Neutrosophic αgs Continuity And Neutrosophic αgs Irresolute Maps

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Abstract. Neutrosophic Continuity functions very first introduced by A.A.Salama et.al.Aim of this present paper is, we introduce and investigate new kind of Neutrosophic continuity is called Neutrosophic αgs Continuity maps in Neutrosophic topological spaces and also discussed about some properties and characterization of Neutrosophic αgs Irresolute Maps.

Keywords: Neutrosophic α-closed sets, Neutrosophic semi-closed sets, Neutrosophic αgs-closed sets Neutrosophic αgs Continuity maps, Neutrosophic αgs irresolute maps

1. Introduction

Neutrosophic set theory concepts first initiated by F.Smarandache[11] which is Based on K. Atanassov's intuitionistic[6]fuzzy sets & L.A.Zadeh's [20]fuzzy sets. Also it defined by three parameters truth(T), indeterminacy (I),and falsity(F)-membership function. Smarandache's neutrosophic concept have wide range of real time applications for the fields of [1,2,3,4&5] Information Systems, Computer Science, Artificial Intelligence, Applied Mathematics, decision making. Mechanics, Electrical & Electronic, Medicine and Management Science etc,.

A.A.Salama[16] introduced Neutrosophic topological spaces by using Smarandache's Neutrosophic sets. I.Arokiarani.[7] et.al., introduced Neutrosophic α-closed sets.P. Ishwarya, [13]et.al., introduced and studied Neutrosophic semi-open sets in Neutrosophic topological spaces. Neutrosophic continuity functions introduced by A.A.Salama[15]. Neutrosophic αgs-closed set[8] introduced by V.Banu priya&S.Chandrasekar. Aim of this present paper is, we introduce and investigate new kind of Neutrosophic continuity is called Neutrosophic αgs Continuity maps in Neutrosophic topological spaces and also we discussed about properties and characterization Neutrosophic αgs Irresolute Maps

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2. PRELIMINARIES

In this section, we introduce the basic definition for Neutrosophic sets and its operations.

Definition 2.1 [11]

Let E be a non-empty fixed set. A Neutrosophic set λ writing the format is

$$\lambda = \{<e, \eta_\lambda(e), \sigma_\lambda(e), \gamma_\lambda(e)>: e\in E\}$$

Where $\eta_\lambda(e)$, $\sigma_\lambda(e)$ and $\gamma_\lambda(e)$ which represents Neutrosophic topological spaces the degree of membership function, indeterminacy and non-membership function respectively of each element e ∈ E to the set λ.

Remark 2.2 [11]

A Neutrosophic set $\lambda=\{<e, \eta_\lambda(e), \sigma_\lambda(e), \gamma_\lambda(e)>: e\in E\}$ can be identified to an ordered triple $<\eta_\lambda, \sigma_\lambda, \gamma_\lambda>$ in]-0,1+[on E.

Remark 2.3[11]

Neutrosophic set $\lambda=\{<e, \eta_\lambda(e),\sigma_\lambda(e),\gamma_\lambda(e)>:e\in E\}$our convenient we can write $\lambda=<e, \eta_\lambda, \sigma_\lambda, \gamma_\lambda>$.

Example 2.4 [11]

we must introduce the Neutrosophic set 0_N and 1_N in E as follows:

0_N may be defined as:

(0_1) $0_N=\{<e, 0, 0, 1>: e\in E\}$

(0_2) $0_N=\{<e, 0, 1, 1>: e\in E\}$

(0_3) $0_N=\{<e, 0, 1, 0>: e\in E\}$

(0_4) $0_N=\{<e, 0, 0, 0>: e\in E\}$

1_N may be defined as:

(1_1) $1_N = \{<e, 1, 0, 0>: e\in E\}$

(1_2) $1_N = \{<e, 1, 0, 1>: e\in E\}$

(1_3) $1_N=\{<e, 1, 1, 0>: e\in E\}$
(1_4) $1_N=\{<e, 1, 1, 1>: e\in E\}$

Definition 2.5 [11]
Let $\lambda=<\eta_\lambda, \sigma_\lambda, \gamma_\lambda>$ be a Neutrosophic set on E, then λ^C defined as $\lambda^C=\{<e, \gamma_\lambda(e), 1-\sigma_\lambda(e), \eta_\lambda(e)>: e\in E\}$

