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Stronger Forms Of Connectedness and Disconnectedness In An Intuitionistic Fuzzy Rough Centred Texure Di- Structure Space

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Abstract

In this paper, the concept of intuitionistic fuzzy rough centred system is introduced . The concept of intuitionistic fuzzy rough centred texture space and intuitionistic fuzzy rough centred texture connectedness are introduced. Some interesting properties of intuitionistic fuzzy rough centred texture connectedness are discussed. Also, the characterizations of intuitionistic fuzzy rough centred texture di - structure space and intuitionistic fuzzy rough centred texture extremally disconnected space are established.

Keywords

intuitionistic fuzzy rough centred system , intuitionistic fuzzy rough centred texture space, intuitionistic fuzzy rough centred texture connectedness , intuitionistic fuzzy rough centred texture di - structure space, intuitionistic fuzzy rough centred texture extremally disconnected space.

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1 Introduction

The concept of fuzzy sets was introduced by Zadeh[13]. Fuzzy sets have applications in many fields such as information [10] and control [11]. Pawlak [10] introduced the concept of rough sets.Nanda and Manjumdar[8] introduced and studied fuzzy rough sets.Atanassov [1] introduced and studied intuitionistic fuzzy sets.T.K.Mandal and S.K.Samanta[7] introduced the concept of intuitionistic fuzzy rough sets and studied some related concepts.The theory of fuzzy topological spaces was introduced and developed by Chang[3]. On the other hand, Coker [4] introduced the notions of an intuitionistic fuzzy topological space and some other concepts. H.Hazra , S.K.Samanta and K.C.Chattopadhyay [6] introduced the topological space of intuitionistic fuzzy rough sets.The method of centered system in the theory of topology was introduced by S.Iliadis and S.Fomin in [9]. In 2007, the above concept was extended to fuzzy topological spaces by M.K.Uma, E.Roja and G.Balasubramanian [12]. L.M.Brown[2] is introduced the concept of texture space. Later M.Diker[5] discussed the concept of connectedness in Ditopological texture space. In this paper, the concept of intuitionistic fuzzy rough centred system is introduced . The concept of intuitionistic fuzzy rough centred texture space and intuitionistic fuzzy rough centred texture connectedness are introduced. Some interesting properties of intuitionistic fuzzy rough centred texture connectedness are discussed. Also, the characterizations of intuitionistic fuzzy rough centred texture di - structure space and intuitionistic fuzzy rough centred texture extremally disconnected space are studied.

2 Preliminaries

Let $(V, \mathcal{B})$ be an rough universe V is an non empty set and $\mathcal{B}$ is a Boolean sub algebra of an Boolean algebra of all subsets of V. Let a rough set $X = (X_L, X_U) \in \mathcal{B}^2$ with $X_L \subseteq X_U$.

Definition 2.1. [8] A fuzzy rough set (briefly FRS) in X is an object of the form $A = (A_L, A_U)$ where A_L and A_U are characterized by a pair of maps $A_L : X_L \to \mathscr{L}$ and $A_L : X_L \to \mathscr{L}$ with $A_L(x) \leq A_U(x)$, $\forall x \in X_L$ where $(\mathscr{L}, \leq)$ is a fuzzy lattice(i.e completed and completely distributive lattice whose least and greatest elements are denoted by 0 and 1 respectively with an involutive order reversing operation$\prime : \mathscr{L} \to \mathscr{L}$.

Definition 2.2. [7] If A and B are fuzzy sets in X_L and X_U respectively where $X_L \subset X_U$. Then the restriction of B on X_L and the extension of A on X_U (denoted by $B_{>L}$ and $A_{<U}$ respectively) are defined by complement of an FRS $A = (A_L, A_U)$ in X are denoted by $\overline{A} = ((\overline{A})_L, (\overline{A})_U)$ and is defined by $(\overline{A})_L(x) = (A_{U>L})'(x)$, $\forall x \in X_L$ and $(\overline{A})_U(x) = (A_{L<U})'(x)$, $\forall x \in X_U$. For simplicity we write $(\overline{A}_L, \overline{A}_U)$ instead of $((\overline{A})_L, (\overline{A})_U)$.

