WEAK AND STRONG FORMS OF INTUITIONISTIC LOCAL CONTINUOUS FUNCTIONS

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Abstract: **The purpose of this paper is to introduce and study a new class of function called intuitionistic local continuous and intuitionistic strong and weak local continuous functions.**

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1. INTRODUCTION

The concept of intuitionistic sets in topological spaces was first given by Coker[3] . He has studied some fundamental topological properties on intuitionistic sets. Here, we have defined intuitionistic local continuous, intuitionistic strongly local continuous and intuitionistic weakly local continuous functions using intuitionistic local sets defined in [4] and studied the characterizations of these functions. Also, the impact of these functions on some separation axioms are discussed.

2. PRELIMINARIES

Definition 2.1 [2] Let X be a nonempty set. An intuitionistic set A is an object having the form A = (X, A_1, A_2), where A_1 and A_2 are disjoint subsets of X. The set A_1 is called the set of members of A and A_2 is called the set of nonmembers of A.

Definition 2.2 [2] Let X be a nonempty set and a $\in$ X. The intuitionistic set $\tilde{a}$ defined by $\tilde{a} = (X, \{a\}, \{a\}^c)$ is called an intuitionistic point in X.

Definition 2.3 [2] Let X be a nonempty set, and the intuitionistic sets A and B be in the form A = (X, A_1, A_2), B = (X, B_1, B_2) respectively. Then

(i) $A \subseteq B$ if and only if $A_1 \subseteq B_1$ and $A_2 \supseteq B_2$;

(ii) $\overline{A} = (X, A_2, A_1)$;

(iii) $A \cap B = (X, A_1 \cap B_1, A_2 \cup B_2)$;

(iv) $A \cup B = (X, A_1 \cup B_1, A_2 \cap B_2)$;

(v) $A - B = A \cap \overline{B}$;

(vi) $\tilde{\phi} = (X, \phi, X)$ and $\tilde{X} = (X, X, \phi)$.

Definition 2.4 [3] An intuitionistic topology on a nonempty set X is a family τ of intuitionistic subsets of X containing $\tilde{\phi} = (X, \phi, X)$, $\tilde{X} = (X, X, \phi)$ and closed under finite infima and arbitrary suprema. Then the pair (X, τ) is called an intuitionistic topological space.

Every member of τ is known as an intuitionistic open set in X. The complement A^c of an intuitionistic open set A in an intuitionistic topological space (X, τ) is called an intuitionistic closed set.

Definition 2.5 [3] Let $f : X \to Y$ be a function. If A = (X, A_1, A_2) is an intuitionistic set in X, then the image of A under f , denoted by f (A), is an intuitionistic set in Y defined by $f(A) = (Y, f(A_1), f\_(A_2))$, where $f\_(A_2) = (f((A_2)^c))^c$.

Definition 2.6 [3] Let $f : X \to Y$ be a function. If A = (Y, A_1, A_2) is an intuitionistic set in Y, then the preimage of A under f , denoted by $f^{-1}(A)$, is an intuitionistic set in X defined by $f^{-1}(A) = (X, f^{-1}(A_1), f^{-1}(A_2))$.

Definition 2.7 [3]Let (X, τ) and (Y, δ) be two intuitionistic topological spaces and f : (X, τ) $\rightarrow$ (Y, δ) be a function. Then f is said to be intuitionistic continuous if and only if the preimage of every intuitionistic open set in Y is intuitionistic open in X.

Definition 2.8 [6] An intuitionistic topological space (X, τ) is intuitionistic submaximal if every intuitionistic dense subset of X is intuitionistic open.

Definition 2.9 [1]An intuitionistic topological space (X, τ) is said to be T_1(vii) if and only if for every x $\in$ X, $\tilde{x}$ is intuitionistic closed; T_2(i) if and only if for every x, y $\in$ X (x $\neq$ y) there exists U, V $\in \tau$ such that $\tilde{x} \in$ U , $\tilde{y} \in$ V, and $U \cap V = \tilde{\phi}$.

