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Intuitionistic Fuzzy RαG Supra Closed Sets In Intuitionistic Fuzzy Supra Topological Spaces

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Abstract- Intuitionistic fuzzy supra topological space was introduced by NeclaTuranl which is a special case of intuitionistic fuzzy topological space. Aim of this present paper is we introduce and study about Intuitionistic fuzzy RαG supra closed sets in Intuitionistic fuzzy supra topological spaces and its properties and characterization are discussed detailed.

Index Terms- IFRαG supra open sets, IFRαG supra closed sets, IFRαG supra interior and IFRαG supra closure
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1. INTRODUCTION

L.A. Zadeh's [21] introduced fuzzy sets, using these fuzzy sets C.L. Chang [4] was introduced and developed fuzzy topological space. Atanassov [2] introduced Intuitionistic fuzzy set, Using this Intuitionistic fuzzy sets Coker[5] introduced the notion of Intuitionistic fuzzy topological spaces. The supra topological spaces introduced and studied by A.S.Mashhour in the year 1983

A M. E. Abd El-Monsef et al. [1] introduced the fuzzy supra topological spaces and studied fuzzy supra-continuous functions and obtained some properties and characterizations. In 2003 Necla Turanl [20] introduced the concept of Intuitionistic fuzzy supra topological space.

NeclaTuranl [20] introduced Intuitionistic fuzzy regular supra closed sets. M.Parimala,Jafari Saeid Intuitionistic fuzzy α-supra continuous maps in Intuitionistic fuzzy supra topological spaces. Aim of this present paper is we introduce Intuitionistic fuzzy RαG supra closed sets in intuitionistic fuzzy supra topological spaces and its properties and characterization are discussed detailed

2. PRELIMINARIES

Definition 2.1[3]

An Intuitionistic fuzzy set (IF for short) A is an object having the form A = {⟨x, μ_A(x), ν_A(x)⟩ : x ∈ X}
where the functions μ_A:X⟶ [0,1] and ν_A:X⟶ [0,1] denote the degree of membership (namely μ_A(x)) and the degree of non-membership (namely ν_A(x)) of each element x ∈ X to the set A respectively, and $0 \le \mu_A(x) + \nu_A(x) \le 1$ for each x ∈ X. Obviously, every fuzzy set A on a nonempty set X is an IFS of the following form

A ={⟨x, μ_A(x), 1- μ_A(x)⟩: x ∈ X}.

Definition 2.2 [3]

Let A and B be two Intuitionistic fuzzy sets of the form
A = {⟨x, μ_A(x), ν_A(x)⟩: x ∈ X} and
B = {⟨x, μ_B(x), ν_B(x)⟩ : x∈X}. Then,
(i) 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,
(ii) A = B if and only if A ⊆ B and A ⊇ B,
(iii) A^C = {⟨x, ν_A(x), μ_A(x)⟩: x ∈ X},
(iv) A∪B = {⟨x, $\mu_A(x) \vee \mu_B(x)$, $\nu_A(x) \wedge \nu_B(x)$⟩: x ∈ X},
(v) A∩B = {⟨x, $\mu_A(x) \wedge \mu_B(x)$, $\nu_A(x) \vee \nu_B(x)$⟩: x ∈ X}.
(vi) [ ]A= {⟨x, μ_A(x), $1 - \mu_A(x)$⟩, x ∈X};
(vii) ⟨⟩A = {⟨x, $1 - \nu_A(x)$, ν_A(x)⟩, x ∈X};
The Intuitionistic fuzzy sets 0~ = ⟨x, 0, 1⟩ and
1~ = ⟨x, 1, 0⟩ are respectively the empty set and the whole set of X

Definition 2.3. [3]

Let {A_i:i ∈J } be an arbitrary family of Intuitionistic fuzzy sets in X. Then
(i) ∩A_i = {⟨x,$\wedge\mu_{A_i}$(x),$\vee\nu_{A_i}$ (x) ⟩ : x ∈ X};
(ii) ∪A_i = {⟨x,$\vee\mu_{A_i}$(x),$\wedge\nu_{A_i}$ (x) ⟩ : x ∈ X}.

Definition 2.4.[3]

we must introduce the Intuitionistic fuzzy sets 0~and 1~in X as follows:
0~ = {⟨x, 0, 1⟩: x ∈X} and 1~ = {⟨x, 1, 0⟩ :x ∈X}.

