Abstract. In this paper, the notions of $N_\delta^*g_\alpha$-continuous and $N_\delta^*g_\alpha$-irresolute functions in neutrosophic topological spaces are given. Furthermore, we analyze their characterizations and investigate their properties.

Keywords: $N_\delta^*g_\alpha$-closed set; $N_\delta^*g_\alpha$-continuous; $N_\delta^*g_\alpha$-irresolute; $N_\delta^*g_\alpha$-homeomorphism; $N_\delta^*g_\alpha$-homeomorphism.

1. Introduction

The notion of fuzzy set ($FS$) and its logic are investigated and discussed by Zadeh [12]. Next, Chang [3] studied the conception of fuzzy topological space ($FTS$). After that, Atanasav [8] investigated the intuitionistic fuzzy set ($IFS$) in 1986. Neutrosophy has extend the grounds for a total family of new mathematical estimations. It is one of the non-classical sets, like fuzzy, nano, soft, permutation sets and so on, see ([17]-[39]). The neutrosophic set ($NS$) was presented by Smarandache [6] and expounded, ($NS$) is a popularization of ($IFS$) in intuitionistic fuzzy topological space ($IFTS$) by coker [4]. In 2012 [1], the conception of neutrosophic topological space ($NTS$) is presented. Further the fundamental sets like semi/pre/$\alpha$-open sets are presented in neutrosophic topological spaces ($NTSs$), see ([13]-[16]). The neutrosophic closed sets ($NCSs$) and neutrosophic continuous functions ($NCFs$) were presented by Salama et al. [2] in 2014. Arokiarani et al. [7] presented the neutrosophic $\alpha$-closed set (NoCS) in ($NTSs$). The concepts of $\delta$-closure are auxiliary tools in standard topology in...
the study of H-closed spaces. Damodharan et al. [9,10] present the idea of $N_\delta$-closure and $N_\delta$-Interior in $(NTSs)$. Further, $N_\delta$-continuous and Neutrosophic almost continuous in $(NTSs)$ were presented and established some of their related attributes. Recently Damodharan and Vigneshwaran [11] presented the conception of $N_\delta^{*g\alpha}$-closed sets in $(NTSs)$ and studied some of its characteristics. In 2020, some applications of $(NS)$ are applied by Abdel-Basset and others, see ([40]). In this work, we presented the $N_\delta^{*g\alpha}$-continuous functions and $N_\delta^{*g\alpha}$-irresolute functions in $(NTSs)$. Furthermore, the conceptions of $N_\delta^{*g\alpha}$-homeomorphism and $N_\delta^{*g\alpha}$c-homeomorphism are presented and investigate their characteristics.

2. Preliminaries

In this section, we mention some pertinent basic preliminaries about neutrosophic sets $(NSs)$ and its operations.

2.1. Definition [1]

Assume $S$ is a non-empty fixed set. A neutrosophic set $(NS)$ $P$ is an object having the form:

$$P = \{\langle s, \mu_m(P(s)), \sigma_i(P(s)), \nu_{nm}(P(s)) \rangle \forall s \in S\},$$

where $\mu_m(P(s))$ represents the degree of membership, $\sigma_i(P(s))$ represents the degree of indeterminacy and $\nu_{nm}(P(s))$ represents the degree of nonmembership $\forall s \in S$ to $P$.

2.2. Remark [1]

A $(NS)$ $P = \{\langle s, \mu_m(P(s)), \sigma_i(P(s)), \nu_{nm}(P(s)) \rangle \forall s \in S\}$ can be identified to an ordered triple $\langle \mu_m(P(s)), \sigma_i(P(s)), \nu_{nm}(P(s)) \rangle$ in $]-1,1[ on S$.

2.3. Definition [1]

In $(NTS)$ We have:

$$
\begin{align*}
0_N & \text{ may be defined as } \forall s \in S \\
1_N & \text{ may be defined as } \forall s \in S \\
0_N &= \langle s, 0, 0, 0, 1 \rangle \\
1_N &= \langle s, 0, 0, 1, 0 \rangle \\
0_N &= \langle s, 0, 1, 0, 1 \rangle \\
1_N &= \langle s, 0, 1, 1, 0 \rangle \\
0_N &= \langle s, 0, 1, 0 \rangle \\
1_N &= \langle s, 0, 1, 1, 0 \rangle \\
0_N &= \langle s, 0, 0, 0 \rangle \\
1_N &= \langle s, 0, 1, 1, 1 \rangle
\end{align*}
$$

$N_\delta^{*g\alpha}$-Continuous and Irresolute Functions in Neutrosophic Topological Spaces.
2.4. Definition [1]

Assume P is (NS) of the form:
\[ P = \{ \langle s, \mu_m(P(s)), \sigma_i(P(s)), \nu_{nm}(P(s)) \rangle \forall s \in S \} \]
Then the complement of \( P \) \( [P^c] \) may be defined as
\[ P^c = \{ \langle s, \nu_{nm}(P(s)), \sigma_i(P(s)), \mu_m(P(s)) \rangle \forall s \in S \} \]

2.5. Definition [1]

Assume P and Q are two (NS) of the form,
\[ P = \{ \langle s, \mu_m(P(s)), \sigma_i(P(s)), \nu_{nm}(P(s)) \rangle \forall s \in S \} \text{ and} \]
\[ Q = \{ \langle s, \mu_m(Q(s)), \sigma_i(Q(s)), \nu_{nm}(Q(s)) \rangle \forall s \in S \} \text{. Then,} \]
(1) Subsets \( P \subseteq Q \) may be defined as follows
\[ P \subseteq Q \iff \mu_m(P(s)) \leq \mu_m(Q(s)), \sigma_i(P(s)) \geq \sigma_i(Q(s)), \nu_{nm}(P(s)) \geq \nu_{nm}(Q(s)) \]
(2) Subsets \( P = Q \iff P \subseteq Q \) and \( Q \subseteq P \)
(3) Union of subsets \( P \cup Q \) may be defined as follows
\[ P \cup Q = \{ s, \max \{ \mu_m(P(s), \mu_m(Q(s)) \}, \min \{ \sigma_i(P(s), \sigma_i(Q(s)) \}, \min \{ \nu_{nm}(P(s)), \nu_{nm}(Q(s)) \} \forall s \in S \} \]
(4) Intersection of subsets \( P \cap Q \) may be defined as follows
\[ P \cap Q = \{ s, \min \{ \mu_m(P(s), \mu_m(Q(s)) \}, \max \{ \sigma_i(P(s), \sigma_i(Q(s)) \}, \max \{ \nu_{nm}(P(s)), \nu_{nm}(Q(s)) \} \forall s \in S \} \]

