



$I\alpha^*g^\#\psi$ –Continuous in Intuitionistic Topological Spaces

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Abstract

The notion of intuitionistic alpha star generalized hash psi ($I\alpha^*g^\#\psi$)-continuity in intuitionistic topological spaces is presented in this study along with the connection between $I\alpha^*g^\#\psi$ –continuity and other intuitionistic generalized sets that are currently in use. There is discussion of some of its traits as well as its lack of resolve. $I\alpha^*g^\#\psi$ homeomorphism has been established.

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1. Introduction

Following the introduction of the notion of fuzzy sets, Atanassov [1] put out the idea of intuitionistic fuzzy sets. Coker [2] earlier proposed intuitionistic sets and intuitionistic points in 1996, then introduced intuitionistic fuzzy topological spaces in 1997 [2]. Utilizing intuitionistic sets, Subsequently, Coker [3] created the notion of intuitionistic topological spaces (also known as intuitionistic fuzzy special topological space by Ozcag. However both Ozcag and Coker in 1998) studied and examined fundamental aspects of compactness and continuous functions [4]. They also looked at connectivity in intuitionistic topological spaces [4, 5]. Afterwards, a

number of scholars investigated irresolute mappings and continuous functions in intuitionistic topological spaces [6, 7]. Non-classical intuitionistic fuzzy sets have a wide range of uses, including fuzzy sets [8] and neutrosophic sets [9]. Selvanayagi and Ilango have given continuous functions using generalised sets in intuitionistic topological spaces [8, 10]. Some of the features of $I\alpha^*g^\#\psi$ – closed maps and $I\alpha^*g^\#\psi$ –irresoluteness in intuitionistic topological space are introduced and examined in this paper. Additionally, the relationship between $I\alpha^*g^\#\psi$ –homeomorphism, $I\alpha^*g^\#\psi$ –open maps, and $I\alpha^*g^\#\psi$ –closed maps was examined.

2. Basic Fundamental

Definition 2.1. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic semi-continuous (ISC) if $\mu^{-1}(H)$ is (ISC) in (A, τ) for all intuitionistic closed set (ICS) H of (B, r) [2].

Definition2.2. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic α -continuous if $\mu^{-1}(H)$ is $I\alpha$ -closed set ($I\alpha$ -CS) in (A, τ) for all (ICS) H of (B, r) [3].

Definition2.3. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic Isg-continuous if $\mu^{-1}(H)$ is Isg-closed in (A, τ) for all (ICS) H of (B, r) [10].

Definition 2.4. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic ψ – continuous if $\mu^{-1}(H)$ is $I\psi$ – closed in (A, τ) for all (ICS) H of (B, r) [11].

Definition 2.5. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic $g\#\psi$ – continuous map ($Ig\#\psi$ – CM) if $\mu^{-1}(H)$ is $Ig\#\psi$ – closed set ($Ig\#\psi$ – CS) in (A, τ) for all (ICS) H of (B, r) [12].

Definition 2.6. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic $Iag\#\psi$ – continuous if $\mu^{-1}(H)$ is $Iag\#\psi$ – closed in (A, τ) for all (ICS) H of (B, r) [13].

Definition 2.7. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an intuitionistic

- i. α – irresolute if $\mu^{-1}(H)$ is $(I\alpha$ – CS) in (A, τ) for all $(I\alpha$ – CS) H of (B, r) [14].
- ii. $ag\#\psi$ – irresolute [14] if for all $Iag\#\psi$ – closed set H of (B, r) , we have $\mu^{-1}(H)$ is $Iag\#\psi$ – closed set in (A, τ) .

Notations:

$N_1 = \emptyset = \langle X, \emptyset, X \rangle$, $N_2 = X = \langle X, X, \emptyset \rangle$, $N_3 = \langle X, \{a\}, \{b\} \rangle$, $N_4 = \langle X, \{b\}, \{a\} \rangle$, $N_5 = \langle X, \{b\}, \{c\} \rangle$, $N_6 = \langle X, \{c\}, \{b\} \rangle$, $N_7 = \langle X, \{a\}, \{c\} \rangle$, $N_8 = \langle X, \{c\}, \{a\} \rangle$, $N_9 = \langle X, \{a, b\}, \{c\} \rangle$, $N_{10} = \langle X, \{c\}, \{a, b\} \rangle$, $N_{11} = \langle X, \{b, c\}, \{a\} \rangle$, $N_{12} = \langle X, \{a\}, \{b, c\} \rangle$, $N_{13} = \langle X, \{a, c\}, \{b\} \rangle$, $N_{14} = \langle X, \{b\}, \{a, c\} \rangle$, $N_{15} = \langle X, \{a\}, \emptyset \rangle$, $N_{16} = \langle X, \emptyset, \{a\} \rangle$, $N_{17} = \langle X, \{b\}, \emptyset \rangle$, $N_{18} = \langle X, \emptyset, \{b\} \rangle$, $N_{19} = \langle X, \{c\}, \emptyset \rangle$, $N_{20} = \langle X, \emptyset, \{c\} \rangle$, $N_{21} = \langle X, \{a, b\}, \emptyset \rangle$, $N_{22} = \langle X, \emptyset, \{a, b\} \rangle$, $N_{23} = \langle X, \{b, c\}, \emptyset \rangle$, $N_{24} = \langle X, \emptyset, \{b, c\} \rangle$, $N_{25} = \langle X, \{a, c\}, \emptyset \rangle$, $N_{26} = \langle X, \emptyset, \{a, c\} \rangle$, $N_{27} = \langle X, \emptyset, \emptyset \rangle$.

3. $I\alpha^*g\#\psi$ – Continuity

Definition 3.1. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is termed as an $I\alpha^*g\#\psi$ – continuous map ($I\alpha^*g\#\psi$ – CM) if $\mu^{-1}(H)$ is $I\alpha^*g\#\psi$ – closed set ($I\alpha^*g\#\psi$ – CS) of (A, τ) for all (ICS) D of (B, r) . Allow A to be a topological space, a subset S of A is stated as $I\alpha^*g\#\psi$ – CS if $I\alpha cl(S) \subseteq G$ and G is $Iag\#\psi$ – OS (open set) in (A, τ) .

