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
2000 AMS Classification: 03 F55, 54A40

1. INTRODUCTION

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, \mu_A(x), \nu_A(x)) : x \in X\}
where the functions \mu_A:X \rightarrow [0,1] and \nu_A:X \rightarrow [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. Obviously, every fuzzy set A on a nonempty set X is an IFS of the following form
A =\{(x, \mu_A(x), 1-\mu_A(x)) : x \in X\}.

Definition 2.2 [3]
Let A and B be two Intuitionistic fuzzy sets of the form
A = \{(x, \mu_A(x), \nu_A(x)) : x \in X\} and
B = \{(x, \mu_B(x), \nu_B(x)) : x \in X\}. Then,
(i) 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,
(ii) A = B if and only if A \subseteq B and B \subseteq A,
(iii) \bar{A} = \{(x, 1-\mu_A(x), 1-\nu_A(x)) : x \in X\},
(iv) A \cap B = \{(x, \mu_A(x) \wedge \mu_B(x), \nu_A(x) \vee \nu_B(x)) : x \in X\},
(v) A \cup B = \{(x, \mu_A(x) \vee \mu_B(x), \nu_A(x) \wedge \nu_B(x)) : x \in X\}.

Definition 2.3., [3]
Let \{A_i : i \in I\} be an arbitrary family of Intuitionistic fuzzy sets in X. Then
(i) \bigcap_{i \in I} A_i = \{(x, \mu_{\bigcap_i A_i}(x), \nu_{\bigcap_i A_i}(x)) : x \in X\};
(ii) \bigcup_{i \in I} A_i = \{(x, \mu_{\bigcap_i A_i}(x), \nu_{\bigcap_i A_i}(x)) : x \in X\}.

Definition 2.4,[3]
we must introduce the Intuitionistic fuzzy sets 0~ and 1~ in X as follows:
0~ = \{(x, 0, 1) : x \in X\} and 1~ = \{(x, 1, 0) : x \in X\}.

Definition 2.5[3]
Let A, B, C be Intuitionistic fuzzy sets in X. Then
(i) A \subseteq B and C \subseteq D \Rightarrow A \cup C \subseteq B \cup D,
(ii) A \subseteq B and A \subseteq C \Rightarrow A \subseteq B \cap C,
(iii) A \subseteq C and B \subseteq C \Rightarrow A \cup B \subseteq C,
(iv) A \subseteq B and B \subseteq C \Rightarrow A \subseteq C,
(v) \bar{A} \cup \bar{B} = \bar{A \cap B},
(vi) \bar{A} \cap \bar{B} = \bar{A \cup B},
(vii) A \subseteq B \Rightarrow B \subseteq A,
(viii) (\bar{A}) = A.
(ix) \bar{0} = 0~,
(x) \bar{1} = 1~.
Definition 2.6[3]
Let f be a mapping from an ordinary set X into an ordinary set Y, if \( B = \{(y, \mu_B(y), \nu_B(y)) : y \in Y \} \) is an IFST in Y, then the inverse image of B under f is an IFST defined by \( f^{-1}(B) = \{ (x, f^{-1}(\mu_B)(x), f^{-1}(\nu_B)(x)) : x \in X \} \). The image of IFST \( A = \{(y, \mu_A(y), \nu_A(y)) : y \in Y \} \) under f is an IFST defined by \( f(A) = \{(x, f(\mu_A)(y), f(\nu_A)(y)) : y \in Y \} \).

Definition 2.7 [3]
Let \( A, A_i (i \in K) \) be Intuitionistic fuzzy sets in X, B, B_i (i \in K) be Intuitionistic fuzzy sets in Y and f : X \to Y is a function. Then
(i) \( A_1 \subseteq A_2 \Rightarrow f(A_1) \subseteq f(A_2) \),
(ii) \( B_1 \subseteq B_2 \Rightarrow f^{-1}(B_1) \subseteq f^{-1}(B_2) \),
(iii) \( A \cap f^{-1}(f(A)) \) if f is injective, then \( A = f^{-1}(f(A)) \),
(iv) \( f(f^{-1}(B)) \subseteq B \) if f is surjective, then \( f(f^{-1}(B)) = B \),
(v) \( f^{-1}(U) \cup f^{-1}(B) \Rightarrow f^{-1}(U) \),
(vi) \( f^{-1}(U) \cap f^{-1}(B) \Rightarrow f^{-1}(U) \cap f^{-1}(B) \),
(vii) \( f^{-1}(A) \subseteq f \), if f is injective, then \( f^{-1}(A) = f(A) \),
(viii) \( f^{-1}(B) = f^{-1}(B) \).