2.6. Proposition [9]

For any two (NSs) P and Q the following condition holds
i): \( (P \cap Q)^c = P^c \cup Q^c \),
ii): \( (P \cup Q)^c = P^c \cap Q^c \),

2.7. Definition [1]

A neutrosophic topology (NT) on a non-empty set S is a family \( \tau \) of neutrosophic subsets in S satisfying the following axioms:
i): \( 0_N, 1_N \in \tau \),
ii): \( G_1 \cap G_2 \in \tau \) for any \( G_1, G_2 \in \tau \),
iii): \( \cup G_i \in \tau \forall \{ G_i : i \in J \} \subseteq \tau \)

Then the pair \( (S, \tau) \) is named a neutroscopic topological space (NTS).

2.8. Definition [1]

Assume P is a (NS) in a (NTS) \( (S, \tau) \). Then

\( N^{g\circ}_{\text{go}} - \text{Continuous and Irresolute Functions in Neutrosophic Topological Spaces} \)
i): \( N \text{int}(P) = \bigcup \{Q/Q \text{is a neutrosophic open set (NOS) in (s,} \tau) \text{and} Q \subseteq P\} \) is named the neutrosophic interior of P;

ii): \( N \text{cl}(P) = \bigcap \{Q/Q \text{is a neutrosophic closed set (NCS) in (s,} \tau) \text{and} Q \supseteq P\} \) is named the neutrosophic closure of P;

2.9. Definition [7]

A subset \( A \) of \( (S, \tau) \) is named

i): neutrosophic semi-open set (NSOS) if \( P \subseteq N \text{cl}(N \text{int}(P)). \)

ii): neutrosophic pre-open set (NPOS) if \( P \subseteq N \text{int}(N \text{cl}(P)). \)

iii): neutrosophic semi-preopen set (NSPOS) if \( P \subseteq N \text{cl}(N \text{int}(N \text{cl}(P))). \)

iv): neutrosophic \( \alpha \)-open set (N\( \alpha \)OS) if \( P \subseteq N \text{int}(N \text{cl}(N \text{int}(N \text{cl}(P)))) \).

v): neutrosophic regular open set (NROS) if \( P = N \text{int}(N \text{cl}(P)). \)

The complement of a (NSOS) (resp. (NPOS), (NSPOS), (N\( \alpha \)OS), (NROS)) set is named (NSCS) (resp. (NPCS), (NSPCS), (N\( \alpha \)CS, (NRCS)).

2.10. Definition [9]

Assume \( \alpha, \beta, \lambda \in [0,1] \) and \( \alpha + \beta + \lambda \leq 3 \). A neutrosophic point \( s_{(\alpha,\beta,\lambda)} \) of S is a neutrosophic point \((NP)\) of S which is clarified by

\[
s_{(\alpha,\beta,\lambda)}(y) = \begin{cases} 
(\alpha, \beta, \lambda) & \text{when } y = s, \\
(0,0,1) & \text{when } y \neq s.
\end{cases}
\]

Here, S is named the support of \( s_{(\alpha,\beta,\lambda)} \) and \( \alpha, \beta \) and \( \lambda \), respectively. A (NP) \( s_{(\alpha,\beta,\lambda)} \) is named belong to a (NS)

\[
P = \langle \mu_{m}(P(s)), \sigma_{i}(P(s)), \nu_{nm}(P(s)) \rangle \]

in S, denoted by \( s_{(\alpha,\beta,\lambda)} \in P \) if \( \alpha \leq \mu_{m}(P(s)), \beta \geq \sigma_{i}(P(s)) \) and \( \lambda \geq \nu_{nm}(P(s)) \) Clearly a (NP) can be represented by an ordered triple of (NP) as follows : \( s_{(\alpha,\beta,\lambda)} = (s_{\alpha}, s_{\beta}, s_{\lambda}). \)

2.11. Definition [9]

Assume \((S, \tau)\) is a \((NTS)\). Assume P is a (NS) and Assume \( s_{(\alpha,\beta,\lambda)} \) is a (NP). \( s_{(\alpha,\beta,\lambda)} \) is named neutrosophic quasi coincident with P [denoted by \( s_{(\alpha,\beta,\lambda)}qP \)] if \( \alpha + \mu_{m}(P(s)) > 1; \beta + \sigma_{i}(P(s)) < 1 \text{ and } \lambda + \nu_{nm}(P(s)) < 1 \).

2.12. Definition [9]

Assume P and Q are two (NSs). P is named neutrosophic quasi coincident with Q [denoted by \( PqQ \)] if \( \mu_{m}(P(s)) + \mu_{m}(Q(s)) > 1; \sigma_{i}(P(s)) + \sigma_{i}(Q(s)) < 1 \text{ and } \nu_{nm}(P(s)) + \nu_{nm}(Q(s)) < 1 \).
2.13. Definition [9]

Assume \((S, \tau)\) is an (NTS). An (NP) \(s_{(\alpha, \beta, \lambda)}\) is named an neutrosophic \(\delta\)-cluster point of an (NS) \(P\) if \(AQ_P\) for each neutrosophic regular open \(q\)-neighborhood \(A\) of \(s_{(\alpha, \beta, \lambda)}\). The set of all neutrosophic \(\delta\)-cluster points of \(P\) is named the neutrosophic \(\delta\)-closure of \(P\) denoted by \(Ncl_\delta (P)\). An (NS) \(P\) is named an \(N_\delta\)-closed set (\(N_\delta\)-CS) if \(P = Ncl_\delta (P)\). The complement of an \((N_\delta\)-CS) is named an \(N_\delta\)-open set (\(N_\delta\)-OS).

3. \(N_\delta^g_\alpha\)-continuous functions

Here, some new conceptions are given by the authors.