Definition 2.10 [3] Let (X, τ) be an intuitionistic topological space. If a family $\{< X, G_i^1, G_i^2 > / i \in J\}$ of intuitionistic open sets in X satisfies the condition $\bigcup\{< X, G_i^1, G_i^2 > / i \in J\}$ = $\tilde{X}$, then it is called an open cover of X. A finite subfamily of an open cover $\{< X, G_i^1, G_i^2 > / i \in J\}$ of X, which is also an open cover of X, is called a finite subcover of $\{< X, G_i^1, G_i^2 > / i \in J\}$.

Definition 2.11 [3] An intuitionistic topological space (X, τ) is called compact if and only if each open cover of X has a finite subcover.

Definition 2.12 [4] An intuitionistic set A of an intuitionistic topological space (X, τ) is said to be intuitionistic locally closed if A = U ∩ V, where U, $V^c \in \tau$.

Definition 2.13 [4] Let (X, τ) be an intuitionistic topological space. An intuitionistic set A of X is called an intuitionistic local difference set (intuitionistic local D-set) if there are two intuitionistic locally open sets U, V in (X, τ) such that U $\neq$ $\tilde{X}$ and A = U – V.

Definition 2.14 [4] An intuitionistic topological space (X, τ) is said to be:

(i) intuitionistic local D_0 (intuitionistic local D_1) if for x, y $\in$ X such that $\tilde{x} \neq \tilde{y}$ there exists an intuitionistic local D-set of (X, τ) containing $\tilde{x}$ but not $\tilde{y}$ or (and) an intuitionistic local D-set containing $\tilde{y}$ but not $\tilde{x}$.

(ii) intuitionistic local D_2 if for x, y $\in$ X such that $\tilde{x} \neq \tilde{y}$ there exist disjoint intuitionistic local D-sets A and B such that $\tilde{x} \in$ A and $\tilde{y} \in$ B.

(iii) intuitionistic local T_0 (intuitionistic local T_1) if for x, y $\in$ X such that $\tilde{x} \neq \tilde{y}$ there exists an intuitionistic locally open set of (X, τ) containing $\tilde{x}$ but not $\tilde{y}$ or (and) an intuitionistic locally open set containing $\tilde{y}$ but not $\tilde{x}$.

(iv) intuitionistic local T_2 if for x, y $\in$ X such that $\tilde{x} \neq \tilde{y}$ there exist disjoint intuitionistic locally open sets A and B such that $\tilde{x} \in$ A and $\tilde{y} \in$ B.

Definition 2.15 [4] An intuitionistic topological space (X, τ) is intuitionistic local regular if for each intuitionistic locally closed set A and any intuitionistic point $\tilde{x} \in$ ($\tilde{X}$ -A), there exist disjoint intuitionistic locally open sets U and V such that A $\subset$ U and $\tilde{x} \in$ V.

3. INTUITIONISTIC LOCAL CONTINUOUS FUNCTIONS

Definition 3.1 A function f : (X, τ) $\rightarrow$ (Y, σ) is called

(i) intuitionistic local irresolute if f^{-1}(M) $\in$ LC(X, τ) for each M $\in$ LC(Y, σ).

(ii) intuitionistic local continuous if f^{-1}(V) $\in$ LC(X, τ) for each V $\in$ σ .

Remark 3.2

For a function f: X $\rightarrow$ Y, we have the following implication diagram:

Intuitionistic Continuous $\Rightarrow$ Intuitionistic local irresolute $\Rightarrow$ Intuitionistic local continuous

Proposition 3.3 If an intuitionistic topological space (X, τ) is intuitionistic submaximal, then every function having (X, τ) as its domain is intuitionistic local irresolute.