Definition 2.3. [7] If A and B are two FRSs in X with $B \subset \overline{A}$ and $A \subset \overline{B}$, then the ordered pair (A, B) is called an intuitionistic fuzzy rough set (briefly $IFRS$) in X. The condition $A \subset \overline{B}$ and $B \subset \overline{A}$ are called intuitionistic condition (briefly IC)

Definition 2.4. [7] $0^* = (\tilde{0}, \tilde{0})$ and $1^* = (\tilde{1}, \tilde{1})$ are respectively called null $IFRS$ and whole $IFRS$ in X. Clearly $(0^*)' = 1^*$ and $(1^*)' = 0^*$.

Definition 2.5. [6] Let $X = (X_L, X_U)$ be a rough set and τ be a family of $IFRS$s in X such that

(i) $0^*, 1^* \in \tau$;

(ii) $P \cap Q \in \tau$ for any $P, Q \in \tau$;

(iii) $P_i \in \tau, i \in \Delta \Rightarrow \bigcup_{i\in\Delta} P_i \in \tau$

Then τ is called a topology of $IFRS$s in X and the pair (X, τ) topological space of $IFRS$s in X. Every member of τ is called open $IFRS$. An $IFRS$ C is called closed $IFRS$ if $C' \in \tau$

Definition 2.6. [12] Let R be a fuzzy Hausdorff space.A system $p = \{\lambda_\alpha\}$ of fuzzy open sets of R is called fuzzy centred if any finite number of fuzzy sets of the system has a non zero intersection.

3 The Characterizations Of Intuitionistic Fuzzy Rough Centred Texture Connectedness and Disconnectedness

Definition 3.1. An intuitionistic fuzzy rough topological space (X, T) is called an intuitionistic fuzzy rough Hausdorff space (or) intuitionistic fuzzy rough T_2 space if for each pair of non zero intuitionistic fuzzy rough sets $A = (P, Q)$ and $B = (L, M)$ such that $A \neq B$, where $P = (P_L, P_U)$, $Q = (Q_L, Q_U)$, $L = (L_L, L_U)$ and $M = (M_L, M_U)$ are fuzzy rough sets of X , then there exist open intuitionistic fuzzy rough sets $C = (U, V)$ and $D = (G, H)$ where $U = (U_L, U_U)$, $V = (V_L, V_U)$ $G = (G_L, G_U)$ and $H = (H_L, H_U)$ are fuzzy rough sets of X such that $A \subseteq C$, $B \subseteq D$ and $C \cap D = 0^*$.

Definition 3.2. Let (X, T) be an intuitionistic fuzzy rough Hausdorff space and a system $p = \{A_i\}$ where each $A_i = (P_i, Q_i)$ is an open intuitionistic fuzzy rough set and $P_i = (P_{i_L}, P_{i_U})$ and $Q_i = (Q_{i_L}, Q_{i_U})$. Then p is said to be an intuitionistic fuzzy rough centred system if any finite collection of A_i such that $A_i \cap A_j \neq 0^*$, for $i \neq j$. The system p is said to be an intuitionistic fuzzy maximal rough centred system (or) intuitionistic fuzzy rough end if it cannot be included in any larger intutionistic fuzzy rough centered system.

Note 3.1. Let $\mathfrak{D}_X = \{p_i/i \in J\}$ be a non empty set where each p_i is an intuitionistic fuzzy rough centred system in an intuitionistic fuzzy rough Hausdorff space (X, T) and J is an index set. Now, $\wp(\mathfrak{D}_X$ denotes the power set of $\mathfrak{D}_X$.

