IFλ-CS A in X such that $p_{(\alpha,\beta)}$ ∈ A and A⊆ f^{-1}(B).

Proof. Follows fromTheorem4.11

5. CONCLUSION

In this paper we have studied the relations between intuitionistic fuzzy λ-closed sets and the other intuitionistic fuzzy sets already exists.Also we studied the intuitionistic fuzzy λ-irresolute map and some of its properties.

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