Definition 2.5[3]

Let A, B, C be Intuitionistic fuzzy sets in X. Then
(i) A ⊆B and C⊆D ⇒A ∪C B∪D and A∩C ⊆B∩D,
(ii) A⊆B and A ⊆C ⇒A ⊆B ∩ C,
(iii) A⊆C and B⊆C ⇒A ∪B ⊆C,
(iv) A⊆B and B ⊆C ⇒A ⊆C,
(v) $\overline{A \cup B} = \bar{A} \cap \bar{B}$
(vi) $\overline{A \cap B} = \bar{A} \cup \bar{B}$,
(vii) A ⊆B ⇒$\bar{B} \subseteq \bar{A}$,
(viii) $\overline{(\bar{A})}$= A,
(ix) $\bar{1}$~ = 0~,
(x) $\bar{0}$~ = 1~.

Definition 2.6[3]
Let f be a mapping from an ordinary set X into an ordinary set Y,
If B ={⟨y, μ_B(y), ν_B(y) ⟩: y ∈Y } is an IFST in Y , then the inverse image of B under
f is an IFST defined by f^{-1}(B)={⟨x,f^{-1}(μ_B)(x), f^{-1}(ν_B)(x) ⟩: x ∈X}The image of IFST A = {⟨y, μ_A(y), ν_A(y) ⟩: y ∈Y } under f is an IFST defined by
f(A) = {⟨y, f(μ_A)(y), f(ν_A)(y) ⟩: y ∈Y }.

Definition 2.7 [3]
Let A, A_i (i ∈J) be Intuitionistic fuzzy sets in X, B, B_i (i∈K) be Intuitionistic fuzzy sets in Y and f: X → Y is a function. Then
(i) A_1⊆A_2⇒f (A_1) ⊆f (A_2),
(ii) B_1⊆B_2⇒f^{-1}(B_1) ⊆f^{-1}(B_2),
(iii) A ⊆f^{-1}(f (A)) { If f is injective,
Then A = f^{-1}(f (A))},
(iv) f (f^{-1}(B)) ⊆B { If f is surjective,
then f (f^{-1}(B)) = B},
(v) $f^{-1}(\cup B_j) = \cup f^{-1}(B_j)$
(vi)$f^{-1}(\cap B_j) = \cap f^{-1}(B_j)$
(vii) $f(\cup B_j) = \cup f(B_j)$
(viii)$f(\cap B_j) \subseteq \cap f(B_j)$ { If f is injective, then $f(\cap B_j) = \cap f(B_j)$}
(ix) f^{-1}(1∼) = 1∼ ,
(x) f^{-1}(0∼) = 0∼,
(xi) f (1∼) = 1∼ , if f is surjective
(xii) f (0∼) = 0∼,
(xiii) $\overline{f(A)} \subseteq f(\bar{A})$, if f is surjective,
(xiv) $f^{-1}(\bar{B}) = \overline{f^{-1}(B)}$.

Definition 2.8[21]
A family τ_μ Intuitionistic fuzzy sets on X is called an Intuitionistic fuzzy supra topology (in short,IFST) on X if 0~∈τ_μ,1~∈τ_μ and τ_μ is closed under arbitrary suprema. Then we call the pair (X,τ_μ) an Intuitionistic fuzzy supra topological space.
Each member of τ_μ is called an Intuitionistic fuzzy supra open set and the complement of an Intuitionistic fuzzy supra open set is called an Intuitionistic fuzzy supra closed set.

Definition 2.9 [21]
The Intuitionistic fuzzy supra closure of a set A is denoted by S-cl(A) and is defined as
S-cl (A) = ∩ {B: B is Intuitionistic fuzzy supra closed and A ⊆ B}.
The Intuitionistic fuzzy supra interior of a set A is denoted by S-int(A) and is defined as
S-int(A) = ∪{B : B is Intuitionistic fuzzy supra open and A ⊇ B}

Definition 2.10[21]
(i). ¬ (AqB) ⇔ A ⊆ B^C .
(ii).A is an Intuitionistic fuzzy supra closed set in X⇔S-Cl (A) = A.
(iii). A is an Intuitionistic fuzzy supra open set in X⇔S-int (A)=A.
(iv). S-cl(A^C)=(S-int(A))^C.
(v). S-int(A^C)=(S-cl(A))^C.
(vi). A⊆B ⇒ S-int(A)⊆S-int(B).
(vii). A⊆B ⇒ S-cl(A)⊆S-cl(B).
(viii).S-cl(A∪B)=S-cl(A)∪S-cl(B).
(ix). S-int(A∩B)=S-int(A)∩S-int(B).