Theorem 3.2. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is intuitionistic continuous. Then μ is ($I\alpha^*g\#\psi$ – CM).

Proof: Assume H is an (ICS) of (B, r) . Because μ is intuitionistic continuous, $\mu^{-1}(H)$ is (ICS) in (A, τ) . However any (ICS) is ($I\alpha^*g\#\psi$ – CS). Then $\mu^{-1}(H)$ is ($I\alpha^*g\#\psi$ – CS) in (A, τ) . Hence μ is ($I\alpha^*g\#\psi$ – CM). The following illustration shows why the contrary of the preceding theorem need not hold true.

Example 3.3.

Assume $N = \{\alpha, \beta, c\} = M$, $\tau = \{\tilde{N}, \tilde{\emptyset}, \langle N, \{\alpha\}, \{\beta\} \rangle\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, \langle N, \{\alpha\}, \{\beta\} \rangle, \langle N, \{\alpha, \beta\}, \emptyset \rangle\}$, $r^c = \{\tilde{M}, \tilde{\emptyset}, \langle X, \{\beta\}, \{\alpha\} \rangle, \langle N, \emptyset, \{\alpha, \beta\} \rangle\}$. Define $\mu: (N, \tau) \rightarrow (M, r)$ from $\mu(\alpha) = \alpha, \mu(\beta) = c, \mu(c) = \beta$. $I\alpha^*g\#\psi C(N, \tau) = \{\tilde{N}, \tilde{\emptyset}, \langle N, \{\beta\}, \{\alpha\} \rangle, \langle X, \{\beta, c\}, \{\alpha\} \rangle, \langle N, \{\beta\}, \{\alpha, c\} \rangle, \langle N, \emptyset, \{\alpha\} \rangle, \langle X, \emptyset, \{\alpha, \beta\} \rangle, \langle N, \{\beta, c\}, \emptyset \rangle, \langle N, \emptyset, \{\alpha, c\} \rangle\}$. $\mu^{-1}(\langle N, \emptyset, \{\alpha, \beta\} \rangle) = \langle N, \emptyset, \{\alpha, c\} \rangle$ is not an (ICS) in (N, τ) . Hence μ is not intuitionistic continuous. But μ is ($I\alpha^*g\#\psi$ – CM).

Theorem 3.4. Let $\mu: (A, \tau) \rightarrow (B, r)$ be $I\alpha$ – continuous. Then μ is ($I\alpha^*g\#\psi$ – CM).

Proof: Assume H is an (ICS) of (B, r) . Because μ is $I\alpha$ – continuous, $\mu^{-1}(H)$ is ($I\alpha$ – CS) in (A, τ) . However any ($I\alpha$ – CS) is ($I\alpha^*g\#\psi$ – CS). Then $\mu^{-1}(H)$ is ($I\alpha^*g\#\psi$ – CS) in (A, τ) . So, μ is ($I\alpha^*g\#\psi$ – CM). The following illustration shows why the contrary of the preceding theorem need not hold true.

Example 3.5. Assume $N = \{\alpha, \beta, c\} = M$, $\tau = \{\tilde{N}, \tilde{\emptyset}, \langle N, \emptyset, \{\alpha\} \rangle, \langle N, \{\beta, c\}, \emptyset \rangle\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, \langle N, \{\alpha\}, \{b\} \rangle, \langle N, \{\beta\}, \{c\} \rangle, \langle N, \{\alpha, b\}, \emptyset \rangle, \langle N, \emptyset, \{\beta, c\} \rangle\}$. Define $\mu: (N, \tau) \rightarrow (M, r)$ from $\mu(\alpha) = \beta, \mu(\beta) = c, \mu(c) = \alpha$. $I\alpha C(N, \tau) = \{\tilde{N}, \tilde{\emptyset}, \langle N, \{\alpha\}, \emptyset \rangle, \langle N, \emptyset, \{\beta, c\} \rangle\}$. $I\alpha^*g\#\psi C(N, \tau) = \{\tilde{N}, \tilde{\emptyset}, \langle N, \{\alpha\}, \{\beta\} \rangle, \langle N, \{\alpha\}, \{c\} \rangle, \langle N, \{\alpha, \beta\}, \{c\} \rangle, \langle N, \{\alpha\}, \{\beta, c\} \rangle, \langle N, \{\alpha, c\}, \{\beta\} \rangle, \langle N, \{\alpha\}, \emptyset \rangle, \langle N, \{\alpha, \beta\}, \emptyset \rangle, \langle N, \emptyset, \{\beta, c\} \rangle, \langle N, \{\alpha, c\}, \emptyset \rangle\}$. Here $\mu^{-1}(\langle N, \{\beta\}, \{c\} \rangle) = \langle N, \{\alpha\}, \{c\} \rangle$ is not an ($I\alpha$ – CS) in (N, τ) . Therefore μ is not $I\alpha$ – continuous. But μ is ($I\alpha^*g\#\psi$ – CM).

Theorem 3.6. Assume $\mu: (A, \tau) \rightarrow (B, r)$ is $(Ia^*g\# \psi - CM)$. Then μ is Isg-continuous.

Proof: Assume that H is an (ICS) of (B, r) . Since μ is $(Ia^*g\# \psi - CM)$, $\mu^{-1}(H)$ is $(Ia^*g\# \psi - CS)$ in (A, τ) . However any $(Ia^*g\# \psi - CS)$ is Isg-closed set. Hence $\mu^{-1}(H)$ is Isg-closed set in (A, τ) . So, μ is Isg-continuous.

The following illustration shows why the contrary of the preceding theorem remains inconclusive

Example 3.7.