Definition 3.3. Let $\mathfrak{D}_X = \{p_i/i \in J\}$ be a non empty set where each p_i is an intuitionistic fuzzy rough centred system in an intuitionistic fuzzy rough Hausdorff space (X, T) and J is an index set. Then $\mathscr{L} \subseteq \wp(\mathfrak{D}_X)$ is said to be an intuitionistic fuzzy rough centred texturing of $\mathfrak{D}_X$ and $\mathfrak{D}_X$ is said to be an intuitionistic fuzzy rough centred textured by $\mathscr{L}$ if

(i) $(\mathscr{L}, \subseteq)$ is a complete lattice containing $\mathfrak{D}_X$ and ϕ, for any index set J and $A_i \in \mathscr{L}$, $i \in J$ the meet $\bigwedge_{i\in J} A_i$ and the join $\bigvee_{i\in J} A_i$ in $\mathscr{L}$ are related with the intersection and union in $\wp(\mathfrak{D}_X)$ by the equalities $\bigwedge_{i\in J} A_i = \bigcap_{i\in J} A_i$ for all J, while $\bigvee_{i\in J} A_i = \bigcup_{i\in J} A_i$ for all finite J.

(ii) $\mathscr{L}$ is completely distributive.

(iii) $\mathscr{L}$ separates the points of $\mathfrak{D}_X$. That is, if $p_1 \neq p_2$ in $\mathfrak{D}_X$, then $L \in \mathscr{L}$ with $p_1 \in L$, $p_2 \notin L$ or $L \in \mathscr{L}$ with $p_2 \in L$, $p_1 \notin L$.

If $\mathfrak{D}_X$ is intuitionistic fuzzy rough centred textured by $\mathscr{L}$ then $(\mathfrak{D}_X, \mathscr{L})$ is said to be an intuitionistic fuzzy rough centred texture space. Every member of $(\mathfrak{D}_X, \mathscr{L})$ is said to be an intuitionistic fuzzy rough centred texture open set and the complement of intuitionistic fuzzy rough centred texture open set is said to be an intuitionistic fuzzy rough centred texture closed set.

Definition 3.4. Let $(\mathfrak{D}_X, \mathscr{L})$ be an intuitionistic fuzzy rough centred texture space and $A \subseteq \mathfrak{D}_X$. Then $\lambda(A)$ is defined by $\lambda(A) = \bigvee_{p_1 \in A} P_{p_1}$

Note 3.2. $\lambda(A)$ is the smallest element of $\mathscr{L}$ containing A.

Definition 3.5. Let $(\mathfrak{D}_{X_i}, \mathscr{L}_i)$, i=1 and 2 be any two intuitionistic fuzzy rough centred texture spaces and $f : \mathfrak{D}_{X_1} \to \mathfrak{D}_{X_2}$ and $\tilde{f} : \mathscr{L}_1 \to \mathscr{L}_2$ be functions. Then $\tilde{f}$ is said to be an intuitionistic fuzzy rough centred texture function if $\tilde{f}^{-1}(L) = \lambda_1(f^{-1}(L))$ for every $L \in \mathscr{L}_2$.

Proposition 3.1. Let $(\mathfrak{D}_{X_i}, \mathscr{L}_i)$, i = 1 and 2 be any two intuitionistic fuzzy rough centred texture spaces and $f : \mathfrak{D}_{X_1} \to \mathfrak{D}_{X_2}$ be a function. Then the following are equivalent.

(i) $f^{-1}(L) \in \mathscr{L}_1$ for every $L \in \mathscr{L}_2$.

(ii) $\tilde{f}^{-1}(L) = f^{-1}(L)$ for every $L \in \mathscr{L}_2$.

Proof It is obvious.