3.1. Definition

A map \(T: (S, \tau) \rightarrow (Y, \sigma)\) is named a Neutrosophic delta star generalized alpha-continuous map(briefly \(N_\delta^g_\alpha\)-CM) if \(T^{-1}(K)\) is \(N_\delta^g_\alpha\)-CS in \((S, \tau)\) for any \((NCS)\) in \((Y, \sigma)\).

3.2. Theorem

Any \(N_\delta^g_\alpha\)-CM is \(N_{gs}\)-CM (resp \(N_{ag}\)-CM, \(N_{gsp}\)-CM, \(N_{gp}\)-CM). Also converse part is not true as shown through the following examples.

Proof. Assume \(K\) is a \((NCS)\) in \((Y, \sigma)\). Since \(T\) is \(N_\delta^g_\alpha\)-CM, \(T^{-1}(K)\) is \(N_\delta^g_\alpha\)-CS in \((S, \tau)\). Since any \(N_\delta^g_\alpha\)-CS is \(N_{gs}\)-CS (resp \(N_{ag}\)-CS, \(N_{gsp}\)-CS, \(N_{gp}\)-CS), therefore \(T^{-1}(K)\) is \(N_{gs}\)-CS (resp \(N_{ag}\)-CS, \(N_{gsp}\)-CS, \(N_{gp}\)-CS) in \((S, \tau)\). Hence \(T\) is \(N_{gs}\)-CM (resp \(N_{ag}\)-CM, \(N_{gsp}\)-CM, \(N_{gp}\)-CM).

3.3. Example

Assume \(S = \{p, q, r\}\). Define the (NSs) \(D_1, D_2, D_3, D_4\) and \(G_1, G_2, G_3, G_4\) as follows:

\[
D_1 = \left\{ \left( \frac{p}{0.3}, \frac{q}{0.3}, \frac{r}{0.2} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.2} \right), \left( \frac{p}{0.4}, \frac{q}{0.6}, \frac{r}{0.6} \right) \right\}
\]

\[
D_2 = \left\{ \left( \frac{p}{0.7}, \frac{q}{0.6}, \frac{r}{0.6} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.5} \right), \left( \frac{p}{0.3}, \frac{q}{0.3}, \frac{r}{0.2} \right) \right\}
\]

\[
D_3 = \left\{ \left( \frac{p}{0.7}, \frac{q}{0.7}, \frac{r}{0.5} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.2} \right), \left( \frac{p}{0.3}, \frac{q}{0.3}, \frac{r}{0.2} \right) \right\}
\]

\[
D_4 = \left\{ \left( \frac{p}{0.3}, \frac{q}{0.3}, \frac{r}{0.2} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.4} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.5} \right) \right\}
\]

and \(G_1 = \left\{ \left( \frac{p}{0.3}, \frac{q}{0.4}, \frac{r}{0.4} \right), \left( \frac{p}{0.5}, \frac{q}{0.4}, \frac{r}{0.4} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.2} \right) \right\}
\]

\[
G_2 = \left\{ \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.3} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.2} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.6} \right) \right\}
\]

\[
G_3 = \left\{ \left( \frac{p}{0.3}, \frac{q}{0.4}, \frac{r}{0.4} \right), \left( \frac{p}{0.3}, \frac{q}{0.2}, \frac{r}{0.2} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.2} \right) \right\}
\]

\[
G_4 = \left\{ \left( \frac{p}{0.7}, \frac{q}{0.4}, \frac{r}{0.4} \right), \left( \frac{p}{0.5}, \frac{q}{0.4}, \frac{r}{0.4} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.5} \right) \right\}
\]

Then the families \(\tau = \{0_N, 1_N, D_1, D_2, D_3, D_4\}\) and \(\xi = \{0_N, 1_N, G_1, G_2, G_3, G_4\}\) are neutrosophic topologies (NTs) on \(S\). Thus, \((S, \tau)\) and \((S, \xi)\) are (NTSs). Define \(T: (S, \tau) \rightarrow (S, \xi)\) as \(T(p) = p, T(q) = q, T(r) = r\). Then \(T\) is \(N_{gs}\)-CM but not \(N_\delta^g_\alpha\)-CM. Hence in \((S, \tau)\), \(N_\delta^g_\alpha\)-CS is \(\left\{ \left( \frac{p}{0.4}, \frac{q}{0.5}, \frac{r}{0.5} \right), \left( \frac{p}{0.5}, \frac{q}{0.5}, \frac{r}{0.5} \right), \left( \frac{p}{0.4}, \frac{q}{0.4}, \frac{r}{0.3} \right) \right\}\) and \(N_\delta^g_\alpha\)-Continuous and Irresolute Functions in Neutrosophic Topological Spacese
Thus, \((H_3, \tau) = (\{0, 1\}, D_1, D_2, D_3, D_4)\) and \((\{0, 1\}, H_1, H_2, H_3, H_4)\) are (NTs) on \(S\). Thus, \((S, \tau)\) and \((S, \psi)\) are (NTs). Define \(T : (S, \tau) \to (S, \psi)\) as \(T(p) = p, T(q) = q, T(r) = r\). Then \(T\) is \(N_{g_\theta^{-1}}\)-CM but not \(N_{g_\theta^{-1}}\)-CM. Hence in \((S, \tau), \)
\(N_{g_\theta^{-1}}\)-CS is \((\{p, q, r\}, \{p, q, r\}, \{p, q, r\})\) and
\(N_{g_\theta^{-1}}\)-CS is \((\{p, q, r\}, \{p, q, r\}, \{p, q, r\})\). Here \(T^{-1}(H_3)\) is \(N_{g_\theta^{-1}}\)-CS but not \(N_{g_\theta^{-1}}\)-CS.