Definition 2.11:
An IFS A in an Intuitionistic fuzzy supra topological space (X,τ_μ) is said to be
(i) Intuitionistic fuzzy semi supra open if A ⊆S-cl(S-int(A))
(ii) Intuitionistic fuzzy α supra open if A ⊆S-int(S-cl(S-int(A)))
(iii) Intuitionistic fuzzy pre supra open if A ⊆S-int(S-cl(A))
(iv) Intuitionistic fuzzy regular supra open if A = S-int(S-cl(A))

Definition 2.12
An Intuitionistic fuzzy point (IFP in short), written as p(α, β), is defined to be an IFS of X given by
$$P_{(\alpha,\beta)}(x) = \begin{cases}(\alpha,\beta) \; if \; x = p, \\ (0,1) \; otherwise\end{cases}$$
An IFP p(α, β) is said to belong to a set A if α ≤ μA and β ≥ ν_A

Definition 2.13
An IFTS (X,τ_μ) is said to be an IF$T_{1/2}$ space if every IFGSCS in (X,τ_μ) is an IFCS in (X, τ_μ).

Definition 2.14
Let A be an IFS in an IFTS (X,τ_μ) Then
(i) IFαS-int(A) = ∪ {G / G is an IFα supra open in X and G ⊆A }
(ii) IFαS-cl(A) = ∩ {K / K is an IFα supra closed in X and A ⊆K }

Result 2.15
Let A be an IFS in (X,τ_μ) Then
(i) IFαS-cl(A) = A ∪ S-cl(S-int(S-cl(A)))
(ii) IFαS-int(A) = A ∩ S-int(S-cl(S-int(A)))

3.INTUITIONISTIC FUZZY RαG SUPRA CLOSED SETS

In this section we introduce the notion of Intuitionistic fuzzy regular α generalized supra closed sets fuzzy supra topological spaces and study some of their properties.

Definition 3.1:
An IFS A of an Intuitionistic fuzzy supra topological spaces (X,τ_μ) is called
Intuitionistic fuzzy regular α generalized Supra closed set (IFRαG-Supra closed set in short)
if IFα-Scl(A)⊆U whenever A⊆U and U is an IF regular-Supra open set in X.
Then complement is called Intuitionistic fuzzy regular α generalized Supra open set (IFRαG-Supra open set)

Example 3.2:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x,(0.7,0.8),(0.5,0.3)⟩whereμa=0.7,μb=0.8,νa=0.5, νb=0.3 and B=⟨x,(0.2,0.3),(0.8,0.8)⟩ where μa=0.2 ,μb=0.3,νa=0.8,νb=0.8.Let A=⟨x, (0.7,0.8),(0.4,0.2)⟩ be any IFS in (X,τ_μ). Then A⊇U where U=⟨x, (0.5,

0.3),(0.7,0.8)⟩is an IFR-Supra closed set in X. Now IFαS-int(A)=⟨x,(0.7,0.8),(0.5,0.3)⟩⊒U. Therefore A is an IFRαG-Supra open set in (X,τ_μ).

Theorem 3.3:
Every IF-Supra open set, IFRSOS and IFα-Supra open set is an IFRαG-Supra open set but the converses are not true in general.

Proof:
Straight forward.

Example 3.4:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x,(0.7,0.6),(0.5,0.3)⟩ and B=⟨x,(0.3,0.2),(0.9,0.9)⟩. Let A=⟨x,(0.7,0.7),(0.4,0.3)⟩ be any IFS in X.Then A⊒U where U=⟨x, (0.5,0.3),(0.7,0.6)⟩ is an IFR-Supra closed set in X. Now IFαS-int(A)=⟨x,(0.7,0.6),(0.5,0.3)⟩⊒U.A is an IFRαG-Supra open set but not an IF-Supra open set in X,since S-int(A)=⟨x, (0.7,0.6),(0.5, 0.3)⟩ ≠ A.