Let $K = \{\sigma, \beta, \delta\} = M$, $\tau = \{\tilde{K}, \tilde{\emptyset}, \langle K, \{\sigma\}, \emptyset \rangle, \langle K, \emptyset, \{\beta, c\} \rangle\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, \langle K, \emptyset, \{\delta\} \rangle, \langle K, \{\sigma, \beta\}, \emptyset \rangle\}$. Define $\mu: (K, \tau) \rightarrow (M, r)$ from $\mu(\sigma) = \delta, \mu(\beta) = \beta, \mu(\delta) = \sigma$. $IsgC(K, \tau) = \{K, \tilde{\emptyset}, \langle K, \{\beta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\delta\} \rangle, \langle K, \{\delta\}, \{\beta\} \rangle, \langle K, \{\delta\}, \{\sigma\} \rangle, \langle K, \{\delta\}, \{\sigma, \beta\} \rangle, \langle K, \{\beta, \delta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\sigma, \delta\} \rangle, \langle K, \emptyset, \{\sigma\} \rangle, \langle K, \{\beta\}, \emptyset \rangle, \langle K, \emptyset, \{\beta\} \rangle, \langle K, \{\delta\}, \emptyset \rangle, \langle K, \emptyset, \{\delta\} \rangle, \langle K, \emptyset, \{\sigma, \beta\} \rangle, \langle K, \{\beta, \delta\}, \emptyset \rangle, \langle K, \emptyset, \{\beta, \delta\} \rangle, \langle K, \emptyset, \{\sigma, \delta\} \rangle, \langle K, \emptyset, \emptyset \rangle\}$. $Ia^*g\# \psi C(K, \tau) = \{\tilde{K}, \tilde{\emptyset}, \langle K, \{\beta, \delta\}, \{\sigma\} \rangle, \langle K, \emptyset, \{\sigma\} \rangle, \langle K, \emptyset, \{\sigma, \beta\} \rangle, \langle K, \{\beta, \delta\}, \emptyset \rangle, \langle K, \emptyset, \{\sigma, \delta\} \rangle\}$. Here $\mu^{-1}(\langle K, \emptyset, \{\sigma, \beta\} \rangle) = \langle K, \emptyset, \{\beta, \delta\} \rangle$ is not $(Ia^*g\# \psi - CS)$ in (K, τ) . Hence μ is not $(Ia^*g\# \psi - CM)$. But μ is Isg-continuous.

Theorem 3.8. Let $\mu: (A, \tau) \rightarrow (B, r)$ be $(Ia^*g\# \psi - CM)$. Then μ is $(Ig\# \psi - CM)$.

Proof: Assume H is an (ICS) of (B, r) . Since μ is $(Ia^*g\# \psi - CM)$, $\mu^{-1}(H)$ is $(Ia^*g\# \psi - CS)$ in (A, τ) . However any $(Ia^*g\# \psi - CS)$ is $(Ig\# \psi - CS)$. Hence $\mu^{-1}(H)$ is $(Ig\# \psi - CS)$ in (A, τ) . So, μ is $(Ig\# \psi - CM)$. The next example indicates how the opposite of the previous theorem does not have to be valid.

Example 3.9. Let $K = \{\sigma, \beta, \delta\} = M$, $\tau = \{\tilde{K}, \tilde{\emptyset}, \langle K, \emptyset, \{\beta\} \rangle, \langle K, \{\sigma, \delta\}, \emptyset \rangle\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, \langle K, \{\delta\}, \emptyset \rangle, \langle K, \emptyset, \{\sigma, \beta\} \rangle\}$. Define $\mu: (K, \tau) \rightarrow (M, r)$ by $\mu(\sigma) = \beta, \mu(\beta) = \delta, \mu(\delta) = \sigma$. $Ig\# \psi C(K, \tau) = \{\tilde{K}, \tilde{\emptyset}, \langle K, \{\beta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\delta\} \rangle, \langle K, \{\sigma, \beta\}, \{\delta\} \rangle, \langle K, \{\beta, \delta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\sigma, \delta\} \rangle, \langle K, \emptyset, \{\sigma\} \rangle, \langle K, \{\beta\}, \emptyset \rangle, \langle K, \emptyset, \{\beta\} \rangle, \langle K, \emptyset, \{\delta\} \rangle, \langle K, \{\sigma, \beta\}, \emptyset \rangle, \langle K, \emptyset, \{\sigma, \beta\} \rangle, \langle K, \{\beta, \delta\}, \emptyset \rangle, \langle K, \emptyset, \{\beta, \delta\} \rangle, \langle K, \emptyset, \{\sigma, \delta\} \rangle, \langle K, \emptyset, \emptyset \rangle\}$. $Ia^*g\# \psi C(K, \tau) = \{\tilde{K}, \tilde{\emptyset}, \langle K, \{\beta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\delta\} \rangle, \langle K, \{\sigma, \beta\}, \{\delta\} \rangle, \langle K, \{\beta, \delta\}, \{\sigma\} \rangle, \langle K, \{\beta\}, \{\sigma, \delta\} \rangle, \langle K, \{\beta\}, \emptyset \rangle, \langle K, \{\sigma, \beta\}, \emptyset \rangle, \langle K, \emptyset, \{\sigma, \delta\} \rangle\}$. Here $\mu^{-1}(\langle K, \emptyset, \{\delta\} \rangle) = \langle K, \emptyset, \{\beta\} \rangle$ is not $(Ia^*g\# \psi - CS)$ in (K, τ) . Hence μ is not $(Ia^*g\# \psi - CM)$. But μ is $(Ig\# \psi - CM)$.

Theorem 3.10. Let $\mu: (A, \tau) \rightarrow (B, r)$ be $Iag\# \psi$ -continuous. Then μ is $(Ia^*g\# \psi - CM)$.

Proof: Assume H is an (ICS) of (B, r) . Since μ is $Iag\# \psi$ -continuous, $\mu^{-1}(H)$ is $Iag\# \psi$ -closed in (A, τ) . However any $Iag\# \psi$ -closed set is $(Ia^*g\# \psi - CS)$. Hence $\mu^{-1}(H)$ is $(Ia^*g\# \psi - CS)$ in (A, τ) . So, μ is $(Ia^*g\# \psi - CM)$. The next example indicates how the opposite of the previous theorem does not have to be valid.