Theorem 3.4 For a function f : X $\rightarrow$ Y, the following statements are equivalent:

(i) f is intuitionistic local continuous;

(ii) For each x $\in$ X and each intuitionistic open set V of (Y, σ) containing f ($\tilde{x}$) there exists U $\in$ LC(X, $\tilde{x}$) such that f (U) $\subset$ V.

Proof: (i) $\Rightarrow$ (ii) : Let V be an intuitionistic open set of (Y, σ) and f ($\tilde{x}$) $\in$ V. Since f is intuitionistic local continuous f^{-1}(V) $\in$ LC(X, τ) and $\tilde{x}$ $\in$ f^{-1}(V). Put U = f^{-1}(V). Then $\tilde{x}$ $\in$ U and f (U) $\subset$ V.

(ii) $\Rightarrow$ (i): Let V be an intuitionistic open set of (Y, σ) and $\tilde{x}$ $\in$ f^{-1}(V). Then f ($\tilde{x}$) $\in$ V. Hence by (ii), there exists U $\in$ LC(X, τ) such that $\tilde{x}$ $\in$ U and f (U) $\subset$ V. Therefore, $\tilde{x}$ $\in$ U $\subset$ f^{-1}(V). Thus f^{-1}(V) is a union of local closed sets of X. Consequently, f^{-1}(V) $\subset$ LC(X, τ) . Hence f is intuitionistic local continuous.

Theorem 3.5 If f : X $\rightarrow$ Y is an intuitionistic local irresolute surjective function and U is an intuitionistic local-D set in (Y, σ), then f^{-1}(U) is an intuitionistic local-D set in X.

Proof: Let U be an intuitionistic local-D set in (Y, σ). Then there are intuitionistic local open sets A and B in Y such that U = A – B and A $\neq$ $\tilde{Y}$. By intuitionistic local irresoluteness of f, f^{-1}(A) and f^{-1}(B) are intuitionistic local open in X. Since A $\neq$ $\tilde{Y}$, f^{-1}(A) $\neq$ $\tilde{X}$. Hence, f^{-1}(U) = f^{-1}(A) - f^{-1}(B) is an intuitionistic local-D set.

Theorem 3.6 If (Y, σ) is intuitionistic local- D_1 and f : (X, τ) $\rightarrow$ (Y, σ) is intuitionistic local irresolute and bijective, then (X, τ) is intuitionistic local- D_1 .

Proof: Suppose that (Y, σ) is intuitionistic local- D_1 . Let $\tilde{x}$ and $\tilde{y}$ be any pair of distinct points in X. Since f is injective and (Y, σ) is intuitionistic local- D_1 , there exist intuitionistic local-D sets A and B of (Y, σ)containing f($\tilde{x}$) and f($\tilde{y}$) respectively, such that f($\tilde{y}$) $\notin$ A and f($\tilde{x}$) $\notin$ B. By Theorem 3.5, f^{-1}(A) and f^{-1}(B) are intuitionistic local-D sets in X containing $\tilde{x}$ and $\tilde{y}$ respectively. Hence X is intuitionistic local- D_1 .

Theorem 3.7 A space X is intuitionistic local- D_1 if and only if for each pair of distinct points $\tilde{x}$ and $\tilde{y}$, there exists an intuitionistic local irresolute surjective function f of X onto an intuitionistic local- D_1 space Y such that $f(\tilde{x}) \neq f(\tilde{y})$.

Proof: Necessity: For every pair of distinct points of X, it suffices to take the identity function on X.

Sufficiency: Let $\tilde{x}$ and $\tilde{y}$ be any pair of distinct points in (X, τ). By hypothesis, there exists an intuitionistic local irresolute, surjective function f of a space X onto an intuitionistic local- D_1 space Y such that f ($\tilde{x}$) $\neq$ f ($\tilde{y}$). Therefore, there exists disjoint intuitionistic local-D sets A and B in Y such that f ($\tilde{x}$) $\in$ A and f ($\tilde{y}$) $\in$ B. Since f is intuitionistic local irresolute and surjective, by Theorem 3.5, f^{-1}(A) and f^{-1}(B) are disjoint intuitionistic local-D sets in X containing $\tilde{x}$ and $\tilde{y}$ respectively. Hence, (X, τ) is intuitionistic local- D_1 .