Example 3.5:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x, (0.7,0.8),(0.5,0.3)⟩ and B=⟨x,(0.2,0.3),(0.9,0.9)⟩ .Let A=⟨x, (0.7,0.8),(0.4,0.3)⟩ be any IFS in (X,τ_μ). Then A⊒U where U=⟨x, (0.5,0.3),(0.7,0.8)⟩is an IFR-Supra closed set in X. Now IFαS-int(A)=⟨x,(0.7,0.8),(0.5,0.3)⟩⊒U.A is an IFRαG-Supra open set but not an IFRSOS in X, since S-int(S-cl(A))=⟨x,(0.7,0.6),(0.5,0.3)⟩ ≠ A.

Example 3.6:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x, (0.6,0.8),(0.5,0.3)⟩ andB=⟨x,(0.3,0.3),(0.9,0.9)⟩. Let A=⟨x, (0.6,0.8),(0.4,0.3)⟩ be any IFS in (X,τ_μ). Then A⊒U where U=⟨x, (0.5,0.3),(0.6,0.8)⟩ is an IFR-Supra closed set in X. Now IFαS-int(A)=⟨x,(0.6,0.8),(0.5,0.3)⟩⊒U. A is an IFRαG-Supra open set but not an IFα-Supra open set in X, since S-int(S-cl(S-int(A)))=⟨x, (0.6,0.8),(0.5,0.3)⟩⋣ A.

Remark 3.7:
Every IFRαG-Supra open sets and every IFP-Supra open sets are independent to each other.

Example 3.8:
In Example 3.6, let A=⟨x, (0.7,0.8),(0.3,0.3)⟩ be any IFS in X. Then A⊒U where U=⟨x,(0.5,0.3),(0.6,0.8)⟩ is an IFR-Supra closed set in X. Now IFαS-int(A)=⟨x,(0.6,0.8),(0.5,0.3)⟩⊒U. A is an IFRαG-Supra open set but not an IFP-Supra open set in X, since S-int(S-cl(A))=⟨x, (0.6,0.8),(0.5,0.3)⟩⋣ A.

Example 3.9:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x,(0.3,0.4),(0.7,0.8)⟩and B=⟨x, (0.9,0.8),(0.2,0.2)⟩. Let A=⟨x, (0.8,0.9),(0.2,0.3)⟩ be any IFS in (X,τμ). Then S-int(S-cl(A))= 1~ ⊒A. Therefore A is an IFP-Supra open set in X but not an IFRαG-Supra open set in X, since A⊒U where U is an IFR-Supra closed set in X but IFαS-int(A)=⟨x, (0.3,0.4),(0.7,0.8)⟩⋣ U.

Remark 3.10:
Every IFRαG-Supra open sets and every IFSupra open sets are independent to each other.

Example 3.11:
Let X={a,b} and let τμ={0~,A,B,A∪B,1~} where A=⟨x,(0.7,0.8),(0.5,0.3)⟩and B=⟨x, (0.2,0.3),(0.8,0.9)⟩. Let A=⟨x, (0.9, 0.8),(0.3,0.2)⟩ be any IFS in (X,τμ). Then A⊒U where U=⟨x, (0.5,0.3),(0.7,0.8)⟩ is an IFR-Supra closed set in X.Now IFαS-int(A)=⟨x, (0.7,0.8),(0.5,0.3)⟩⊒U. A is an IFRαG-Supra open set but not an IF Supra open set in X, since S-cl(S-int(A))=⟨x, (0.8,0.9),(0.2,0.3)⟩⋣ A.

Example 3.12:
Let X={a,b} and let τ_μ={0~,A,B,A∪B,1~} where A=⟨x,(0.6,0.3),(0.6,0.9) and B=⟨x,(0.3,0.3),(0.9,0.9)⟩. Let A=⟨x,(0.6,0.9),(0.6,0.3)⟩ be any IFS in (X,τ_μ). ThenS-cl(S-int(A))=⟨x,(0.6,0.9),(0.6,0.3)⟩=A.
Therefore A is an IF Supra open set in X but not an IFRαG-Supra open set in X, since A=U where U=⟨x, (0.6,0.9),(0.6,0.3)⟩ is an IFR-Supra closed set in X but IFαS-int(A)=⟨x, (0.6,0.3),(0.6,0.9)⟩⋣ U.

Theorem 3.15:
Let (X,τ_μ) be an Intuitionistic fuzzy supra topological Spaces. Then for every A∈IFRαGSO(X) and for every B∈IFS(X), IFαS-int(A) ⊆ B ⊆ A⟹B∈ IFRαGSO(X).