Example 3.11. Let $N = \{e, y, \delta\} = M$, $\tau = \{\tilde{N}, \tilde{\emptyset}, \langle N, \emptyset, \{\delta\} \rangle, \langle N, \{e, y\}, \emptyset \rangle\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, \langle N, \{y\}, \{\delta\} \rangle, \langle N, \emptyset, \{y, \delta\} \rangle\}$. Define $\mu: (N, \tau) \rightarrow (M, r)$ by $\mu(e) = e, \mu(y) = y, \mu(c) = c$. $Iag\# \psi C(N, \tau) = \{\tilde{V}, \tilde{\emptyset}, \langle V, \{\delta\}, \{y\} \rangle, \langle V, \{\delta\}, \{e\} \rangle, \langle V, \{\delta\}, \{e, y\} \rangle, \langle V, \{\delta\}, \emptyset \rangle, \langle V, \emptyset, e, y \rangle\}$. $Ia^*g\# \psi C(V, \tau) = \{\tilde{V}, \tilde{\emptyset}, \langle V, \{\delta\}, \{y\} \rangle, \langle V, \{c\}, \{e\} \rangle, \langle V, \{\delta\}, \{e, y\} \rangle, \langle V, \{y, \delta\}, \{e\} \rangle, \langle V, \{e, \delta\}, \{y\} \rangle, \langle V, \{\delta\}, \emptyset \rangle, \langle V, \emptyset, \{e, y\} \rangle, \langle V, \{y, \delta\}, \emptyset \rangle, \langle V, \{e, \delta\}, \emptyset \rangle\}$. Here $\mu^{-1}(\langle V, \{y, \delta\}, \emptyset \rangle) = \langle V, \{y, \delta\}, \emptyset \rangle$ is not $Iag\# \psi$ -closed set in (V, τ) . Hence μ is not $Iag\# \psi$ -continuous. But μ is $(Ia^*g\# \psi - CM)$.

Remark 3.12. The composition of two $(Ia^*g\# \psi - CM)$ map need not be a $(Ia^*g\# \psi - CM)$. The instance demonstrates that.

Example 3.13. Assume $K = \{\sigma, y, \delta\} = M = M$, $\tau = \{K, \tilde{\emptyset}, \langle K, \emptyset, \{\sigma\} \rangle, \langle K, \{y, \delta\}, \emptyset \rangle\}$, $r = \{\tilde{M}, \tilde{\emptyset}, \langle K, \{y\}, \{\sigma\} \rangle, \langle K, \{y\}, \{\delta\} \rangle\}$, $u = \{\tilde{M}, \tilde{\emptyset}, \langle K, \emptyset, \{y\} \rangle, \langle K, \{\sigma, \delta\}, \emptyset \rangle\}$. Define $T: (N, \tau) \rightarrow (M, r)$ by $T(\sigma) = \sigma, T(y) = y, T(\delta) = \delta$. Define $H: (M, r) \rightarrow (M, u)$ from $H(\sigma) = \delta, H(y) = y, H(c) = \sigma$. $Ia^*g\# \psi C(K, \tau) = \{\tilde{K}, \tilde{\emptyset}, \langle K, \{\sigma\}, \{y\} \rangle, \langle K, \{\sigma\}, \{\delta\} \rangle, \langle K, \{\sigma, y\}, \{\delta\} \rangle, \langle K, \{\sigma\}, \{y, \delta\} \rangle, \langle K, \{\sigma, \delta\}, \{y\} \rangle, \langle K, \{\sigma\}, \emptyset \rangle, \langle K, \{\sigma, y\}, \emptyset \rangle, \langle K, \emptyset, \{y, \delta\} \rangle, \langle K, \{\sigma, \delta\}, \emptyset \rangle\}$. $Ia^*g\# \psi C(M, r) = \{\tilde{M}, \tilde{\emptyset}, \langle K, \{\sigma\}, \{y\} \rangle, \langle K, \{\sigma\}, \{y, \delta\} \rangle, \langle K, \{\sigma, \delta\}, \{y\} \rangle, \langle K, \emptyset, \{y\} \rangle, \langle K, \emptyset, \{\sigma, y\} \rangle, \langle K, \emptyset, \{y, \delta\} \rangle, \langle K, \{\sigma, \delta\}, \emptyset \rangle\}$. Both T and H are $(Ia^*g\# \psi - CM)$. Here $\langle K, \emptyset, \{\sigma, \delta\} \rangle$ is an (ICS)

in (M, u) . But $(HoT)^{-1}(< K, \emptyset, \{\sigma, \delta\} >) = < K, \emptyset, \{\sigma, \delta\} >$ is not $(Ia^*g\#\psi-CS)$ in (K, τ) . Hence HoT is not $(Ia^*g\#\psi-CM)$.

Remark 3.14.

The connections between $(Ia^*g\#\psi-CS)$ and other generalized intuitionistic sets in the previously described theorems are depicted illustrated graphic, where A implies B , but not the other way around.

4. $Ia^*g\#\psi$ –irresolute functions

Definition 4.1. We say $T: (A, \tau) \rightarrow (B, r)$ is an $Ia^*g\#\psi$ –irresolute, if $T^{-1}(H)$ is $(Ia^*g\#\psi-CS)$ of (A, τ) for each $(Ia^*g\#\psi-CS)$ H of (B, r) .

Theorem 4.2. Every $Ia^*g\#\psi$ –irresolute is $(Ia^*g\#\psi-CM)$.

Proof: Assume H is an (ICS) of (B, r) .

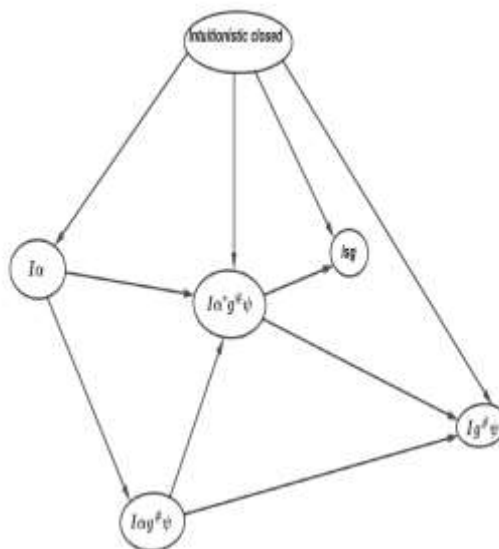


Figure 1. Intuitionistic $\alpha^*g\#\psi$ –closed set

Since every (ICS) is $(Ia^*g\#\psi-CS)$. Hence D is $(Ia^*g\#\psi-CS)$ of (B, r) . Since f is $Ia^*g\#\psi$ –irresolute, $T^{-1}(D)$ is $(Ia^*g\#\psi-CS)$ in (A, τ) . Hence T is $(Ia^*g\#\psi-CM)$. The next example indicates how the opposite of the previous theorem doesn't have to be valid.