Definition 3.8 An intuitionistic topological space (X, τ) is said to be:

(i) intuitionistic T_0 if for every x, y $\in$ X and x $\neq$ y there exists an intuitionistic open set U such that either $\tilde{x}$ $\in$ U and $\tilde{y}$ $\notin$ U or $\tilde{y}$ $\in$ U and $\tilde{x}$ $\notin$ U.

(ii) intuitionistic T_1 if for every x, y $\in$ X and x $\neq$ y there exist intuitionistic open sets U, V containing $\tilde{x}$, $\tilde{y}$ respectively such that either $\tilde{y} \notin$ U and $\tilde{x} \notin$ V.

(iii) intuitionistic T_2 if for every x, y $\in$ X and x $\neq$ y there exist disjoint intuitionistic open sets U, V such that $\tilde{x} \in$ U and $\tilde{y} \in$ V.

Theorem 3.9 Let (Y, σ) be an intuitionistic T_0 (intuitionistic T_1, intuitionistic T_2) space and f : (X, τ) $\rightarrow$ (Y, σ) be a bijective intuitionistic local continuous function. Then (X, τ) is intuitionistic local- D_0 (intuitionistic local- T_1, intuitionistic local- D_2)

Proof: The proof is obvious.

4. STRONG AND WEAK INTUITIONISTIC LOCAL CONTINUOUS FUNCTIONS

Definition 4.1 A function f : (X, τ) $\rightarrow$ (Y, σ) is intuitionistic strongly local continuous at $\tilde{x}$ if for each intuitionistic open set V of (Y, σ) containing f ($\tilde{x}$) there exists U $\in$ LO(X, $\tilde{x}$) such that f (lcl(U)) $\subset$ V. If f is intuitionistic strongly local continuous at every intuitionistic point of (X, τ), then it is intuitionistic strongly local continuous.

Theorem 4.2 For a function f : X $\rightarrow$ Y, the following are equivalent:

(i) f is intuitionistic strongly local continuous;
(ii) f^{-1}(V) is intuitionistic locally open in X for every intuitionistic open set V of Y;
(iii) f^{-1}(F) is intuitionistic locally closed for every intuitionistic closed set F of Y.

Definition 4.3 A function f : (X, τ) $\rightarrow$ (Y, σ) is intuitionistic weakly local continuous if for each intuitionistic open set V of (Y, σ) containing $f(\tilde{x})$ there exists U $\in$ LO(X, $\tilde{x}$) such that f(U) $\subset$ lcl (V).

Theorem 4.4 Let Y be an intuitionistic local regular space. Then for a function f : X $\rightarrow$ Y, the following properties are equivalent

(i) f is intuitionistic weakly local continuous;
(ii) f is intuitionistic local continuous;
(iii) f is intuitionistic strongly local continuous.

Proof:
(i) $\Rightarrow$ (ii) Let x $\in$ X and V an intuitionistic open set of (Y, σ) containing f ($\tilde{x}$) . Since (Y, σ) is intuitionistic local regular, there exists an intuitionistic open set W such that $f(\tilde{x}) \in$ W $\subset$ lcl (W) $\subset$ V. Since f is intuitionistic weakly local continuous, there exists U $\in$ LO (X, $\tilde{x}$) such that f(U) $\subset$ lcl (W). Hence, f(U) $\subset$ V.