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

Each member of \( \tau_a \) 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
\[
S-cl(A) = \bigcap \{ B : B \text{ is Intuitionistic fuzzy supra closed and } A \subseteq B \}.
\]
The Intuitionistic fuzzy supra interior of a set A is denoted by S-int(A) and is defined as
\[
S-int(A) = \bigcup \{ B : B \text{ is Intuitionistic fuzzy supra open and } A \supseteq B \}.
\]

Definition 2.10[21]
(i) \( \neg (A \cup B) \Rightarrow A \subseteq B \),
(ii) A is an Intuitionistic fuzzy supra closed set in \( X \Rightarrow S-cl(A) = A \),
(iii) A is an Intuitionistic fuzzy supra open set in \( X \Rightarrow S-int(A) = A \).
(iv) \( S-cl(A) = S-cl(A) \),
(v) \( S-int(A) = S-cl(A) \).
(vi) \( A \subseteq B \Rightarrow S-int(A) \subseteq S-int(B) \).
(vii) \( A \subseteq B \Rightarrow S-cl(A) \subseteq S-cl(B) \).
(viii) \( S-cl(A \cup B) = S-cl(A) \cup S-cl(B) \).
(ix) \( S-int(A \cap B) = S-int(A) \cap S-int(B) \).

Definition 2.11:
An IFS A in an Intuitionistic fuzzy supra topological space \((X, \tau_a)\) is said to be
(i) Intuitionistic fuzzy semi supra open if \( A \subseteq S-cl(S-int(A)) \),
(ii) Intuitionistic fuzzy alpha supra open if \( A \subseteq S-int(S-cl(S-int(A))) \),
(iii) Intuitionistic fuzzy pre supra open if \( A \subseteq S-int(S-cl(A)) \),
(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 \( p(\alpha, \beta) \), is defined to be an IFS of X given by
\[
P(\alpha, \beta)(x) = \begin{cases} (\alpha, \beta) & \text{ if } x = p, \\ (0, 0.1) & \text{ otherwise} \end{cases}
\]
An IFP \( p(\alpha, \beta) \) is said to belong to a set A if \( \alpha \leq \mu_A \) and \( \beta \geq \nu_A \).

Definition 2.13
An IFST \((X, \tau_a)\) is said to be an IFSI space if every IFGSCS in \((X, \tau_a)\) is an IFCS in \((X, \tau)\).

Definition 2.14
Let A be an IFS in an IFST \((X, \tau_a)\) Then
(i) IFSpr-int(A) = \{ G / G is an IF supra open in X and G \subseteq A \},
(ii) IFSpr-cl(A) = \{ K / K is an IF supra closed in X and A \subseteq K \}.

Result 2.15
Let A be an IFS in \((X, \tau_a)\) Then
(i) IFSpr-cl(A) = A U S-cl(S-int(A)),
(ii) IFSpr-int(A) = A \cap S-int(S-cl(S-int(A))).

3. INTUITIONISTIC FUZZY RG SUPRA CLOSED SETS
In this section we introduce the notion of Intuitionistic fuzzy regular \(\alpha\) 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 \((X, \tau_a)\) is called
Intuitionistic fuzzy regular \(\alpha\) generalized supra closed set (IFRG-Supra closed set in short) if IF\(\alpha\)-S-cl(A)\subseteq U whenever \(A\subseteq U\) and U is an IF regular-Supra open set in X.
Then complement is called Intuitionistic fuzzy regular \(\alpha\) generalized Supra open set (IFRG-Supra open set).