3.5. example

Assume \(Y = \{u, v, w\}\). Define the (NSs)\(F_1, F_2, F_3, F_4\) and \(I_1, I_2, I_3, I_4\) as follows:
\(F_1 = \langle (p, 0.3, 0.6, 0.3), (p, 0.4, 0.4, 0.4), (p, 0.3, 0.3, 0.3) \rangle\)
\(F_2 = \langle (p, 0.4, 0.6, 0.6), (p, 0.4, 0.4, 0.4), (p, 0.3, 0.3, 0.3) \rangle\)
\(F_3 = \langle (p, 0.4, 0.6, 0.6), (p, 0.4, 0.4, 0.4), (p, 0.3, 0.3, 0.3) \rangle\)
\(F_4 = \langle (p, 0.4, 0.5, 0.3), (p, 0.5, 0.5, 0.6), (p, 0.5, 0.5, 0.6) \rangle\)
and \(I_1 = \langle (p, 0.4, 0.5, 0.5), (p, 0.5, 0.6, 0.6), (p, 0.4, 0.5, 0.5) \rangle\)
\(I_2 = \langle (p, 0.4, 0.5, 0.5), (p, 0.5, 0.6, 0.6), (p, 0.4, 0.5, 0.5) \rangle\)
\(I_3 = \langle (p, 0.4, 0.5, 0.5), (p, 0.5, 0.6, 0.6), (p, 0.4, 0.5, 0.5) \rangle\)
\(I_4 = \langle (p, 0.4, 0.5, 0.5), (p, 0.5, 0.6, 0.6), (p, 0.4, 0.5, 0.5) \rangle\)
Then the families \(\vartheta = \{0_N, 1_N, F_1, F_2, F_3, F_4\}\) and \(\zeta = \{0_N, 1_N, I_1, I_2, I_3, I_4\}\) are (NTs) on \(Y\). Thus, \((Y, \vartheta)\) and \((Y, \zeta)\) are (NTs). Define \(g : (Y, \vartheta) \to (Y, \zeta)\) as \(g(u) = u, g(v) = v, g(w) = w\).
Then \(g\) is \(N_{g_\vartheta^{-1}}\)-CM but not \(N_{g_\theta^{-1}}\)-CM. Hence in \((Y, \vartheta), \)
\(N_{g_\vartheta^{-1}}\)-CS is \((\{p, q, r\}, \{p, q, r\}, \{p, q, r\})\) and
\(N_{g_\vartheta^{-1}}\)-CS is \((\{p, q, r\}, \{p, q, r\}, \{p, q, r\})\). Here \(g^{-1}(I_3)\) is \(N_{g_\vartheta^{-1}}\)-CS but not \(N_{g_\theta^{-1}}\)-CS.
3.6. Example

Assume \( Y = \{ u, v, w \} \). Define the (NSs) \( F_1, F_2, F_3, F_4 \) and \( J_1, J_2, J_3, J_4 \) as follows:

\[
F_1 = \{ (p_{0.3}, q_{0.3}, r_{0.2}), (p_{0.4}, q_{0.4}, r_{0.4}), (p_{0.6}, q_{0.6}, r_{0.6}) \}
\]

\[
F_2 = \{ (p_{0.4}, q_{0.6}, r_{0.6}), (p_{0.5}, q_{0.4}, r_{0.4}), (p_{0.6}, q_{0.4}, r_{0.3}) \}
\]

\[
F_3 = \{ (p_{0.4}, q_{0.6}, r_{0.7}), (p_{0.5}, q_{0.4}, r_{0.7}), (p_{0.6}, q_{0.4}, r_{0.3}) \}
\]

\[
F_4 = \{ (p_{0.3}, q_{0.3}, r_{0.2}), (p_{0.5}, q_{0.4}, r_{0.4}), (p_{0.6}, q_{0.6}, r_{0.6}) \}
\]

and \( J_1 = \{ (p_{0.3}, q_{0.3}, r_{0.3}), (p_{0.4}, q_{0.4}, r_{0.4}), (p_{0.6}, q_{0.6}, r_{0.6}) \} \)

Then the families \( \vartheta = \{ 0_N, 1_N, F_1, F_2, F_3, F_4 \} \) and \( \zeta = \{ 0_N, 1_N, J_1, J_2, J_3, J_4 \} \) are (NTs) on \( Y \). Thus, \( (Y, \vartheta) \) and \( (Y, \varphi) \) are (NTSs). Define \( g: (Y, \vartheta) \to (Y, \varphi) \) as \( g(u) = u, g(v) = w, g(w) = v \). Then \( g \) is \( N_{gsp} \)-C but not \( N_{\delta^{*} ga} \)-C. Hence in \( (Y, \vartheta) \),

\( N_{\delta^{*} ga} \)-CS is \( \{ (p_{0.4}, q_{0.5}, r_{0.5}), (p_{0.5}, q_{0.5}, r_{0.5}), (p_{0.6}, q_{0.5}, r_{0.5}) \} \) and

\( N_{gsp} \)-CS is \( \{ (p_{0.3}, q_{0.6}, r_{0.5}), (p_{0.4}, q_{0.4}, r_{0.4}), (p_{0.5}, q_{0.4}, r_{0.3}) \} \). Here \( g^{-1}(J_3) \) is \( N_{gsp} \)-CS but not \( N_{\delta^{*} ga} \)-CS.

3.7. Theorem

The composition of two \( N_{\delta^{*} ga} \)-CMs is also a \( N_{\delta^{*} ga} \)-CM. Proof. Assume \( T: (S, \tau) \to (Y, \sigma) \) and \( g: (Y, \sigma) \to (Z, \eta) \) are two \( N_{\delta^{*} ga} \)-CMs. Assume \( l \) is a NCS in \( (Z, \eta) \). Since \( g \) is a \( N_{\delta^{*} ga} \)-CM, \( g^{-1}(l) \) is \( N_{\delta^{*} ga} \)-CS in \( (Y, \sigma) \). Since any \( N_{\delta^{*} ga} \)-CS is NCS, \( g^{-1}(l) \) is NCSS in \( (Y, \sigma) \). Since \( T \) is a \( N_{\delta^{*} ga} \)-CM, \( T^{-1}(g^{-1}(l)) = g \circ T(l) \) is \( N_{\delta^{*} ga} \)-CS in \( (S, \tau) \), therefore \( g \circ T \) is also \( N_{\delta^{*} ga} \)-CM.

4. \( N_{\delta^{*} ga} \)-Irresolute Functions

Here, some new conceptions are given by the authors.

4.1. Definition

A map \( T: (S, \tau) \to (Y, \sigma) \) is named a Neutrosophic delta star generalized alpha-Irresolute map (briefly \( N_{\delta^{*} ga}-\text{IMM} \)) if \( T^{-1}(K) \) is \( N_{\delta^{*} ga} \)-CS in \( (S, \tau) \) for any \( N_{\delta^{*} ga} \)-CS in \( (Y, \sigma) \).