Proof:
Let A be any IFRαG-Supra open set of X and B be any IFS of X. Let IFαS-int(A)⊆B⊆ A. Then A^C is an IFRαG supra closed set and A^C⊆B^C⊆IFαS-cl(A^C). Then B^C is an IFRαG supra closed setand Therefore B is an IFRαG-Supra open set in X. Hence B ∈IFRαGSO(X).

Theorem 3.16:
If A is an IFR-Supra closed set and an IFRαG-Supra open set in (X,τ_μ). Then A is an IFα-Supra open set in (X,τ_μ).

Proof:
As A⊒A, by the hypothesis, IFαS-int(A) ⊒A. But we have A⊒IFαS-int(A). This implies IFαS-int(A)=A .Hence A is an IFRαG-Supra open set .

Theorem 3.17:
Let (X,τ_μ) be an Intuitionistic fuzzy supra topological spaces . Then for every A ∈ IFS(X) and for every B∈IFRC(X),B⊆A⊆S-int(S-cl(B))⟹A∈IFRαGSO(X).

Proof:
Let B be an IFR-Supra closed set. Then B=S-cl(S-int(B)). By hypothesis, A⊆S-int(S-cl(B))⊆S-int(S-cl(S-cl(S-int(B))))⊆S-int(S-cl(S-int(B)))⊆S-int(S-l(S-int(A))).Therefore A is an IFα-Supra open set and by Theorem 3.3, A is an IFRαG-Supra open set .Hence A ∈IFRαGSO(X).

IV. APPLICATIONS OF INTUITIONISTIC FUZZY REGULAR α GENERALIZED SUPRA CLOSED SETS

In this section we provide some applications of Intuitionistic fuzzy regular α generalized supra closed sets.

Definition 4.1:
If every IFRαG supra closed set in (X,τ_μ) is an IFα-supra closed in (X,τ_μ), then the space can be called as an Intuitionistic fuzzy regular $\alpha T_{1/2}$ space (IFR$\alpha T_{1/2}$ in short).

Theorem 4.2:
An Intuitionistic fuzzy supra topological spaces (X,τ_μ) is an IFR$\alpha T_{1/2}$ space if and only if IFαSO(X)=IFRαGSO(X).

Proof:

Necessity:
Let A be an IFRαG-Supra open set in (X,τ_μ), then A^C is an IFRαG supra closed set in (X,τ_μ). By hypothesis, A^C is an IFα-supra closed in (X,τ_μ) and therefore A is an IFα-Supra open set in (X,τ_μ). Hence IFαSO(X)=IFRαGSO(X).

Sufficiency:
Let A be an IFRαG supra closed set in (X,τ_μ). Then A^C is an IFRαG-Supra open set in (X,τ_μ). By hypothesis, A^C is an IFα-Supra open set in (X,τ_μ) and therefore A is an IFα-supra closed in (X,τ_μ). Hence (X,τμ) is an IFR$\alpha T_{1/2}$ space.

Theorem 4.3:
Let an IFR$\alpha T_{1/2}$ space be an Intuitionistic fuzzy supra topological spaces. If A is an IFS of X then the following properties are hold:
(i) A ∈IFRαGSO(X)
(ii) A⊆S-int(S-cl(S-int(A)))
(iii) There exists IF-Supra open set G such that G⊆A ⊆S-int(S-cl(G)).

Proof:
(i) ⟹ (ii): Let A∈IFRαGSO(X). This implies A is an IFα-Supra open set in X, since X is an IFR$\alpha T_{1/2}$ space,. Then A^C is an IFα-supra closed in X. Therefore S-cl(S-int(S-cl(Ac)))⊆A^C. This implies A⊆S-int(S-cl(S-int(A))).
(ii) ⟹ (iii): Let A ⊆S-int(S-cl(S-int(A))). Hence S-int(A)⊆A ⊆S-int(S-cl(S-int(A))). Then there exists IF-Supra open set G in X such that G ⊆A⊆S-int(S-cl(G)) where G=S-int(A).
(iii) ⟹ (i): Suppose that there exists IF-Supra open set G such that G⊆A⊆S-int(S-cl(G)). It is clear that $(S\text{-int}(S\text{-cl}(G)))^C \subseteq A^C$. That is $(S\text{-int}(S\text{-cl}(S\text{-int}(A))))^C \subseteq A^C$. This implies $S\text{-cl}(S\text{-int}(S\text{-cl}(A^C))) \subseteq A^C$. That is A^C is an IFα-supra closed in X. This implies A is an IFα-Supra open set in X.Hence A ∈IFRαGSO(X).