Definition 2.6 [11]
Let E be a non-empty set, and Neutrosophic sets λ and μ in the form
$\lambda=\{<e, \eta_\lambda(e), \sigma\lambda(e), \gamma\lambda(e)>: e\in E\}$ and
$\mu=\{<e, \eta_\mu(e), \sigma_\mu(e), \gamma_\mu(e)>: e\in E\}$.
Then we consider definition for subsets $(\lambda\subseteq\mu)$.
$\lambda\subseteq\mu$ defined as: $\lambda\subseteq\mu \Leftrightarrow \eta_\lambda(e)\le\eta_\mu(e)$, $\sigma_\lambda(e)\le\sigma_\mu(e)$ and $\gamma_\lambda(e)\ge\gamma_\mu(e)$ for all $e\in E$

Proposition 2.7 [11]
For any Neutrosophic set λ, then the following condition are holds:
(i) $0_N\subseteq\lambda$, $0_N\subseteq 0_N$
(ii) $\lambda\subseteq 1_N$, $1_N\subseteq 1_N$

Definition 2.8 [11]
Let E be a non-empty set, and $\lambda=<e, \eta_\mu(e), \sigma_\lambda(e), \gamma_\lambda(e)>$, $\mu=<e, \eta_\mu(e), \sigma_\mu(e), \gamma_\mu(e)>$ be two Neutrosophic sets. Then
(i) $\lambda\cap\mu$ defined as :$\lambda\cap\mu=<e, \eta_\lambda(e)\wedge\eta_\mu(e), \sigma_\lambda(e)\wedge\sigma_\mu(e), \gamma_\lambda(e)\vee\gamma_\mu(e)>$
(ii) $\lambda\cup\mu$ defined as :$\lambda\cup\mu=<e, \eta_\lambda(e)\vee\eta_\mu(e), \sigma_\lambda(e)\vee\sigma_\mu(e), \gamma_\lambda(e)\wedge\gamma_\mu(e)>$

Proposition 2.9 [11]
For all λ and μ are two Neutrosophic sets then the following condition are true:
(i) $(\lambda\cap\mu)^C=\lambda^C\cup\mu^C$
(ii) $(\lambda\cup\mu)^C=\lambda^C\cap\mu^C$.

Definition 2.10 [16]
A Neutrosophic topology is a non-empty set E is a family τ_N of Neutrosophic subsets in E satisfying the following axioms:
(i) $0_N, 1_N\in\tau_N$,
(ii) $G_1\cap G_2\in\tau_N$ for any $G_1, G_2\in\tau_N$,
(iii) $\cup G_i\in\tau_N$ for any family $\{G_i \mid i\in J\}\subseteq\tau_N$.
the pair (E, τ_N) is called a Neutrosophic topological space.
The element Neutrosophic topological spaces of τ_N are called Neutrosophic open sets.
A Neutrosophic set λ is closed if and only if λ^C is Neutrosophic open.

Example 2.11[16]
Let E={e} and
$A_1=\{<e, .6, .6, .5>: e\in E\}$
$A_2=\{<e, .5, .7, .9>: e\in E\}$
$A_3=\{<e, .6, .7, .5>: e\in E\}$
$A_4=\{<e, .5, .6, .9>: e\in E\}$
Then the family $\tau_N=\{0_N, 1_N, A_1, A_2, A_3, A_4\}$ is called a Neutrosophic topological space on E.

Definition 2.12[16]
Let (E, τ_N) be Neutrosophic topological spaces and $\lambda=\{<e, \eta_\lambda(e), \sigma_\lambda(e), \gamma_\lambda(e)>: e\in E\}$ be a Neutrosophic set in E. Then the Neutrosophic closure and Neutrosophic interior of λ are defined by
Neu-cl$(\lambda)=\cap\{D:D$ is a Neutrosophic closed set in E and $\lambda\subseteq D\}$
Neu-int$(\lambda)=\cup\{C:C$ is a Neutrosophic open set in E and $C\subseteq\lambda\}$.