4.2. Theorem

Assume \( T: (S, \tau) \to (Y, \sigma) \) and \( g: (Y, \sigma) \to (Z, \eta) \) are any two functions, then

(i) \( g \circ T: (S, \tau) \to (Z, \eta) \) is \( N_{\delta^{*} ga} \)-CM if \( g \) is \( N \)-CM and \( T \) is \( N_{\delta^{*} ga} \)-CM.

(ii) \( g \circ T: (S, \tau) \to (Z, \eta) \) is \( N_{\delta^{*} ga} \)-IM if both \( g \) and \( T \) are \( N_{\delta^{*} ga} \)-IM.

(iii) \( g \circ T: (S, \tau) \to (Z, \eta) \) is \( N_{\delta^{*} ga} \)-CM if both \( g \) is \( N_{\delta^{*} ga} \)-CM and \( T \) is \( N_{\delta^{*} ga} \)-IM.
Proof.

(i) Assume $K$ is a $(NCS)$ in $(Z, \eta)$. Since $g$ is $N$-CM, $g^{-1}(K)$ is $NCS$ in $(Y, \sigma)$. Since $T$ is $N_{\delta_{*}ga}$-CM, $T^{-1}(g^{-1}(K)) = (goT)^{-1}(K)$ is $N_{\delta_{*}ga}$-CS in $(S, \tau)$, Therefore $goT$ is $N_{\delta_{*}ga}$-CM.

(ii) Assume $K$ is a $N_{\delta_{*}ga}$-CS in $(Z, \eta)$. Since $g$ is $N_{\delta_{*}ga}$-IM, $g^{-1}(K)$ is $N_{\delta_{*}ga}$-CS in $(Y, \sigma)$. Since $T$ is $N_{\delta_{*}ga}$-IM, $T^{-1}(g^{-1}(K)) = (goT)^{-1}(K)$ is $N_{\delta_{*}ga}$-CS in $(S, \tau)$, Therefore $goT$ is $N_{\delta_{*}ga}$-IM.

(iii) Assume $K$ is a $(NCS)$ in $(Z, \eta)$. Since $g$ is $N_{\delta_{*}ga}$-CM, $g^{-1}(K)$ is $N_{\delta_{*}ga}$-CS in $(Y, \sigma)$. Since $T$ is $N_{\delta_{*}ga}$-IM, $T^{-1}(g^{-1}(K)) = (goT)^{-1}(K)$ is $N_{\delta_{*}ga}$-CS in $(S, \tau)$, Therefore $goT$ is $N_{\delta_{*}ga}$-CM.

4.3. Theorem

Assume $T : (S, \tau) \rightarrow (Y, \sigma)$ is $N_{\delta_{*}ga}$-CM ($N_{gs}$-CM, $N_{ag}$-CM, $N_{g}$-CM). If $(S, \tau)$ is an $N_{\alpha_{a}T_{\frac{3}{4}}^{**}ga}$-space ($N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space, $N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space, $N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space) then $T$ is continuous.

Proof. Assume $K$ is a $(NCS)$ of $(Y, \sigma)$. Since $T$ is $N_{\delta_{*}ga}$-CM ($N_{gs}$-CM, $N_{ag}$-CM, $N_{g}$-CM), then $T^{-1}(K)$ is $N_{\delta_{*}ga}$-CS ($N_{gs}$-CS, $N_{ag}$-CS, $N_{g}$-CS) in $(S, \tau)$. Since $(S, \tau)$ is $N_{\alpha_{a}T_{\frac{3}{4}}^{**}ga}$-space ($N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space, $N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space, $N_{\alpha_{a}T_{\frac{1}{2}}^{*}ga}$-space), then $T^{-1}(K)$ is $N_{\delta}$-CS in $(S, \tau)$. Any $N_{\delta}$-CS is $(NCS)$ in $(S, \tau)$. Therefore $T$ is continuous.

4.4. Theorem

Assume $T : (S, \tau) \rightarrow (Y, \sigma)$ is a surjective, $N_{\delta_{*}ga}$-IM and $N_{\delta}$-CM. Then $T(A)$ is $N_{\delta_{*}ga}$-CS of $(Y, \sigma)$ for any $N_{\delta_{*}ga}$-CS $A$ of $(S, \tau)$.

Proof. Assume $A$ is a $N_{\delta_{*}ga}$-CS of $(S, \tau)$. Assume $U$ is a $N_{\delta}$-OS of $(Y, \sigma)$. such that $T(A) \subseteq U$. Since $T$ is surjective and $N_{\delta_{*}ga}$-IM, $T^{-1}(U)$ is $N_{\delta}$-OS in $(S, \tau)$. Since $A \subseteq T^{-1}(U)$ and $A$ is $N_{\delta_{*}ga}$-CS of $(S, \tau)$, $Ncl_{\delta}(A) \subseteq T^{-1}(U)$. Then $T[Ncl_{\delta}(A)] \subseteq T[T^{-1}(U)] = U$, Since $T$ is $N_{\delta}$-CS, $T[Ncl_{\delta}(A)] = Ncl_{\delta}[T[Ncl_{\delta}(A)]].$ This implies $Ncl_{\delta}[T(A)] \subseteq Ncl_{\delta}[T[Ncl_{\delta}(A)]] = T[Ncl_{\delta}(A)] \subseteq U$, Therefore $T(A)$ is a $N_{\delta_{*}ga}$-CS of $(Y, \sigma)$.

4.5. Theorem

Assume $T : (S, \tau) \rightarrow (Y, \sigma)$ is a surjective, $N_{\delta_{*}ga}$-IM and $N_{\delta}$-CM. If $(S, \tau)$ is an $N_{\alpha_{a}T_{\frac{3}{4}}^{**}ga}$-space, then $(Y, \sigma)$ is also an $N_{\alpha_{a}T_{\frac{3}{4}}^{**}ga}$-space.