Definition 3.6. Let $(\mathfrak{D}_X, \mathscr{L})$ be an intuitionistic fuzzy rough centred texture space, $\phi \neq Z \subseteq \mathfrak{D}_X$ and $\{A, B\} \in \wp(\mathfrak{D}_X)$. Then, $\{A, B\}$ is said to be an intuitionistic fuzzy rough centred texture partition of Z if $A \cap Z \neq \phi$, $Z \nsubseteq B$ and $A \cap Z = B \cap Z$.

Note 3.3. (i) If $\{A, B\}$ is an intuitionistic fuzzy rough centred texture partition of Z, then $B \cap Z \neq \phi$ and $Z \nsubseteq A$.

(ii) If $\mathscr{L} = \wp(\mathfrak{D}_X)$, then $\{A, \mathfrak{D}_X \setminus B\}$ and $\{\mathfrak{D}_X \setminus A, B\}$ are intuitionistic fuzzy rough centred texture partition of Z.

Definition 3.7. Let $(\mathfrak{D}_X, \mathscr{L})$ be an intuitionistic fuzzy rough centred texture space. Then $(\mathfrak{D}_X, \mathscr{L}, \mathfrak{T}, \mathfrak{K})$ is said to be an intuitionistic fuzzy rough centred texture di - structure space on $\mathfrak{D}_X$ if the collection of intuitionistic fuzzy rough centred texture open sets $\mathfrak{T}$ satisfies the following conditions.

(i) $\mathfrak{D}_X, \phi \in \mathfrak{T}$.

(ii) If $G_1, G_2 \in \mathfrak{T}$ then $G_1 \cap G_2 \in \mathfrak{T}$.

(iii) If $G_i \in \mathfrak{T}$ for $i \in J$ then $\bigvee_{i\in J} G_i \in \mathfrak{T}$.

and if the collection of intuitionistic fuzzy rough centred texture closed sets $\mathfrak{K}$ satisfies the following conditions.

(i) $\mathfrak{D}_X, \phi \in \mathfrak{K}$.

(ii) If $F_1, F_2 \in \mathfrak{K}$ then $F_1 \cup F_2 \in \mathfrak{K}$.

(iii) If $F_i \in \mathfrak{K}$ for $i \in J$ then $\bigwedge_{i\in J} F_i \in \mathfrak{K}$.

Definition 3.8. Let $(\mathfrak{D}_{X_2}, \mathscr{L}_1, \mathfrak{T}_1, \mathfrak{K}_1)$, $(\mathfrak{D}_{X_2}, \mathscr{L}_2, \mathfrak{T}_2, \mathfrak{K}_2)$ be an intuitionistic fuzzy rough centred texture di - structure spaces and $f : \mathfrak{D}_{X_1} \to \mathfrak{D}_{X_2}$ be a function. Then f is said to be an intuitionistic fuzzy rough centred texture continuous function if (i) $\tilde{f}^{-1}(G) \in \mathfrak{T}_1$ for every $G \in \mathfrak{T}_2$ and (ii) $\tilde{f}^{-1}(F) \in \mathfrak{K}_1$ for every $L \in \mathfrak{K}_2$.

Definition 3.9. Let $(\mathfrak{D}_X, \mathscr{L}, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred texture di - structure space and $Z \subseteq \mathfrak{D}_X$. Then Z is said to be an intuitionistic fuzzy rough centred texture connected set if there exists no intuitionistic fuzzy rough centred texture partition $\{G, F\}$ with $G \in \mathfrak{T}$ and $F \in \mathfrak{K}$.

Note 3.4. Let $\mathfrak{D}^*_X = \{p\}$ and $\mathscr{L}^* = \wp(\mathfrak{D}^*_X)$ and $(\mathfrak{D}_{X^*}, \mathscr{L}^*, \mathfrak{T}^*, \mathfrak{K}^*)$ be an intuitionistic fuzzy rough centred di - structure texture space where $\mathfrak{T}^* = \mathfrak{K}^* = \{\phi, \{p_1\}\}$. Now, $\mathscr{C}(\mathfrak{D}_X, \mathfrak{D}^*_X)$ denote the family of all intuitionistic fuzzy rough centred texture continuous functions from $\mathfrak{D}_X$ to $\mathfrak{D}^*_X$.