Example 4.3. Let $N = \{\alpha, y, \delta\} = M$, with $\tau = \{\tilde{N}, \tilde{\emptyset}, < N, \{\alpha\}, \{y\} >\}$ and $r = \{\tilde{M}, \tilde{\emptyset}, < N, \{y\}, \{\alpha\} >, < N, \{\delta\}, \{y\} >, < N, \emptyset, \{\alpha, y\} >, < N, \{y, \delta\}, \emptyset >\}$. Define $T: (N, \tau) \rightarrow (M, r)$ by $T(\alpha) = \delta, T(y) = \alpha, T(\delta) = y$. $Ia^*g\#\psi C(N, \tau) = \{\tilde{N}, \tilde{\emptyset}, < N, \{y\}, \{\alpha\} >, < N, \{y, \delta\}, \{\alpha\} >, < N, \{y\}, \{\alpha, \delta\} >, < N, \emptyset, \{\alpha\} >, < N, \emptyset, \{\alpha, y\} >, < N, \{y, \delta\}, \emptyset >, < N, \emptyset, \{\alpha, \delta\} >\}$. $Ia^*g\#\psi C(M, r) = \{\tilde{M}, \tilde{\emptyset}, < N, \{y\}, \{\alpha\} >, < N, \{\delta\}, \{y\} >, < N, \{\delta\}, \{\alpha, y\} >, < N, \{y\}, \{\alpha, \delta\} >, < N, \emptyset, \{\alpha\} >, < N, \emptyset, \{y\} >, < N, \emptyset, \{\alpha, y\} >, < N, \emptyset, \{y, \delta\} >, < N, \emptyset, \{\alpha, \delta\} >\}$. Here T is $(Ia^*g\#\psi-CM)$ but T is not $Ia^*g\#\psi$ –irresolute. Since $< N, \{y\}, \{\alpha\} >$ is $(Ia^*g\#\psi-CS)$ in (M, r) , but $T^{-1}(< N, \{y\}, \{\alpha\} >) = < N, \{\delta\}, \{y\} >$ is not a $(Ia^*g\#\psi-CS)$ in (N, τ) .

Theorem 4.4. Suppose that $T: (A, \tau) \rightarrow (B, r)$ and $H: (B, r) \rightarrow (M, u)$ are two maps. Then

- $HoT: (A, \tau) \rightarrow (M, u)$ is $(Ia^*g\#\psi-CM)$ if H is an intuitionistic continuous and T is $(Ia^*g\#\psi-CM)$.
- $HoT: (A, \tau) \rightarrow (M, u)$ is $Ia^*g\#\psi$ –irresolute if both H and T are $Ia^*g\#\psi$ –irresolute.
- $HoT: (A, \tau) \rightarrow (M, u)$ is $(Ia^*g\#\psi-CM)$ if H is $(Ia^*g\#\psi-CM)$ and T is $Ia^*g\#\psi$ –irresolute.

Proof:

- i. Assume D is an (ICS) in (M, u) . Since g is an intuitionistic continuous, $H^{-1}(D)$ is (ICS) in (B, r) . Since T is $(Ia^*g\#\psi - CM)$, $T^{-1}(H^{-1}(D)) = (HoT)^{-1}(D)$ is $(Ia^*g\#\psi - CS)$ in (A, τ) . Hence HoT is $(Ia^*g\#\psi - CM)$.
- ii. Assume D is an $(Ia^*g\#\psi - CS)$ in (M, u) . Since H and T are $Ia^*g\#\psi$ – irresolute, then $T^{-1}(H^{-1}(D)) = (HoT)^{-1}(D)$ is $(Ia^*g\#\psi - CS)$ in (A, τ) . Hence HoT is $Ia^*g\#\psi$ – irresolute.
- iii. Assume D is an (ICS) in (M, u) . Since H is $(Ia^*g\#\psi - CM)$, $H^{-1}(D)$ is $(Ia^*g\#\psi - CS)$ in (Y, σ) . Since T is $Ia^*g\#\psi$ – irresolute, then $T^{-1}(H^{-1}(D)) = (HoT)^{-1}(D)$ is $(Ia^*g\#\psi - CS)$ in (A, τ) . Hence HoT is $(Ia^*g\#\psi - CM)$.

Theorem 4.5. Let $J: (A, \tau) \rightarrow (B, r)$ be a $(Ia^*g\#\psi - CM)$ map. If (A, τ) is an $T(Ia^*g\#\psi)$ (resp $T^*Ia^*g\#\psi$, $T^{**}Ia^*g\#\psi$) space, then J is an intuitionistic continuous (Ia -continuous, $Iag\#\psi$ – continuous).

Proof: Assume D is an (ICS) of (B, r) . Since J is an $(Ia^*g\#\psi - CM)$, therefore $J^{-1}(D)$ is $(Ia^*g\#\psi - CS)$ in (A, τ) . Since (A, τ) is an $T(Ia^*g\#\psi)$ (resp $T^*Ia^*g\#\psi$, $T^{**}Ia^*g\#\psi$) space, then $J^{-1}(D)$ is an (ICS) (Ia -closed, $Iag\#\psi$ – closed) in (A, τ) . Hence J is an intuitionistic continuous (Ia -continuous, $Iag\#\psi$ – continuous).

Theorem 4.6. Assume $T: (A, \tau) \rightarrow (B, r)$ is onto, $Iag\#\psi$ – irresolute and an (ICS) map. Then $f(W)$ is $(Ia^*g\#\psi - CS)$ of (B, r) for all $(Ia^*g\#\psi - CS)$ W of (A, τ) .

Proof: Assume W is an $(Ia^*g\#\psi - CS)$ of (A, τ) . Assume U is an $Iag\#\psi$ – open set of (B, r) with $f(W) \subseteq U$. Since T is surjective and $Iag\#\psi$ – irresolute, $T^{-1}(U)$ is an $Iag\#\psi$ – open set of (A, τ) . Because $W \subseteq T^{-1}(U)$ and W is $(Ia^*g\#\psi - CS)$ of (A, τ) , $Iacl(W) \subseteq T^{-1}(U)$. Therefore $T(Iacl(W)) \subseteq T(T^{-1}(U)) = U$. Since T is Ia -closed, $T(Iacl(W)) = Iacl(T(Iacl(W)))$. $Iacl(T(W)) \subseteq (T(Iacl(W))) = T(Iacl(W)) \subseteq U$. Hence $T(W)$ is an $(Ia^*g\#\psi - CS)$ of (B, r) .