Proof. Assume $A$ is a $N_{\delta_{*}ga}$-CS of $(Y, \sigma)$. Since $T$ is $N_{\delta_{*}ga}$-IM, $T^{-1}(A)$ is $N_{\delta_{*}ga}$-CS in $(S, \tau)$. Since $(S, \tau)$ is $N_{\alpha_{a}T_{\frac{3}{4}}^{*}ga}$-space, $T^{-1}(A)$ is $N_{\delta}$-CS of $(S, \tau)$. Since $T$ is $N_{\delta}$-CM and surjective, $T[T^{-1}(A)] = A$ is $N_{\delta}$-CS in $(Y, \sigma)$. Thus $A$ is $N_{\delta}$-CS in $(Y, \sigma)$, Therefore $(Y, \sigma)$ is an $N_{\alpha_{a}T_{\frac{3}{4}}^{*}ga}$-space.

$N_{\delta_{*}ga}$-Continuous and Irresolute Functions in Neutrosophic Topological Spacese
5. \(N_{\delta^*g_\alpha}\)-Homeomorphism

Here, some new conceptions are given by the authors.

5.1. Definition

A map \(T : (S, \tau) \rightarrow (Y, \sigma)\) is named a neutrosophic delta star generalized alpha-homeomorphism (briefly \(N_{\delta^*g_\alpha}\)-H) if \(T\) is bijective, \(N_{\delta^*g_\alpha}\)-CM and \(N_{\delta^*g_\alpha}\)-OM.

5.2. Theorem

Any \(N_{\delta^*g_\alpha}\)-H is \(N_{gs}\)-H.

Proof. Let \(f : (X, \tau) \rightarrow (Y, \sigma)\) be \(N_{\delta^*g_\alpha}\)-H then \(f\) is bijective, \(N_{\delta^*g_\alpha}\)-continuous and \(N_{\delta^*g_\alpha}\)-OM. Let \(V\) be N-CS in \((Y, \sigma)\), then \(f^{-1}(V)\) is \(N_{\delta^*g_\alpha}\)-CS in \((X, \tau)\). Since every \(N_{\delta^*g_\alpha}\)-CS is \(N_{gs}\)-CS, then \(f^{-1}(V)\) is \(N_{gs}\)-CS in \((X, \tau)\), Therefore \(f\) is \(N_{gs}\)-continuous. Let \(U\) be N-OS in \((X, \tau)\), then \(f(U)\) is \(N_{\delta^*g_\alpha}\)-OS in \((Y, \sigma)\). Since every \(N_{\delta^*g_\alpha}\)-OS is \(N_{gs}\)-OS, then \(f(U)\) is \(N_{gs}\)-OS in \((Y, \sigma)\), Therefore \(f\) is \(N_{gs}\)-OM. Hence \(f\) is \(N_{gs}\)-H.

5.3. Example

Assume \(S = \{p, q, r\}\). Define the (NSs)\(D_1, D_2, D_3, D_4\) and \(G_1, G_2, G_3, G_4\) as follows:

\[
D_1 = \left\{ \begin{array}{l}
\left( p_{0.3}, q_{0.3}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.2}, q_{0.2}, r_{0.2} \right)
\end{array} \right.
\]

\[
D_2 = \left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.6}, r_{0.4} \right), \left( p_{0.5}, q_{0.4}, r_{0.4} \right), \left( p_{0.3}, q_{0.3}, r_{0.2} \right)
\end{array} \right.
\]

\[
D_3 = \left\{ \begin{array}{l}
\left( p_{0.7}, q_{0.6}, r_{0.3} \right), \left( p_{0.3}, q_{0.3}, r_{0.2} \right), \left( p_{0.3}, q_{0.3}, r_{0.2} \right)
\end{array} \right.
\]

\[
D_4 = \left\{ \begin{array}{l}
\left( p_{0.7}, q_{0.3}, r_{0.2} \right), \left( p_{0.4}, q_{0.3}, r_{0.1} \right), \left( p_{0.4}, q_{0.3}, r_{0.1} \right)
\end{array} \right.
\]

and \(G_1 = \left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.4}, r_{0.4} \right), \left( p_{0.5}, q_{0.4}, r_{0.4} \right), \left( p_{0.5}, q_{0.4}, r_{0.4} \right)
\end{array} \right.
\]

\[
G_2 = \left\{ \begin{array}{l}
\left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right)
\end{array} \right.
\]

\[
G_3 = \left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.4}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right)
\end{array} \right.
\]

\[
G_4 = \left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.4}, r_{0.2} \right), \left( p_{0.4}, q_{0.4}, r_{0.2} \right), \left( p_{0.4}, q_{0.4}, r_{0.2} \right)
\end{array} \right.
\]

Then the families \(\tau = \{0_N, 1_N, D_1, D_2, D_3, D_4\}\) and \(\xi = \{0_N, 1_N, G_1, G_2, G_3, G_4\}\) are (NTs) on \(S\). Thus, \((S, \tau)\) and \((S, \xi)\) are (NTSs). Define \(T : (S, \tau) \rightarrow (S, \xi)\) as \(T(p) = p, T(q) = q, T(r) = r.\) Then \(T\) is \(N_{gs}\)-H but not \(N_{\delta^*g_\alpha}\)-H. Hence in \((S, \tau),\)

\(N_{\delta^*g_\alpha}\)-CS is \(\left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.5}, r_{0.5} \right), \left( p_{0.5}, q_{0.5}, r_{0.5} \right), \left( p_{0.4}, q_{0.4}, r_{0.3} \right)
\end{array} \right.\)

and \(N_{gs}\)-CS is \(\left\{ \begin{array}{l}
\left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right), \left( p_{0.3}, q_{0.2}, r_{0.2} \right)
\end{array} \right.\). Here \(T^{-1}(G_3)\) is \(N_{gs}\)-CS but not \(N_{\delta^*g_\alpha}\)-CS.

\(N_{\delta^*g_\alpha}\)-OS is \(\left\{ \begin{array}{l}
\left( p_{0.4}, q_{0.4}, r_{0.4} \right), \left( p_{0.5}, q_{0.5}, r_{0.5} \right), \left( p_{0.5}, q_{0.5}, r_{0.5} \right)
\end{array} \right.\) and \(N_{gs}\)-OS is \(\left\{ \begin{array}{l}
\left( p_{0.3}, q_{0.3}, r_{0.1} \right), \left( p_{0.3}, q_{0.3}, r_{0.1} \right), \left( p_{0.3}, q_{0.3}, r_{0.1} \right)
\end{array} \right.\) is \(N_{gs}\)-OS but not \(N_{\delta^*g_\alpha}\)-OS.