Example 3.2:
Let \( X = \{a, b\} \) and let \( \tau_a = \{0, A, B, A \cup B, 1\} \) where \( A = \{x : (0.7, 0.8), (5, 0.3)\} \) where \( a = 0.2, b = 0.3, \) and \( B = \{x : (0.2, 0.3), (0.5, 0.8)\} \) where \( a = 0.2, b = 0.3, \) and \( \tau_a \subseteq U \) where \( U = (x, (0.7, 0.8), (0.4, 0.2)) \) be any IFS in \((X, \tau_a)\). Then \( A \subseteq U \) where \( U = (x, (0.5, 0.8)) \).
0.3), (0.7, 0.8)) is an IFR-Supra closed set in X. Now IFSoS-int(A)=(x, (0.7, 0.8), (0.5, 0.3)) ⊇ U. Therefore A is an IFRoG-Supra open set in (X, τμ).

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

**Proof:**
Straight forward.

**Example 3.4:**
Let X={a,b} and let τμ={0~, A, B, AUB, 1~} where A=(x, (0.7, 0.8), (0.5, 0.3)) and B=(x, (0.3, 0.4), (0.9, 0.9)). Let A=(x, (0.9, 0.8), (0.3, 0.4)) be any IFS in (X, τμ).

Then A=A 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 IFRoG-Supra open set but not an IFα-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 τμ={0~, A, B, AUB, 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, (0.6, 0.8), (0.4, 0.3)) be any IFS in (X, τμ).

Then A=A where U=(x, (0.5, 0.3), (0.7, 0.8)) is an IFR-Supra closed set in X. Now IFSoS-int(A)=(x, (0.7, 0.8), (0.5, 0.3)) ⊇ U. A is an IFRoG-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 τμ={0~, A, B, AUB, 1~} where A=(x, (0.6, 0.8), (0.5, 0.3)) and B=(x, (0.3, 0.4), (0.9, 0.9)). Let A=(x, (0.4, 0.3), (0.9, 0.3)) be any IFS in (X, τμ).

Then A=A where U=(x, (0.5, 0.3), (0.6, 0.8)) is an IFR-Supra closed set in X. Now IFSoS-int(A)=(x, (0.6, 0.8), (0.5, 0.3)) ⊇ U. A is an IFRoG-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 IFRoG-Supra open sets and every IFα-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=A where U=(x, (0.5, 0.3), (0.6, 0.8)) is an IFR-Supra closed set in X. Now IFSoS-int(A)=(x, (0.6, 0.8), (0.5, 0.3)) ⊇ U. A is an IFRoG-Supra open set but not an IF-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 τμ={0~, A, B, AUB, 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 IFRoG-Supra open set in X but not an IFα-Supra closed set in X but IFαS-int(A)=(x, (0.3, 0.4), (0.7, 0.8)) ⊇ U.

**Remark 3.10:**
Every IFRoG-Supra open sets and every IFα-Supra open sets are independent to each other.

**Example 3.11:**
Let X={a,b} and let τμ={0~, A, B, AUB, 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, (0.9, 0.8), (0.3, 0.2)) be any IFS in (X, τμ).

Then A=A 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 IFRoG-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 τμ={0~, A, B, AUB, 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, τμ).

Then S-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 IFRoG-Supra open set in X, since A=A 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, τμ) be an Intuitionistic fuzzy supra topological Spaces. Then for every A∈IFαRSA(X) and for every B∈IFS(X), IFαS-int(A) ⊆ B ⊆ A⇒B∈IFαRSA(X).

**Proof:**
Let A be any IFRoG-Supra open set of X and B be any IFS of X. Let IFαS-int(A) ⊆ B ⊆ A. Then A=(x, (0.6, 0.9), (0.6, 0.3)) is an IFR-Supra closed set in X. Hence B∈IFαRSA(X).

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

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

**Theorem 3.17:**
Let (X, τμ) be an Intuitionistic fuzzy supra topological spaces. Then for every A∈IFS(X) and for every B∈IFRC(X), B∈A∈IFS(S-cl(B))⇒A∈IFαRSA(X).