Definition 2.13
Let (E, τ_N) be a Neutrosophic topological space. Then λ is called
(i) Neutrosophic regular Closed set [7] (Neu-RCS in short) if λ=Neu-Cl(Neu-Int(λ)),
(ii) Neutrosophic α-Closed set[7] (Neu-αCS in short) if Neu-Cl(Neu-Int(Neu-Cl(λ)))$\subseteq\lambda$,
(iii) Neutrosophic semi Closed set [13] (Neu-SCS in short) if Neu-Int(Neu-Cl(λ))$\subseteq\lambda$,
(iv) Neutrosophic pre Closed set [18] (Neu-PCS in short) if Neu-Cl(Neu-Int(λ))$\subseteq\lambda$,

Definition 2.14
Let (E, τ_N) be a Neutrosophic topological space. Then λ is called
(i). Neutrosophic regular open set [7](Neu-ROS in short) if λ=Neu-Int(Neu-Cl(λ)),
(ii). Neutrosophic α-open set [7](Neu-αOS in short) if $\lambda\subseteq$Neu-Int(Neu-Cl(Neu-Int(λ))),
(iii). Neutrosophic semi open set [13](Neu-SOS in short) if $\lambda\subseteq$Neu-Cl(Neu-Int(λ)),
(iv).Neutrosophic pre open set [18] (Neu-POS in short) if $\lambda\subseteq$Neu-Int(Neu-Cl(λ)),

Definition 2.15
Let (E, τ_N) be a Neutrosophic topological space. Then λ is called
(i).Neutrosophic generalized closed set[9](Neu-GCS in short) if Neu-cl(λ)$\subseteq$U whenever $\lambda\subseteq$U and U is a Neu-

OS in E ,
(ii).Neutrosophic generalized semi closed set[17] (Neu-GSCS in short) if Neu-scl(λ)⊆U Whenever λ⊆U and U is a Neu-OS in E,
(iii).Neutrosophic α generalized closed set [14](Neu-αGCS in short) if Neu-αcl(λ)⊆U whenever λ⊆U and U is a Neu-OS in E ,
(iv).Neutrosophic generalized alpha closed set [10] (Neu-GαCS in short) if Neu-αcl(λ)⊆U whenever λ⊆U and U is a Neu-αOS in E .
The complements of the above mentioned Neutrosophic closed sets are called their respective Neutrosophic open sets.

Definition 2.16 [8]
Let (E, τ_N) be a Neutrosophic topological space.Then λ is called Neutrosophic α generalized Semi closed set (Neu-αGSCS in short) if Neu-αcl(λ)⊆U whenever λ⊆U and U is a Neu-SOS in E
The complements of Neutrosophic αGS closed sets is called Neutrosophic αGS open sets.

3. Neutrosophic αgs-Continuity maps

In this section we Introduce Neutrosophic α-generalized semi continuity maps and study some of its properties.

Definition 3.1.
A maps f:(E_1, τ_N)→(E_2, σ_N) is called a Neutrosophic α-generalized semi continuity(Neu-αGS continuity in short) $f^{-1}(\mu)$ is a Neu-αGSCS in (E_1, τ_N) for every Neu-CS μ of (E_2, σ_N)

Example 3.2.
Let E_1={a_1,a_2}, E_2={b_1,b_2}, U=<e_1,(.7,.5,.8),(.5,.5,.4)> andV=<e_2,(1,.5,.9),(.2,.5,.3)>.Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic Topologies on $E_1$and E_2 respectively.
Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2. Then f is a Neu-αGS continuity maps.

Theorem 3.3.
Every Neu-continuity maps is a Neu-αGS continuity maps.