(ii) $\Rightarrow$ (iii) Let x $\in$ X and V an intuitionistic open set of (Y, σ) containing f ($\tilde{x}$) . Since (Y, σ) is intuitionistic local regular, there exists an intuitionistic open set W such that $f(\tilde{x}) \in$ W $\subset$ lcl (W) $\subset$ V. By (ii), f is intuitionistic local continuous. So there exists U $\in$ LO (X, $\tilde{x}$) such that f (U) $\subset$ W. To prove that f (lcl (U)) $\subset$ cl (W). Suppose that $\tilde{y} \notin$ W. There exists an intuitionistic open neighbourhood G of $\tilde{y}$ such that G $\cap$ W = $\tilde{\phi}$. Since f is intuitionistic local continuous, f^{-1}(G) is intuitionistic locally open in (X, τ) and f^{-1}(G) $\cap$ U = $\tilde{\phi}$ and hence f^{-1}(G) $\cap$ lcl (U) = $\tilde{\phi}$. Therefore, we obtain G$\cap f$ (lcl (U)) = $\tilde{\phi}$ and $\tilde{y} \notin f$ (lcl (U)). Consequently, f (lcl (U)) $\subset$ cl (W).

(iii) $\Rightarrow$ (ii) The proof is obvious.

Theorem 4.5 Let Y be T_1(vii). Then for a function f : X $\rightarrow$ Y if f is intuitionistic weakly local continuous then f is intuitionistic local continuous.

Proof: If Y is T_1(vii) , for every y $\in$ Y, $\tilde{y}$ is intuitionistic closed. As f is intuitionistic weakly local continuous, for each intuitionistic open set V of Y containing f($\tilde{x}$) there exists U $\in$ LO(X, $\tilde{x}$)

such that f (U) $\subset$ lcl (V). As each $\tilde{y}$ is intuitionistic closed in (Y, σ), V is intuitionistic locally closed. Hence f (U) $\subset$ V. Therefore, f is intuitionistic local continuous.

Theorem 4.6 An intuitionistic local continuous function $f : X \to Y$ is intuitionistic strongly local continuous if X is intuitionistic submaximal.

Proof: As f is intuitionistic local continuous, for every intuitionistic open set V of (Y, σ) containing $f(\tilde{x})$ there exists U ∈ LO(X, $\tilde{x}$) such that f (U) $\subset$ V. As (X, τ) is intuitionistic submaximal, every intuitionistic set of X is intuitionistic locally closed. Hence, f (lcl (U)) $\subset$ V. Therefore, f is intuitionistic strongly local continuous.

Theorem 4.7 Let $f : X \to Y$ and g: $Y \to Z$ be functions. Then, the following properties hold:

(i) If f is intuitionistic strongly local continuous and g is intuitionistic continuous, then $g \circ f : X \to Z$ is intuitionistic strongly local continuous.

(ii) If f is intuitionistic local irresolute and g is intuitionistic strongly local continuous, then $g \circ f$ is intuitionistic strongly local continuous.

(iii) If f is intuitionistic local open bijection and $g \circ f$ is intuitionistic strongly local continuous, then g is intuitionistic strongly local continuous.

Proof: (i), (ii) The proof is obvious.

(iii)Let W be an intuitionistic open set of Z. Then $(g \circ f)^{-1}$(W) is intuitionistic local open in X. Since, f is intuitionistic local open and bijective, $f[(g \circ f)^{-1}(W)] = f[(f^{-1} \circ g^{-1})](W) = g^{-1}(W)$ is intuitionistic local open in Y. Hence, g is intuitionistic strongly local continuous.

Theorem 4.8

(i) If a function $f : X \to Y$ is intuitionistic strongly local continuous injection and Y is intuitionistic T_0, then (X, τ) is intuitionistic local T_2.

(ii) If f: $X \to Y$ is intuitionistic local continuous injection and Y is T_2(i), then (X, τ) is intuitionistic local T_2.