Theorem 4.7. Assume $J: (A, \tau) \rightarrow (B, r)$ is onto, $Ia^*g\#\psi$ – irresolute and an (ICS) map. If (X, τ) is a $T(Ia^*g\#\psi)$ – space, then (B, r) is a $T(Ia^*g\#\psi)$ – space.

Proof : Assume W is an $(Ia^*g\#\psi - CS)$ of (B, r) . Since f is $Ia^*g\#\psi$ – irresolute, $J^{-1}(W)$ is an $(Ia^*g\#\psi - CS)$ of (A, τ) . Since (A, τ) is an $T(Ia^*g\#\psi)$ – space, $J^{-1}(W)$ is an (ICS) of (A, τ) . Then $J(J^{-1}(W)) = W$ is closed in (B, r) . So, W is an (ICS) of (B, r) and then (B, r) is an $T(Ia^*g\#\psi)$ – space.

Definition 4.8. We say $T: (A, \tau) \rightarrow (B, r)$ is an intuitionistic pre- $\alpha^*g\#\psi$ – closed if $T(W)$ is $(Ia^*g\#\psi - CS)$ of (B, r) for all $(Ia^*g\#\psi - CS)$ W of (A, τ) .

Theorem 4.9. Assume $J: (A, \tau) \rightarrow (B, r)$ is onto, $Ia^*g\#\psi$ – irresolute and an intuitionistic pre- α -closed map. If (A, τ) is an $T^*Ia^*g\#\psi$ – space, then (B, r) is an $T^*Ia^*g\#\psi$ – space.

Proof: Assume W is an $(Ia^*g\#\psi - CS)$ of (B, r) . Since J is $Ia^*g\#\psi$ – irresolute, $J^{-1}(W)$ is an $(Ia^*g\#\psi - CS)$ of (A, τ) . Since (A, τ) is an $T^*Ia^*g\#\psi$ – space, $J^{-1}(W)$ is an $(Ia - CS)$ of (A, τ) . Since J is an intuitionistic pre- α -closed map, $J(J^{-1}(W))$ is $(Ia - CS)$ in (B, r) for all $(Ia - CS)$ of $J^{-1}(W)$ of (A, τ) . Because J is surjection, we get $W = J(J^{-1}(W))$. So, W is an $(Ia - CS)$ in (B, r) . Hence (B, r) is an $T^*Ia^*g\#\psi$ – space.

Theorem 4.10. Let $J: (A, \tau) \rightarrow (B, r)$ be onto, $Ia^*g\#\psi$ – irresolute and an intuitionistic pre- $\alpha g\#\psi$ – closed map. If (A, τ) is an $T^{**}Ia^*g\#\psi$ – space, then (B, r) is an $T^{**}Ia^*g\#\psi$ – space.

Proof: Assume W is an $(Ia^*g\#\psi - CS)$ of (B, r) . Since J is $Ia^*g\#\psi$ – irresolute, $J^{-1}(W)$ is a $(Ia^*g\#\psi - CS)$ of (A, τ) . Since (A, τ) is an $T^{**}Ia^*g\#\psi$ – space, $J^{-1}(W)$ is a $Iag\#\psi$ – closed set of (A, τ) . Since J is an intuitionistic pre- $\alpha g\#\psi$ – closed map, $J(J^{-1}(W))$ is $Iag\#\psi$ – closed in (B, r) for all $Iag\#\psi$ – closed set of $J^{-1}(W)$ of (A, τ) . Because J is onto, we get $W = J(J^{-1}(W))$. So, W is an $Iag\#\psi$ – closed set in (B, r) . Hence (B, r) is an $T^{**}Ia^*g\#\psi$ – space.

5. $Ia^*g\#\psi$ – Homeomorphism

Definition 5.1. We say $T: (A, \tau) \rightarrow (B, r)$ is an $Ia^*g\#\psi$ – open map ($Ia^*g\#\psi$ – OM) if the image $T(U)$ is an $Ia^*g\#\psi$ – open set ($Ia^*g\#\psi$ – OS) in (B, r) for all intuitionistic open set (IOS) U of (A, τ) .

Example 5.2. Let $F = \{\alpha, y, \delta\} = G$, with $\tau = \{\tilde{F}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >\}$ and $r = \{\tilde{G}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >, < F, \{\alpha, y\}, \emptyset >\}$. Then $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ of $(G, r) = \{\tilde{B}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >, < F, \{\alpha, \delta\}, \{y\} >, < F, \{\alpha\}, \emptyset >, < F, \{\alpha, y\}, \emptyset >, < F, \{\alpha, \delta\}, \emptyset >\}$. Let $T: (F, \tau) \rightarrow (G, r)$ from $T(\alpha) = \alpha, T(y) = y, T(\delta) = \delta$. Then T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$.

Definition 5.3. A map $T: (A, \tau) \rightarrow (B, r)$ is called an $\text{Ia}^*\text{g}\#\psi\text{-closed map}$ ($\text{Ia}^*\text{g}\#\psi\text{-CM}$) if the image $T(U)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) for all (ICS) U of (A, τ) .

Example 5.4. Suppose that $F = \{\alpha, y, \delta\} = Y$, $\tau = \{\tilde{F}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >\}$ and $r = \{\tilde{Y}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >, < F, \{\alpha, y\}, \emptyset >\}$. (ICS) of $(F, \tau) = \{\tilde{F}, \tilde{\emptyset}, < F, \{y\}, \{\alpha\} >\}$. $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ of $(B, r) = \{\tilde{B}, \tilde{\emptyset}, < F, \{y\}, \{\alpha\} >, < F, \{y\}, \{\alpha, \delta\} >, < F, \tau, \{\alpha\} >, < F, \emptyset, \{\alpha, y\} >, < F, \emptyset, \{\alpha, \delta\} >\}$. Let $T: (F, \tau) \rightarrow (B, r)$ from $T(\alpha) = \alpha, T(y) = b, T(\delta) = \delta$. Then T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

Definition 5.5. A bijective map $T: (A, \tau) \rightarrow (B, r)$ is called an $\text{Ia}^*\text{g}\#\psi\text{-homeomorphism}$ ($\text{Ia}^*\text{g}\#\psi\text{-H}$) if T and T^{-1} are $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

Definition 5.6. A function $T: (A, \tau) \rightarrow (B, r)$ is said to be an $\text{Ia}^*\text{g}\#\psi\text{-C-open}$ if the image $T(U)$ is an $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) for all $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ U of (A, τ) .