Proposition 3.2. Let $(\mathfrak{D}_X, \mathscr{L}, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred texture di - structure space. Then the following statements are valid.

(i) $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set if and only if $\mathfrak{T} \cap \mathfrak{K} = \{\mathfrak{D}_X, \phi\}$.

(ii) If for all $p_1, p_2 \in \mathfrak{D}_X$ with $p_1 \neq p_2$ there exists an intuitionistic fuzzy rough centred texture connected set $Z \subseteq \mathfrak{D}_X$ with $p_1, p_2 \in Z$ then $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set.

(iii) $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set if and only if every intuitionistic fuzzy rough centred texture continuous function $f \in \mathscr{C}(\mathfrak{D}_X, \mathfrak{D}^*_X)$ is constant.

Proof

(i) Suppose that $\mathfrak{T} \cap \mathfrak{K} \neq \{\mathfrak{D}_X, \phi\}$. Then choose $H \in \mathfrak{T} \cap \mathfrak{K}$ with $H \neq \mathfrak{D}_X$ and $H \neq \phi$. Clearly, $H \cap \mathfrak{D}_X \neq \phi$ and $\mathfrak{D}_X \nsubseteq H$ and $H \cap \mathfrak{D}_X = \mathfrak{D}_X \cap H$. Hence, $\{H, H\}$ is an intuitionistic fuzzy rough centred texture partition of $\mathfrak{D}_X$ which is a contradiction. Therefore, $\mathfrak{T} \cap \mathfrak{K} = \{\mathfrak{D}_X, \phi\}$.

Conversely, if $\mathfrak{T} \cap \mathfrak{K} = \{\mathfrak{D}_X, \phi\}$, then $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set. Otherwise, $\{G, F\}$ is an intuitionistic fuzzy rough centred texture partition of $\mathfrak{D}_X$ and clearly, $G = F \in \mathfrak{T} \cap \mathfrak{K} = \{\mathfrak{D}_X, \phi\}$ which contradicts the intuitionistic fuzzy rough centred texture connectedness of $\mathfrak{D}_X$. Hence, $\mathfrak{T} \cap \mathfrak{K} \neq \{\mathfrak{D}_X, \phi\}$

(ii) Suppose that $\mathfrak{D}_X$ is not an intuitionistic fuzzy rough centred texture connected set, then by (i), $\mathfrak{T} \cap \mathfrak{K} \neq \phi$. Take $H \in \mathfrak{T} \cap \mathfrak{K}$ with $H \neq \mathfrak{D}_X$ and $H \neq \phi$. Then choose $p_1, p_2 \in \mathfrak{D}_X$ with $p_1 \notin H$ and $p_2 \in H$. Then by the hypothesis, there is an intuitionistic fuzzy centred texture connected set Z with $p_1, p_2 \in Z$. Since $H \cap Z \neq \phi$ and $Z \nsubseteq H$, $\{H, H\}$ is an intuitionistic fuzzy rough centred texture partition of Z. Contradiction to the intuitionistic fuzzy rough centred texture connectedness of Z. Therefore, $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set.

(iii) Let $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set. Then by (i), $\mathfrak{T} \cap \mathfrak{K} = \{\mathfrak{D}_X, \phi\}$. If $f : \mathfrak{D}_X \to \mathfrak{D}^*_X$ is an intuitionistic fuzzy rough centred continuous function , then $\tilde{f}^{-1}(\{p\}) = \mathfrak{D}_X$ or ϕ. That is, f is constant.