5.4. Theorem

For any bijective map \(T : (S, \tau) \rightarrow (Y, \sigma)\) the following statement are equivalent.

(i) \(T^{-1} : (Y, \tau) \rightarrow (S, \sigma)\) is \(N_{\delta^*g_\alpha}\)-CM.

(ii) \(T\) is an \(N_{\delta^*g_\alpha}\)-OM.

(iii) \(T\) is an \(N_{\delta^*g_\alpha}\)-CM.
Proof.

(i) ⇒ (ii) Assume $U$ is an $(NOS)$ in $(S, \tau)$, then $S-U$ is $(NCS)$ in $(S, \tau)$ Since $T^{-1}$ is $N_{\delta^*g\alpha}$-CM, then $(T^{-1})^{-1}(U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. That is $T(S-U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$, that is $Y-T(U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. This implies that $T(U)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$. Thus $T$ is $N_{\delta^*g\alpha}$-OM.

(ii) ⇒ (iii) Assume $F$ is an $(NCS)$ in $(S, \tau)$, then $S-F$ is N-OS in $(S, \tau)$. Since $T$ is $N_{\delta^*g\alpha}$-OM, then $T(S-F)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$. That is $Y-T(F)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$. This implies that $T(F)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. hence $T$ is $N_{\delta^*g\alpha}$-CM.

(iii) ⇒ (i) Assume $K$ is an $(NCS)$ in $(S, \tau)$, Since $T$ is $N_{\delta^*g\alpha}$-CM, then $T(K)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. That is $[T^{-1}]^{-1}(K)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. hence $T^{-1}$ is $N_{\delta^*g\alpha}$-CM.

5.5. Theorem

Assume $T : (S, \tau) \longrightarrow (Y, \sigma)$ is bijective and $N_{\delta^*g\alpha}$-CM. then the following statement are equivalent.

(i) $T$ is an $N_{\delta^*g\alpha}$-OM.

(ii) $T$ is an $N_{\delta^*g\alpha}$-H.

(iii) $T$ is an $N_{\delta^*g\alpha}$-CM.

Proof.

(i) ⇒ (ii) Assume $T$ is an $N_{\delta^*g\alpha}$-OM. Since $T$ is bijective and $N_{\delta^*g\alpha}$-CM, $T$ is $N_{\delta^*g\alpha}$-H.

(ii) ⇒ (iii) Assume $T$ is an $N_{\delta^*g\alpha}$-H. Then $T$ is $N_{\delta^*g\alpha}$-OM. If $F$ is $(NCS)$ in $S$, then $T(S-F)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$. That is $Y-T(F)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$. This implies that $T(F)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. hence $T$ is $N_{\delta^*g\alpha}$-CM.

(iii) ⇒ (i) Assume $U$ is an $(NOS)$ in $(S, \tau)$, Then $S-U$ is $(NCS)$ in $(S, \tau)$. Since $T$ is $N_{\delta^*g\alpha}$-CS, then $T(S-U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. That is $Y - T(U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. Hence $T(U)$ is $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$.

5.6. Theorem

The composition of two $N_{\delta^*g\alpha}$-Hs is also a $N_{\delta^*g\alpha}$-H.

Proof. Assume $T : (S, \tau) \longrightarrow (Y, \sigma)$ and $g : (Y, \sigma) \longrightarrow (Z, \eta)$ are two $N_{\delta^*g\alpha}$-CM. Assume $U$ is a $(NCS)$ in $(Z, \eta)$. Since $g$ is a $N_{\delta^*g\alpha}$-CM, $g^{-1}(U)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. Since any $N_{\delta^*g\alpha}$-CS is $(NCS)$, $g^{-1}(U)$ is $(NCS)$ in $(Y, \sigma)$. Since $T$ is a $N_{\delta^*g\alpha}$-CM, $T^{-1}(g^{-1}(U)) = goT(U)$ is $N_{\delta^*g\alpha}$-CS in $(S, \tau)$, therefore $goT$ is also $N_{\delta^*g\alpha}$-CM.

Assume $A$ is a $(NCS)$ in $(S, \tau)$ then $S-A$ is a $(NOS)$ in $(S, \tau)$. Since $T$ is $N_{\delta^*g\alpha}$-H, then $T(S-A)$ is a $N_{\delta^*g\alpha}$-OS in $(Y, \sigma)$, implies $T(A)$ is $N_{\delta^*g\alpha}$-CS in $(Y, \sigma)$. Since any $N_{\delta^*g\alpha}$-CS is $(NCS)$, then $T(A)$ is $(NCS)$ in $(Y, \sigma)$, then $Y - T(A)$ is N-OS in $(Y, \sigma)$. Since $g$ is $N_{\delta^*g\alpha}$-H.
g (Y - T (A)) is N_δ^* ga-OS in (Z, η), implies g (T (A)) = goT (A) is N_δ^* ga-CS in (Z, η) therefore goT is N_δ^* ga-CM and N_δ^* ga-OM, implies goT is N_δ^* ga-H.

5.7. Definition

A map T : (S, τ) → (Y, σ) is named N_δ^* ga-c-H if T is bijective, T and T^{-1} are N_δ^* ga-IM.

5.8. Theorem

The composition of two N_δ^* ga-c-Hs is also a N_δ^* ga-c-H.

Proof. Assume T : (S, τ) → (Y, σ) and g : (Y, σ) → (Z, η) are two N_δ^* ga-c-Hs. Assume U is a N_δ^* ga-CS in (Z, η). Since g is a N_δ^* ga-IM, g^{-1} (U) is N_δ^* ga-CS in (Y, σ). Since U is N_δ^* ga-IM, T^{-1} (g^{-1} (U)) is N_δ^* ga-CS in (S, τ). that is (goT)^{-1} (T) is N_δ^* ga-CS in (S, τ), therefore goT : (Y, σ) → (Z, η) is N_δ^* ga-IM.