Proof.
Let f:(E_1, τ_N)→(E_2, σ_N) be a Neu-continuity maps. Let λ be a Neu-CS in E_2. Since f is a Neu-continuity maps, $f^{-1}(\lambda)$ is a Neu-CS in E_1. Since every Neu-CS is a Neu-αGSCS,$f^{-1}(\lambda)$ is a Neu-αGSCS in E_1. Hence f is a Neu-αGS continuity maps.

Example 3.4.
Neu-αGS continuity maps is not Neu-continuity maps
Let E_1={a_1, a_2}, E_2={b_1, b_2},U=< e_1, (.5,.5,.3), (.7,.5, .8)> and V=< e_2,(.4,.5,.3), (.8,.5, .9)>. Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic sets on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N) by f(a_1)=b_1 and f(a_2)=b_2 . Since the Neutrosophic set λ=<y ,(.3,.5, .4),(.9,.5, .8)> is Neu-CS in E_2, $f^{-1}(\lambda)$ is a Neu-αGSCS but not Neu-CS in E_1. Therefore f is a Neu-αGS continuity maps but not a Neu-continuity maps.

Theorem 3.5.
Every Neu-α continuity maps is a Neu-αGS continuity maps.

Proof.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu- α continuity maps. Let λ be a Neu-CS in E_2. Then by hypothesis
$f^{-1}(\lambda)$ is a Neu-αCS in E_1. Since every Neu-αCS is a Neu-αGSCS,$f^{-1}(\lambda)$is a Neu-αGSCS in E_1. Hence f is a Neu-αGS continuity maps.

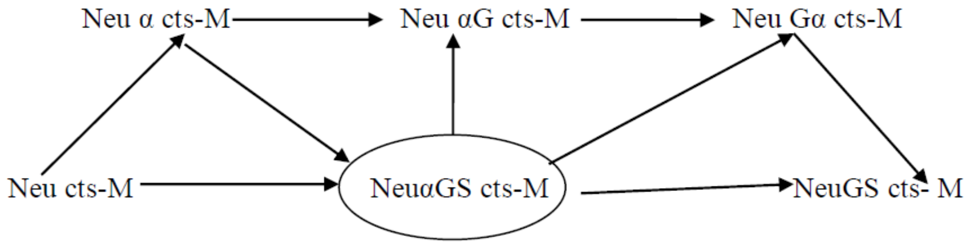
Example 3.6.
Neu-αGS continuity maps is not Neu-α continuity maps
Let E_1={a_1,a_2}, E_2={b_1,b_2},U=< e_1,(.5,.5, .6), (.7,.5,.6)> and V=< e_2 ,(.3,.5,.9), (.5,.5, .7)>. Then τ_N={0_N,U,1_N} and σ_N={0_N, V, 1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N) by f(a_1)=b_1 and f(a_2)=b_2. Since the Neutrosophic set λ=< e_2 , (.9,.5, .3), (.7,.5, .5)> is Neu-CS in E_2, $f^{-1}(\lambda)$ is a Neu-αGSCS continuity maps.

Remark 3.7.
Neu-G continuity maps and Neu-αGS continuity maps are independent of each other.

Example 3.8.
Neu-αGS continuity maps is not Neu-G continuity maps.
Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1,(.5,.5, .6), (.8,.5,.4)> and V=< e_2 ,(.7,.5,.4), (.9,.5, .3)>. Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N) by f(a_1)=b_1 and f(a_2)=b_2 .Then f is Neu-αGS continuity maps but not Neu-G continuity maps.
Since λ=< e_1,(.4,.5, .7), (.3,.5, .9)> is Neu-CS in E_2, $f^{-1}(\lambda)$=< e_2, (.4,.5, .7), (.7,.5, .3)> is not Neu-GCS in E_1.