Proof:

(i) Suppose Y is intuitionistic T_0. Let $\tilde{x} \neq \tilde{y}$. Then $f(\tilde{x}) \neq f(\tilde{y})$. Hence there exists either an intuitionistic open set V of $f(\tilde{x})$ not containing $f(\tilde{y})$ or an intuitionistic open set W of $f(\tilde{y})$ not containing $f(\tilde{x})$. From first case let $f(\tilde{x}) \in$ V, $f(\tilde{y}) \notin$ V. Then there exists an intuitionistic local open set U in X containing $\tilde{x}$ such that f (lcl (U)) $\subset$ V. Hence, $f(\tilde{y}) \notin f$ (lcl (U)). Therefore, $\tilde{X}$ - lcl(U) $\in$ LO (X, $\tilde{y}$). From the second case, a similar result is obtained. Hence, X is intuitionistic local T_2.

(ii) Let Y be intuitionistic T_2(i) and $\tilde{x}$ and $\tilde{y}$ be distinct points in X. Then $f(\tilde{x}) \neq f(\tilde{y})$. Since Y is intuitionistic T_2(i) there exist disjoint intuitionistic open sets V and W of Y such that $f(\tilde{x}) \in$ V and $f(\tilde{y}) \in$ W. Therefore, we obtain f^{-1}(V) $\in$ LO (X, $\tilde{x}$), f^{-1}(W) $\in$ LO (X, $\tilde{y}$) and $f^{-1}(V) \cap f^{-1}(W) = \tilde{\phi}$. Hence, X is intuitionistic local T_2.

Theorem 4.9 Let $f : X \to Y$ be intuitionistic local continuous. If Y is T_1(vii) then (X, τ) is intuitionistic local T_1.

Definition 4.10 An intuitionistic topological space X is said to be intuitionistic local compact if every cover of (X, τ) by intuitionistic local open sets has a finite subcover.

Definition 4.11 Let A be an intuitionistic set of X. Then A is intuitionistic local compact relative to (X, τ) if every cover of A by intuitionistic local open sets of (X, τ) has a finite subcover.

Definition 4.12 An intuitionistic topological space (X,τ) is said to be intuitionistic L-closed if every cover of (X,τ) by intuitionistic local open sets has a finite subcover whose intuitionistic local closures cover (X,τ).

Definition 4.13 An intuitionistic topological space (X,τ) is said to be intuitionistic L-Lindelof if every cover of (X,τ) by intuitionistic local open sets has a countable subcover whose intuitionistic local closures cover (X,τ).

Definition 4.14 An intuitionistic topological space (X,τ) is said to be intuitionistic countably L-closed if every countable cover of (X,τ) by intuitionistic local open sets has a finite subcover whose intuitionistic local closures cover (X,τ).

Definition 4.15 Let A be an intuitionistic set of X. Then A is intuitionistic L-closed relative to X if for every cover $\{V_\alpha / \alpha \in \nabla\}$ of A by intuitionistic local open sets of (X,τ), there exists a finite subset ∇_0 of ∇ such that $A \subset \bigcup\{\mathrm{lcl}(V_\alpha) / \alpha \in \nabla_0\}$.

Theorem 4.16 If $f : X \to Y$ is intuitionistic strongly local continuous and A is intuitionistic L-closed relative to (X,τ), then f (A) is an intuitionistic compact set of (Y,σ).

Proof: Suppose that $f : X \to Y$ is intuitionistic strongly local continuous and let A be intuitionistic L-closed relative to X. Let $\{V_\alpha / \alpha \in \nabla\}$ be an intuitionistic open cover of f (A). For each intuitionistic point $\tilde{x} \in A$, $f(\tilde{x}) \in V_\alpha$. Since f is intuitionistic strongly local continuous, there exists $U \in LO(X, \tilde{x})$ such that $f(\mathrm{lcl}(U)) \subset V_\alpha$. Hence, $\{U / \tilde{x} \in A\}$ is a cover of A by intuitionistic local open sets of X and hence there exists a finite intuitionistic set A_0 of A such that $A \subset \bigcup_{\tilde{x} \in A_0} \mathrm{lcl}(U)$. Hence $f(A) \subset \bigcup_{\alpha \in A_0} V_\alpha$. Therefore, f (A) is intuitionistic compact.