**Proof:**
Let B be an IFR-Supra closed set. Then B=S-cl(S-cl(B)). By hypothesis, A∈S-cl(S-cl(B)) ∈ S-cl(S-cl(S-int(B))) ∈ S-int(S-cl(S-int(B))) ∈ S-int(S-lS-int(A)). Therefore A is an IFα-Supra open set and by Theorem 3.3, A is an IFRoG-Supra open set. Hence A ∈ IFαRSA(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 IFRaG supra closed set in \((X,\tau_p)\) is an IFα-supra closed in \((X,\tau_p)\), then the space can be called as an Intuitionistic fuzzy regular \(\alpha T^{1/2}\) space (IFRaG\(T^{1/2}\) in short).

Theorem 4.2: An Intuitionistic fuzzy supra topological spaces \((X,\tau_p)\) is an IFRaG\(T^{1/2}\) space if and only if IFRaSo\((X)\) is an IFRaGSo\((X)\).

Proof: Necessity: Let \(A\) be an IFRaG-Supra open set in \((X,\tau_p)\). Then \(A^C\) is an IFRaG supra closed set in \((X,\tau_p)\). By hypothesis, \(A^C\) is an IFα-supra closed in \((X,\tau_p)\) and therefore \(A\) is an IFα-Supra open set in \((X,\tau_p)\). Hence IFRaSo\((X)\)=IFRaGSo\((X)\).

Sufficiency: Let \(A\) be an IFRaG supra closed set in \((X,\tau_p)\). Then \(A^C\) is an IFRaG-Supra open set in \((X,\tau_p)\). By hypothesis, \(A^C\) is an IFα-Supra open set in \((X,\tau_p)\) and therefore \(A\) is an IFα-supra closed in \((X,\tau_p)\). Hence \((X,\tau_p)\) is an IFRaG\(T^{1/2}\) space.

Theorem 4.3: Let an IFRaG\(T^{1/2}\) space be an Intuitionistic fuzzy supra topological spaces. If \(A\) is an IFS of \(X\) then the following properties are hold:

(i) \(A\) is an IFRaGSo\((X)\).
(ii) \(A\subseteq S\text{-int}(S\text{-cl}(A))\).
(iii) There exists IF-Supra open set \(G\) such that 

\[G\subseteq A\subseteq S\text{-int}(S\text{-cl}(G)).\]

Proof: (i) \(\Rightarrow\) (ii): Let \(A\subseteq S\text{-int}(S\text{-cl}(A))\). This implies \(A\subseteq S\text{-int}(S\text{-cl}(S\text{-int}(A)))\). Hence \(S\text{-int}(S\text{-int}(A))\subseteq S\text{-int}(S\text{-cl}(A))\). Then there exists IF-Supra open set \(G\) in \(X\) such that \(G\subseteq A\subseteq S\text{-int}(S\text{-cl}(G))\) where \(G\subseteq S\text{-int}(A)\).

(ii) \(\Rightarrow\) (iii): Suppose that \(A\subseteq S\text{-int}(S\text{-cl}(A))\) and \(S\text{-int}(S\text{-int}(A))\subseteq S\text{-int}(S\text{-cl}(A))\). Then there exists IF-Supra open set \(G\) in \(X\) such that \(G\subseteq A\subseteq S\text{-int}(S\text{-cl}(G))\) where \(G\subseteq S\text{-int}(A)\).

(iii) \(\Rightarrow\) (i): Suppose that there exists IF-Supra open set \(G\) such that \(G\subseteq A\subseteq S\text{-int}(S\text{-cl}(G))\). It is clear that \((S\text{-int}(S\text{-cl}(G)))\subseteq A\). This implies \(S\text{-cl}(S\text{-int}(S\text{-cl}(A)))\subseteq A\). That is \(A\) is an IFα-supra closed in \(X\). Hence \(A\subseteq S\text{-int}(S\text{-cl}(A))\).

Definition 4.4: An Intuitionistic fuzzy supra topological spaces \((X,\tau_p)\) is said to be an Intuitionistic fuzzy regular \(\alpha T^{1/2}\) space (IFRaG\(T^{1/2}\) space in short) if every IFRaG supra closed set is an IFSCS in \((X,\tau_p)\).

Theorem 4.5: For any IFS in \((X,\tau_p)\), there exist an IFRaG-Supra open set \(B\) in \(X\) such that \(p(\alpha,\beta)\subseteq B\subseteq A\).