Definition 5.7. We say $T: (A, \tau) \rightarrow (B, r)$ is an $\text{Ia}^*\text{g}\#\psi\text{-C-closed}$ if the image $T(U)$ is an $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) for all $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ U of (A, τ) .

Definition 5.8. A bijective function $T: (A, \tau) \rightarrow (B, r)$ is said to be $\text{Ia}^*\text{g}\#\psi\text{-C-homeomorphism}$ if T & T^{-1} are $\text{Ia}^*\text{g}\#\psi\text{-irresolute}$.

Theorem 5.9. Every intuitionistic open function is an $(\text{Ia}^*\text{g}\#\psi\text{-OS})$.

Proof: Suppose that W is an (IOS) in (X, τ) . Since T is an intuitionistic open function, $T(W)$ is an (IOS) in (B, r) . Also, any (IOS) is a $(\text{Ia}^*\text{g}\#\psi\text{-OS})$. Hence $T(W)$ is a $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . Hence T is a $(\text{Ia}^*\text{g}\#\psi\text{-OM})$. The next example indicates how the opposite of the previous theorem doesn't have to be valid.

Example 5.10. Let $= \{\alpha, y, \delta\} = B$, with $\tau = \{\tilde{F}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >\}$ and $\sigma = \{\tilde{B}, \tilde{\emptyset}, < F, \{y\}, \{\alpha\} >, < F, \{\delta\}, \{y\} >, < F, \{\delta\}, \{\alpha, y\} >, < F, \emptyset, \{\alpha, y\} >, < F, \emptyset, \{\alpha\} >, < F, \emptyset, \{y\} >, < F, \emptyset, \{\alpha, y\} >, < F, \emptyset, \{y, \delta\} >, < F, \emptyset, \{\alpha, \delta\} >\}$. Let $T: (F, \tau) \rightarrow (B, r)$ from $T(\alpha) = y, T(y) = \delta, T(\delta) = \alpha$. Then T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$ but not an intuitionistic open function, since $T(< F, \{y\}, \{\alpha\} >) = < F, \{\delta\}, \{y\} >$ is not an (IOS) in (B, σ) .

Theorem 5.11. Every intuitionistic homeomorphism (IH) is an $(\text{Ia}^*\text{g}\#\psi\text{-H})$.

Proof: Let $T: (A, \tau) \rightarrow (B, r)$ be an (IH) . Since T is an (IH) , T is bijective where T is both intuitionistic open and intuitionistic continuous. Also, every (IOS) is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ set and every intuitionistic continuous function is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. By above, we consider that T is bijective, $(\text{Ia}^*\text{g}\#\psi\text{-OM})$ and $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. Therefore T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$.

The next example indicates how the opposite of the previous theorem doesn't have to be valid.

Example 5.12. Suppose that $= \{\alpha, y, \delta\} = B$, $\tau = \{\tilde{F}, \tilde{\emptyset}, < F, \{\alpha\}, \{y\} >, < F, \{\alpha, y\}, \emptyset >\}$ and $r = \{\tilde{B}, \tilde{\emptyset}, < F, \{\alpha\}, \{\delta\} >\}$. Define $T: (F, \tau) \rightarrow (B, r)$ from $T(\alpha) = \alpha, T(y) = b, T(\delta) = \delta$. $\text{Ia}^*\text{g}\#\psi\text{-C}(F, \tau) = \{\tilde{F}, \tilde{\emptyset}, < F, \{y\}, \{\alpha\} >, < F, \{y\}, \{\alpha, \delta\} >, < F, \emptyset, \alpha >, < F, \emptyset, \{a, b\} >, < F, \emptyset, \{\alpha, \delta\} >\}$. $\text{Ia}^*\text{g}\#\psi\text{-C}(B, r) = \{\tilde{B}, \tilde{\emptyset}, < F, \{\delta\}, \{\alpha\} >, < F, \{\delta\}, \{\alpha, y\} >, < F, \{y, \delta\}, \{\alpha\} >, < F, \emptyset, \{\alpha\} >, < F, \emptyset, \{\alpha, y\} >, < F, \{y, \delta\}, \emptyset >, < F, \emptyset, \{\alpha, \delta\} >\}$. Then T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$ but not (IH) , since $T(< F, \{\alpha\}, \{y\} >) = < F, \{\alpha\}, \{y\} >$ is not an (IOS) in (B, r) .

Theorem 5.13. If T is an (IH) , then T and T^{-1} are $\text{Ia}^*\text{g}\#\psi\text{-irresolute}$.

Proof : To prove T^{-1} is $\text{Ia}^*\text{g}\#\psi$ –irresolute, let W be an $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ of (A, τ) . To prove $(T^{-1})^{-1}(W) = T(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) , let U be an $\text{Ia}^*\text{g}\#\psi$ –open set such that $T(W) \subseteq U$. Then $W = (T^{-1}(T(W))) \subseteq T^{-1}(U)$ is $\text{Ia}^*\text{g}\#\psi$ –open. Since W is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$, $\text{Iacl}(W) \subseteq T^{-1}(U)$, we have $\text{Iacl}(T(W)) \subseteq T(\text{Iacl}(W)) \subseteq T(T^{-1}(U)) = U$, and so $T(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$. So, T^{-1} is $\text{Ia}^*\text{g}\#\psi$ –irresolute. Since T^{-1} is an (IH), $(T^{-1})^{-1} = T$ is $\text{Ia}^*\text{g}\#\psi$ –irresolute.

Theorem 5.14. Every $\text{Ia}^*\text{g}\#\psi$ C-homeomorphism is $(\text{Ia}^*\text{g}\#\psi\text{-H})$.