Corollary 4.17 Let $f : X \to Y$ be an intuitionistic strongly local continuous surjection. Then, the following properties hold:

(i) If (X,τ) is intuitionistic L-closed, then (Y,σ) is intuitionistic compact.

(ii) If (X,τ) is intuitionistic L-Lindelof, then (Y,σ) is intuitionistic Lindelof.

(iii) If (X,τ) is intuitionistic countably L-closed, then (Y,σ) is intuitionistic countably compact.

Theorem 4.18 Let $f : X \to Y$ be intuitionistic local continuous bijection and (X,τ) be intuitionistic local compact. Then (Y,σ) is intuitionistic compact.

Proof: Let $\{V_\alpha / \alpha \in \nabla\}$ be an intuitionistic open cover of (Y,σ). As f is intuitionistic local continuous, there exists $U_\alpha \in LO(X, \tilde{x})$ such that $f(U_\alpha) \subset V_\alpha$ for each intuitionistic open set V_α containing $f(\tilde{x})$ in (Y,σ). Hence, $\{U_\alpha / \alpha \in \nabla\}$ is a cover of (X,τ) by intuitionistic local open sets of (X,τ). Hence there exists a finite subcover which covers (X,τ). Hence, $\tilde{X} = \bigcup_{\alpha \in \Delta_0}\{U_\alpha\}$. Therefore, $f(\tilde{X}) = \bigcup_{\alpha \in \Delta_0} f(U_\alpha) \subseteq \bigcup V_\alpha$. (ie) $\tilde{Y} = \bigcup_{\alpha \in \Delta_0} V_\alpha$. Thus, (Y,σ) is intuitionistic compact.

Remark 4.19

For a function f: X → Y, we have the following implication diagram:

intuitionistic continuous ⟹ intuitionistic strongly local continuous

intuitionistic local continuous ⟹ intuitionistic weakly local continuous

The converse implications are not true as it is shown by the following examples:

Example 4.20 Let X = {a, b, c}, $\tau = \{\tilde{\phi}, \tilde{X}, (\{a\}, \{b\}), (\{b\}, \{c\}), (\{a,b\}, \phi), (\{a, c\}, \{b\}), (\phi, \{b, c\})\}$,

$\sigma = \{\tilde{\phi}, \tilde{X}, (\{a, c\}, \phi),$

$(\{b, c\}, \{a\}), (\{a\}, \{b\}), (\phi, \{a\}), (\{c\}, \{a\}), (\phi, \{a, b\}), (\{a\}, \phi)\}$ and $f:(X,\tau)\to(X,\sigma)$ be a function such that f (a) = c, f (b) = a, f (c) = b. Then the function f is intuitionistic strongly local continuous but not intuitionistic continuous.

Example 4.21 Let X = {a, b, c}, $\tau=\{\tilde{\phi}, \tilde{X}\}$, $\sigma=\{\tilde{\phi}, \tilde{X}, (\{a, b\}, \{c\})\}$ and $f:(X,\tau)\to(X,\sigma)$ be a function such that f (a) = b, f (b) = a, f (c) = b. Then the function f is intuitionistic local continuous but not intuitionistic strongly local continuous.

Example 4.22 Let X = {a, b, c}, $\tau=\{\tilde{\phi}, \tilde{X}, (\{a\}, \{b\})\}$, $\sigma=\{\tilde{\phi}, \tilde{X}, (\{b\}, \phi)\}$ and $f:(X,\tau)\to(X,\sigma)$ be a function such that f (a) = b, f (b) = c, f (c) = a. Then the function f is intuitionistic weakly local continuous but not intuitionistic local continuous.

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