Conversely, suppose that every intuitionistic fuzzy rough centred texture continuous function $f : \mathfrak{D}_X \to \mathfrak{D}_X^*$ is constant and $\mathfrak{D}_X$ is not an intuitionistic fuzzy rough centred texture connected set. Then choose $H \in \mathfrak{T} \cap \mathfrak{K}$ with $H \neq \phi$ and $H \neq \mathfrak{D}_X$. Define a function $f : \mathfrak{D}_X \to \mathfrak{D}_X^*$ by $f(H) = \{p_1\}$ and $f(\{p_2\}) = \phi$ for every $p_2 \notin H$. Clearly, f is an intuitionistic fuzzy rough centred texture continuous function but not constant a contradiction. Therefore, $\mathfrak{D}_X$ is an intuitionistic fuzzy rough centred texture connected set.

Proposition 3.3. If $\{Z_i/i \in J\}$ is a family of intuitionistic fuzzy rough centred texture connected sets in $\mathscr{L}$ with $\bigcap_{i\in J} Z_i \neq \phi$, then $\bigvee_{i\in J} Z_i$ is also an intuitionistic fuzzy rough centred texture connected set.
Proof It is simple.

Definition 3.10. Let $(\mathfrak{D}_X, \mathscr{L}, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred texture di - structure space and $Z \subseteq \mathfrak{D}_X$. Then the intuitionistic fuzzy rough centred texture exterior of Z , the intuitionistic fuzzy rough centred texture closure of Z and the intuitionistic fuzzy rough centred texture interior of Z are respectively denoted and defined by

(i) $IF\mathscr{R}Ext_{\mathfrak{D}_X}(Z) = \bigvee\{G/G \in \mathfrak{T} \text{ and } G \cap Z = \phi\}$.

(ii) $IF\mathscr{R}[Z]_{\mathfrak{D}_X} = \bigcap\{F/Z \subseteq F, F \in \mathfrak{K}\}$ and (iii)$IF\mathscr{R}]Z[_{\mathfrak{D}_X} = \bigcup\{F/Z \supseteq F, F \in \mathfrak{T}\}$.

Proposition 3.4. Let $(\mathfrak{D}_X, \mathscr{L}, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred texture di - structure space and $Z \subseteq \mathfrak{D}_X$ be an intuitionistic fuzzy rough centred texture connected set, $Z \subseteq A \subseteq IF\mathscr{R}[Z]_{\mathfrak{D}_X}$ and $IF\mathscr{R}Ext_{\mathfrak{D}_X}(Z) \cap A = \phi$. Then A is also an intuitionistic fuzzy rough centred texture connected set.
Proof It is simple.

Proposition 3.5. Let $(\mathfrak{D}_X, \mathscr{L}_1, \mathfrak{T}_1, \mathfrak{K}_1)$ be an intuitionistic fuzzy rough centred texture di - structure space and Z be an intuitionistic fuzzy rough centred texture connected set in $(\mathfrak{D}_X, \mathscr{L}_1, \mathfrak{T}_1, \mathfrak{K}_1)$. Let f be an intuitionistic fuzzy rough centred texture continuous function of $(\mathfrak{D}_X, \mathscr{L}_1, \mathfrak{T}_1, \mathfrak{K}_1)$ into an intuitionistic fuzzy rough centred texture di - structure space $(\mathfrak{D}_Y, \mathscr{L}_2, \mathfrak{T}_2, \mathfrak{K}_2)$. Then $f(Z)$ is an intuitionistic fuzzy rough centred texture connected set in $\mathfrak{D}_Y$.
Proof: It is Obvious.

Definition 3.11. Let $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred complemented texture di - structure space. Then **(i)** $\gamma(IF\mathscr{R}[A]_{\mathfrak{D}_X}) = IF\mathscr{R}]\gamma(A)[_{\mathfrak{D}_X}$ and **(ii)** $\gamma(IF\mathscr{R}]A[_{\mathfrak{D}_X}) = IF\mathscr{R}[\gamma(A)]_{\mathfrak{D}_X}$.