Definition 4.4:
An Intuitionistic fuzzy supra topological spaces (X,τ_μ) is said to be an Intuitionistic fuzzy regular α $T^*_{1/2}$ space (IFRα$T^*_{1/2}$ space in short) if every IFRαG supra closed set is an IFSCS in (X,τ_μ).

Theorem 4.5:
For any IFS A in (X,τ_μ) where X is an IFRα$T^*_{1/2}$ space, A∈IFRαGSO(X) if and only if every IFP p(α,β) ∈ A, there exist an IFRαG-Supra open set B in X such that p(α,β) ∈ B ⊆ A.

Proof:
Necessity:
If A∈IFRαGSO(X), then we can take B=A so that $p_{(\alpha,\beta)}$∈B⊆A. For every IFP $p_{(\alpha,\beta)}$∈ A.
Sufficiency:
Let A be an IFS in (X,τμ) and assume that there exist B ∈IFRαGSO(X) such that $p_{(\alpha,\beta)}$∈B⊆A. Since X is an IFRα$T^*_{1/2}$ space, B is an IF -Supra open set. Then $A=\cup_{p(\alpha,\beta)\in A}\{p(\alpha,\beta)\}\subseteq\cup_{p(\alpha,\beta)\in A} B \subseteq A$. Therefore $A=\cup_{p(\alpha,\beta)\in A} B$, which is an IF-Supra open set in X. Hence by Theorem 3.3, A is an IFRαG-Supra open set in X.

Definition 4.6
An Intuitionistic fuzzy supra topological spaces (X,τ_μ) is said to be an Intuitionistic fuzzy regular α generalized $T_{1/2}$ (IFRα$GT_{1/2}$ in short) space if every IFRαG supra closed set in X is an IFαGCS in X.

Theorem 4.8
Let an IFRα$GT_{1/2}$supra space be an Intuitionistic fuzzy supra topological spaces. If A is an IFS of X then the following properties are hold:
(i) A∈IFRαGSO(X)
(ii) U ⊆S-int(S-cl(S-int(A))) whenever U ⊆ A and U is an IFSCS in X
(iii) There exists IF-Supra open sets G and A such that A⊆U⊆S-int(S-cl(G)).

Proof:
(i) ⟹ (ii): Let A∈IFRαGSO(X). This implies A is an IFαGOS in X, since X is an IFrα$gT_{1/2}$ space. Then A^C is an IFαGCS in X. Therefore IFαS-cl(A^C)⊆V whenever A^C⊆V and V is an IF-Supra open set in X. That is S-cl(S-int(S-cl(A^C))) ⊆ V. This implies V^C⊆S-int(S-cl(S-int(A))) whenever V^C⊆ A and V^C is IFCS in X. Replacing V^C by U, U ⊆S-int(S-cl(S-int(A))) whenever U ⊆ A and U is an IFCS in X.
(ii) ⟹ (iii): Let U ⊆S-int(S-cl(S-int(A))) whenever U ⊆A and U is an IFCS in X. Hence S-int(U) ⊆ U ⊆S-int(S-cl(S-int(A))). Then there exists IF-Supra open sets G and A in X such that A⊆U⊆S-int(S-cl(G)) where G=S-int(A) and A=S-int(U).
(iii) ⟹ (i): Suppose that there exists IF -Supra open sets G and A such that A⊆ U ⊆S-int(S-cl(G)). It is clear that $(S\text{-int}(S\text{-cl}(G)))^C \subseteq U^C$. That is $(S\text{-int}(S\text{-cl}(S\text{-int}(A))))^C \subseteq U^C$. This implies $S\text{-cl}(S\text{-int}(S\text{-cl}(A^C))) \subseteq U^C$, $A^C \subseteq U^C$ and U^C is an IF-Supra open set in X. This implies IFαS-cl(A^C) ⊆U^C. That is A^C is an IFαGCS in X. This implies A is an IFαGOS in X. Hence A ∈IFRαGSO(X).

4. CONCLUSION

Many different forms of generalized closed sets have been introduced over the years. Various interesting problems arise when one considers openness. Its importance is significant in various areas of mathematics and related sciences, this paper we introduced in IFRαG supra closed sets in Intuitionistic fuzzy supra topological spaces and investigate some of the basic properties. This shall be extended in the future Research with some applications.

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