Proof: Necessity: If \(A\subseteq IFRaGSo\((X)\), then we can take \(B=A\) so that \(p(\alpha,\beta)\subseteq B\subseteq A\). For every IFP \(p(\alpha,\beta)\subseteq A\).

Sufficiency: Let \(A\) be an IFS in \((X,\tau_p)\) and assume that there exist \(B\subseteq IFRaGSo\((X)\) such that \(p(\alpha,\beta)\subseteq B\subseteq A\). Since \(A\) is an IFRaG\(T^{1/2}\) space, \(B\) is an IFSupra open set. Then \(A=U_{p(\alpha,\beta)}=A\) \(\subseteq B\subseteq A\). Therefore \(A\subseteq U_{p(\alpha,\beta)}=B\subseteq A\), which is an IFSupra open set. In \((X,\tau_p)\). Hence by Theorem 3.3, \(A\subseteq IFRaG-Supra open set\) in \(X\).

Definition 4.6: An Intuitionistic fuzzy supra topological spaces \((X,\tau_p)\) is said to be an Intuitionistic fuzzy regular \(\alpha T^{1/2}\) space (IFRaG\(T^{1/2}\) space) if \(p(\alpha,\beta)\subseteq B\subseteq A\). Since \(A\) is an IFRaG supra closed set in \(X\) is an IFRaGCS in \(X\).

Theorem 4.8: Let an IFRaG\(T^{1/2}\) supra space be an Intuitionistic fuzzy supra topological spaces. If \(A\) is an IFS in \(X\) then the following properties are hold:

(i) \(A\subseteq IFRaGSo\((X)\)
(ii) \(U\subseteq S\text{-int}(S\text{-cl}(S\text{-int}(A)))\) whenever \(U\subseteq A\) and \(U\subseteq \text{IFS}\) in \(X\)
(iii) There exists IF-Supra open sets \(G\) and \(A\) such that 

\[G\subseteq U\subseteq S\text{-int}(S\text{-cl}(G)).\]

Proof: (i) \(\Rightarrow\) (ii): Let \(A\subseteq IFRaGSo\((X)\). This implies \(A\subseteq IFRaGSo\((X)\). Since \(X\) is an \(\alpha T^{1/2}\) space. Then \(A\subseteq IFRaGSo\((X)\). Therefore \(IFRaGSo\((X)\subseteq IFRaGSo\((X)\). This implies \(V\subseteq S\text{-int}(S\text{-cl}(S\text{-int}(A)))\) whenever \(V\subseteq A\) and \(V\subseteq IFRaGSo\((X)\). Hence by \(\text{IFS}\) in \(X\). Replacing \(V\) by \(U\), \(U\subseteq S\text{-int}(S\text{-int}(S\text{-int}(A)))\) whenever \(U\subseteq \text{IFS}\) in \(X\).

(ii) \(\Rightarrow\) (iii): Let \(U\subseteq S\text{-int}(S\text{-int}(S\text{-int}(A)))\) whenever \(U\subseteq A\) and \(U\subseteq \text{IFS}\) in \(X\).

(iii) \(\Rightarrow\) (i): Suppose that there exists IF -Supra open sets \(G\) and \(A\) such that \(A\subseteq U\subseteq S\text{-int}(S\text{-cl}(G))\). It is clear that \((S\text{-int}(S\text{-cl}(G)))\subseteq U\). This implies \(S\text{-cl}(S\text{-int}(S\text{-int}(A)))\subseteq U\). This implies \(S\text{-cl}(S\text{-int}(S\text{-int}(A)))\subseteq U\). Therefore \(A\subseteq IFRaG-Supra open set\) in \(X\). This implies \(IFRaGCS\subseteq IFRaGCS\). That is \(A\subseteq IFRaGCS\). This implies \(A\subseteq IFRaGCS\). Hence \(A\subseteq IFRaGSo\((X)\).

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 IFRaG 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.
5. ACKNOWLEDGMENT

I wish to acknowledge friends of our institution and others who extended their help to make this paper as successful one. I acknowledge the Editor in chief and other friends of this publication for providing the timing help to publish this paper.

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