Definition 3.12. Let $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred complemented texture di - structure space. Then $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ is said to be an

(i) intuitionistic fuzzy rough centred texture extremally disconnected space if $IF\mathscr{R}[A]_{\mathfrak{D}_X} \in \mathfrak{T}$ whenever $A \in \mathfrak{T}$.

(ii) intuitionistic fuzzy rough centred texture co - extremally disconnected space if $IF\mathscr{R}]A[_{\mathfrak{D}_X} \in \mathfrak{K}$ whenever $A \in \mathfrak{K}$.

(iii) intuitionistic fuzzy rough centred texture di - extremally disconnected space if it is both an intuitionistic fuzzy rough centred texture extremally disconnected space and an intuitionistic fuzzy rough centred texture co - extremally disconnected space.

Proposition 3.6. Let $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ be an intuitionistic fuzzy rough centred complemented texture di - structure space. Then the following are equivalent.

(i) $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ is an intuitionistic fuzzy rough centred texture extremally disconnected space.

(ii) $(\mathfrak{D}_X, \mathscr{L}, \gamma, \mathfrak{T}, \mathfrak{K})$ is an intuitionistic fuzzy rough centred texture co - extremally disconnected space.

(iii) For each $A \in \mathfrak{T}$, $IF\mathscr{R}[A]_{\mathfrak{D}_X} \cup IF\mathscr{R}[\gamma(IF\mathscr{R}[A]_{\mathfrak{D}_X})]_{\mathfrak{D}_X} = \mathfrak{D}_X$.

(iv) If for any pair of $A, B \in \mathfrak{T}$ with $IF\mathscr{R}[A]_{\mathfrak{D}_X} \cup B = \mathfrak{D}_X$ then $IF\mathscr{R}[A]_{\mathfrak{D}_X} \cup IF\mathscr{R}[B]_{\mathfrak{D}_X} = \mathfrak{D}_X$.

Proof: It is simple.

References

[1] K.T.Atanassov,Intuitionistic Fuzzy Sets,Fuzzy Sets and Systems, 20 (1986), 87 − 96.

[2] L.M. Brown, Ditopological Fuzzy Sructures I, Fuzzy systems A.I.Mag.3(2)(1993).

[3] C.L.Chang,Fuzzy Topological Spaces,J.Math.Annal.Appl.24 (1968),182 − 190.

[4] D.Coker,An Introduction to Intuitionistic Fuzzy Topological Spaces,Fuzzy Sets and Systems,88 (1997),81 − 89.

[5] M. Diker, Connectedness in Ditopological texture spaces,Fuzzy sets and Systems, 108,(1999) 223–230.

[6] H.Hazra, S.K.samanta and K.C.Chattopadhyay, Topology of IF rough sets,Scientia Magna,No 7,(2011)3,18-30.

[7] T.K.Mandal and S.K.Samanta,Intuitionistic Fuzzy Rough Sets and Rough Intuitionistic Fuzzy Sets,The Journal of Fuzzy Mathematics,No 3,9,(2011),561-582.

[8] S.Nanda and S.Manjumdar,Fuzzy Rough Sets,Fuzzy Sets and System,45,(1992),157-160.

[9] S.Iliadis and S.Fomin, The method of centred system in the theory of topological spaces, *UMN*,21(1996),47–66.

[10] Z.Pawlak, Rough Sets,Internat.J.Inform.Comput.Sci.No.11,5(1982),341-356.

[11] P.Smets, The Degree of Belief in a Fuzzy Event,Information Sciences,25(1981),1–19.

[12] M.Sugeno, An Introductory Survey of Control,Information Sciences,36(1985),59–83.

[13] M.K.Uma, E.Roja and G. Balasubramanian, The method of Centred Systems in Fuzzy Topological spaces, The Journals of Fuzzy Mathematics, Vol.15, No.4, (2007).

[14] L.A.Zadeh,Fuzzy Sets Infor.and Control,9 (1965),338 − 353.