Proof: Suppose that T is a bijective. Since T is $\text{Ia}^*\text{g}\#\psi$ C –homeomorphism, T & T^{-1} are $\text{Ia}^*\text{g}\#\psi$ –irresolute. Also every $\text{Ia}^*\text{g}\#\psi$ –irresolute map is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$, T and T^{-1} are $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. Hence T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$.

Theorem 5.15. Let $T: (A, \tau) \rightarrow (B, r)$ be a bijective, then next terms are identical.

- i. T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$.
- ii. T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.
- iii. $T^{-1}: (B, r) \rightarrow (A, \tau)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

Proof:

(i) $\rightarrow$ (ii): Let T be an $(\text{Ia}^*\text{g}\#\psi\text{-OM})$ and bijective, let $= \langle A, W_1, W_2 \rangle$ be an (ICS) in (A, τ) . Then $A - W = \langle A, W_2, W_1 \rangle$ is intuitionistic open in A . Since T is an $(\text{Ia}^*\text{g}\#\psi\text{-OM})$, $T(A - W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . So, $(\langle A, W_2, W_1 \rangle = \langle B, T(W_2), T(W_1) \rangle = \langle B, T(W_2), T(A - W_1) \rangle$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in B . So $\langle B, B - T(A - W_1), T(W_2) \rangle$ is $\text{Ia}^*\text{g}\#\psi$ –closed in B . Since $-T(A - W_1) = W_1$, $\langle B, B - T(A - W_1), T(W_2) \rangle = \langle B, T(W_1), f(W_2) \rangle$ is $\text{Ia}^*\text{g}\#\psi$ –closed in B . Hence T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

(ii) $\rightarrow$ (iii): Let W be an (ICS) in (A, τ) . Since T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$, $T(W)$ is $\text{Ia}^*\text{g}\#\psi$ –closed in (B, r) . Since T is bijective, $T(W) = (T^{-1})^{-1}(W)$, T^{-1} is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

(iii) $\rightarrow$ (i): Let W be an intuitionistic open in (A, τ) . From hypothesis, $(T^{-1})^{-1}(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . i.e., $T(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in Y . (Since $(T^{-1})^{-1}(W) = T(W)$).

Theorem 5.16. Let $T: (A, \tau) \rightarrow (B, r)$ be a bijective and $(\text{Ia}^*\text{g}\#\psi\text{-CM})$ function. Then next terms are identical.

- i. T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$.
- ii. T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$.
- iii. T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

Proof:

(i) $\rightarrow$ (ii): Suppose T is $(\text{Ia}^*\text{g}\#\psi\text{-OH})$, then T is bijective and $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. From definition of $(\text{Ia}^*\text{g}\#\psi\text{-H})$, T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$.

(ii) $\rightarrow$ (iii): Because T is $(\text{Ia}^*\text{g}\#\psi\text{-H})$, then T is bijective and also T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$ and $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. Assume T is an (ICS) of (A, τ) , then T^c is an (IOS) in (A, τ) . Since T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$, $T(T^c)$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . So, $T(T^c) = (T(T))^c$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . So, $T(T)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) . Hence T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$.

(iii) $\rightarrow$ (i): Suppose T is an $(\text{Ia}^*\text{g}\#\psi\text{-CM})$. Let W be an (ICS) in (A, τ) . Since T is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$, $T(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) from which $T(W) = (T^{-1})^{-1}(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-CS})$ in (B, r) . Then T^{-1} is $(\text{Ia}^*\text{g}\#\psi\text{-CM})$ on (B, r) . From hypothesis, T is $(\text{Ia}^*\text{g}\#\psi\text{-OM})$.

Theorem 5.17. Let $T: (A, \tau) \rightarrow (B, r)$ be a bijective, then next terms are identical.

- (i) $f^{-1}: (Y, \sigma) \rightarrow (X, \tau)$ is $\text{Ia}^*\text{g}\#\psi$ –irresolute.
- (ii) f is $\text{Ia}^*\text{g}\#\psi$ C –open.
- (iii) f is $\text{Ia}^*\text{g}\#\psi$ C –closed.

Proof:

(i) $\rightarrow$ (ii): Assume $W = \langle A, W_1, W_2 \rangle$ is an $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (A, τ) . From (i), $(T^{-1})^{-1}(W) = T(W)$ is $(\text{Ia}^*\text{g}\#\psi\text{-OS})$ in (B, r) . So T is an $\text{Ia}^*\text{g}\#\psi$ C-open map.

(ii) $\rightarrow$ (iii): Assume W is an $(I\alpha^*\# \psi - CS)$ in (A, τ) . Hence $A - W = \langle A, W_2, W_1 \rangle$ is $(I\alpha^*\# \psi - OS)$ in A . From (ii), $T(A - W) = T(\langle A, W_2, W_1 \rangle) = \langle B, T(W_2), T(W_1) \rangle$
 $= \langle B, T(W_2), T(A - W_1) \rangle$ is $(I\alpha^*\# \psi - OS)$ in B . So, $\langle B, B - T(A - W_1), T(W_2) \rangle$ is $(I\alpha^*\# \psi - CS)$ in B . Since $B - T(A - W_1) = W_1$, $\langle B, W_1, T(W_2) \rangle = \langle B, T(W_1), T(W_2) \rangle$. So $T(W)$ is $(I\alpha^*\# \psi - CS)$ in B . Hence T is $(I\alpha^*\# \psi - CM)$.

(iii) $\rightarrow$ (i): Assume W is an $(I\alpha^*\# \psi - CS)$ in (A, τ) . From (iii), $T(W)$ is $I\alpha^*\# \psi$ -closed in (B, r) . But $f(W) = T^{-1})^{-1}(W)$. So, T^{-1} is $I\alpha^*\# \psi$ -irresolute.

6. Conclusion

This work introduces the concept of intuitionistic alpha star generalized hash psi $(I\alpha^*\# \psi)$ -continuity in intuitionistic topological spaces and discusses the relationship between $I\alpha^*\# \psi$ -continuity and other currently used intuitionistic generalized sets. Some of its characteristics are discussed, along with its lack of resolution. It has therefore been established that $I\alpha^*\# \psi$ is homeomorphic. In Futcher's work, we will investigate each theorem's opposite in sections three and four and determine the necessary conditions. Additionally, some interesting results employing soft sets instead of neutrosophic sets will be shown

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