Assume G is a N_δ^* ga-CS in (S, τ), since T^{-1} is a N_δ^* ga-IM, (T^{-1})^{-1} (G) is N_δ^* ga-CS in (Y, σ), that is T (G) is N_δ^* ga-CS in (Y, σ). Since g^{-1} is N_δ^* ga-IM, (g^{-1})^{-1} (T (G)) is N_δ^* ga-CS in (Z, η), that is g (T (G)) is N_δ^* ga-CS in (Z, η), therefore (goT) (G) is N_δ^* ga-CS in (Z, η). This implies that (goT)^{-1} (G) is a N_δ^* ga-CS in (Z, η). This shows that (goT)^{-1} : (Y, σ) → (Z, η) is N_δ^* ga-IM. Hence (goT) is a N_δ^* ga-c-H.

5.9. Theorem

Any N_δ^* ga-H from a N_{α T_{\frac{3}{4}}} ga-space into another N_{α T_{\frac{3}{4}}} ga-space is a homeomorphism.

Proof.

Assume T : (S, τ) → (Y, σ) is a N_δ^* ga-H. Then T is bijective, N_δ^* ga-OM and N_δ^* ga-CM. Assume U is an (NOS)in (S, τ). Since T is N_δ^* ga-OM and since (Y, σ) is N_{α T_{\frac{3}{4}}} ga-space, T (U) is (NOS)in (Y, σ). This implies that T is N-open map. Assume K is a (NCS) in (Y, σ), since T is N_δ^* ga-CM and since (S, τ) is N_{α T_{\frac{3}{4}}} ga-space, T^{-1} (K) is (NCS) in (S, τ). Therefore T is continuous. Hence T is a homeomorphism.

5.10. Theorem

Assume (Y, σ) is N_{α T_{\frac{3}{4}}} ga-space. If T : (S, τ) → (Y, σ) and g : (Y, σ) → (Z, η) are N_δ^* ga-H then (goT) is N_δ^* ga-H.

Proof. Assume T : (S, τ) → (Y, σ) and g : (Y, σ) → (Z, η) are two N_δ^* ga-H. Assume U is an (NOS)in (S, τ). Since T is N_δ^* ga-OM, T (U) is N_δ^* ga-OS in (Y, σ). Since (Y, σ) is N_{α T_{\frac{3}{4}}} ga-space, T (U) is N-OS in (Y, σ). Also since g is N_δ^* ga-OM, g (T (U)) is N_δ^* ga-OS in (Z, η). Hence goT is N_δ^* ga-OM. Assume v is a (NCS) in (Z, η). Since g is N_δ^* ga-CM and since (Y, σ) is N_{α T_{\frac{3}{4}}} ga-space, g^{-1} (V) is (NCS) in (Y, σ). Since T is N_δ^* ga-CM,
$T^{-1}(g^{-1}(V)) = (gT)^{-1}(V)$ is $\mathcal{N}^{\delta^*g\alpha}$-CS in $(S, \tau)$. That is $(gT)$ is $\mathcal{N}^{\delta^*g\alpha}$-continuous. Hence $(gT)$ is $\mathcal{N}^{\delta^*g\alpha}$-H.

5.11. Theorem

Any $\mathcal{N}^{\delta^*g\alpha}$-H from $(\mathcal{N}_aT^*_3\mathcal{g}\alpha\mathcal{S})$ into another $(\mathcal{N}_aT^*_3\mathcal{g}\alpha\mathcal{S})$ is a $\mathcal{N}^{\delta^*g\alpha}$-c-H.

Proof. Assume $T : (S, \tau) \rightarrow (Y, \sigma)$ is $\mathcal{N}^{\delta^*g\alpha}$-H. Assume $U$ be $\mathcal{N}^{\delta^*g\alpha}$-CS in $(Y, \sigma)$. Then $U$ is $\mathcal{N}^{\delta^*g\alpha}$ (CS) in $(Y, \sigma)$. Since $T$ is $\mathcal{N}^{\delta^*g\alpha}$-CM, $T^{-1}(U)$ is $\mathcal{N}^{\delta^*g\alpha}$-CS in $(S, \tau)$. Then $T$ is a $\mathcal{N}^{\delta^*g\alpha}$-IM. Let $K$ be $\mathcal{N}^{\delta^*g\alpha}$-OS in $(S, \tau)$. Then $K$ is $(\mathcal{N}OS)$ in $(S, \tau)$. Since $T$ is $\mathcal{N}^{\delta^*g\alpha}$-OM, $T(K)$ is $\mathcal{N}^{\delta^*g\alpha}$-OS in $(Y, \sigma)$. That is $(T^{-1})^{-1}(K)$ is $\mathcal{N}^{\delta^*g\alpha}$-OS in $(Y, \sigma)$ and hence $T^{-1}$ is $\mathcal{N}^{\delta^*g\alpha}$-IM. Thus $T$ is $\mathcal{N}^{\delta^*g\alpha}$-c-H.

6. Conclusion

The notions of $\mathcal{N}^{\delta^*g\alpha}$-continuous and $\mathcal{N}^{\delta^*g\alpha}$-irresolute functions in (NTS) are given in this work. Next, their characterizations and investigate their properties are analyzed. In future work, we will use the soft sets theory to investigate new classes of neutrosophic soft maps and then we can study these new classes of (NTS) in soft setting.

References


$\mathcal{N}^{\delta^*g\alpha}$-Continuous and Irresolute Functions in Neutrosophic Topological Spaces.


[19] S. M. Khalil and A. Rajah, Solving Class Equation $x^d = \beta$ in an Alternating Group for each $\beta \in H \cap C^\alpha$ and $n \notin \Theta$, Journal of the Association of Arab Universities for Basic and Applied Sciences, 10,(2011), 42-50.

[20] S. M. Khalil and A. Rajah, Solving Class Equation $x^d = \beta$ in an Alternating Group for all $n \in \Theta$ & $\beta \in H_n \cap C^\alpha$, journal of the Association of Arab Universities for Basic and Applied Sciences, 16 (2014), 38–45.


$N_{\delta^* g_\alpha}$-Continuous and Irresolute Functions in Neutrosophic Topological Spaces.


Received: June 7, 2020. Accepted: Nov 25, 2020

$N_{3^{*}}{}_{g_{0}}$-Continuous and Irresolute Functions in Neutrosophic Topological Spaces