Example 3.9.
Neu-G continuity maps is not Neu-αGS continuity maps.
Let E_1={a_1, a_2}, E_2={b_1,b_2}, U=<e_1,(.6,.5,.4), (.8,.5,.2)> and V=<e_2,(.3,.5,.7), (.1,.5, .9)>. Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N) →(E_2, σ_N) by f(a_1)=b_1 and f(a_2)=b_2 . Then f is Neu-G continuity maps but not a Neu-αGS continuity maps.
Since λ=< e_2 ,(.7,.5, .3), (.9,.5, .1)> is Neu-CS in E_2, $f^{-1}(\lambda)$=< e_1, (.7,.5, .3), (.9,.5,.1)> is not Neu-αGSCS in E_1.

Theorem 3.10.
Every Neu-αGS continuity maps is a Neu-GS continuity maps.
Proof.
Let f f:(E_1, τ_N)→(E_2, σ_N) be a Neu-αGS continuity maps. Let λ be a Neu-CS in E_2.Then by hypothesis $f^{-1}(\lambda)$ Neu-αGSCS in E_1. Since every Neu-αGSCS is a Neu-GSCS, $f^{-1}(\lambda)$ is a Neu-GSCS in E_1. Hence f is a Neu-GS continuity maps.
Example 3.11.
Neu-GS continuity maps is not Neu-αGS continuity maps.
Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1,(.8,.5,.4), (.9,.5,.2)> and V=< e_2,(.3,.5,.9), (0.1,.5, .9)>. Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2.Since the Neutrosophic set λ=< e_2,(.9,.5,.3),(.9, .5,.1)> is Neu-CS in E_2, $f^{-1}(\lambda)$ is Neu-GSCS in E_1 but not Neu-αGSCS in E_1. Therefore f is a Neu-GS continuity maps but not a Neu-αGS continuity maps.
Remark 3.12.
Neu-P continuity maps and Neu-αGS continuity maps are independent of each other.
Example 3.13.
Neu-P continuity maps is not Neu-αGS continuity maps Let E_1={a_1, a_2}, E_2={b_1, b_2},U= < e_1, (.3,.5,.7),(.4,.5,.6)> and V=< e_2,(.8,.5,.3), (.9,.5, .2)>. Then τ_N={0_N,U,1_N} and σ_N={0_N, V, 1_N } are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2.Since the Neutrosophic set λ=< e_2,(.3,.5, .8), (.2,.5, .9)> is Neu-CS in E_2, $f^{-1}(\lambda)$ is Neu-PCS in E_1 but not Neu-αGSCS in E_1. Therefore f is a Neu-P continuity maps but not Neu-αGS continuity maps.
Example 3.14.
Neu-αGS continuity maps is not Neu-P continuity maps
Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1,(.4,.5,.8),(.5,.5,.7)> and V=< e_1,(.5,.5,.7), (.6,.5, .6)> and W=< e_2,(.8,.5,.4), (.5,.5,.7)>. Then τ_N={0_N,U,V,1_N} and σ_N={0_N,W,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1) = b_1 and f(a_2)=b_2. Since the Neutrosophic set λ=<y ,(.4,.5, .8), (.7,.5, .5)> is Neu-αGSCS but not Neu-PCS in E_2, $f^{-1}(\lambda)$is Neu-αGSCS in E_1 but not Neu-PCS in E_1. Therefore f is a Neu-αGS continuity maps but not Neu-P continuity maps.
Theorem 3.15.
Every Neu-αGS continuity maps is a Neu-αG continuity maps.
Proof.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps. Let λ be a Neu-CS in E_2. Since f is Neu-αGS continuity maps, $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1. Since every Neu-αGSCS is a Neu- αGCS, $f^{-1}(\lambda)$ is a Neu- αGCS in E_1. Hence f is a Neu- αG continuity maps.
Example 3.16.
Neu- αG continuity maps is not Neu-αGS continuity maps
Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1,(.1,.5,.7),(.3,.5, .6)> and V=< e_2,(.7,.5,.4), (.6,.5, .5)>.Then τ_N={0_N,U,1_N} and σ_N={0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2.Since the Neutrosophic set λ=< e_2,(.4,.5,.7),(.5,.5, .6)> is Neu-CS in E_2, $f^{-1}(\lambda)$ is Neu-αGCS in E_1 but not Neu-αGSCS in E_1. Therefore f is a Neu-αG continuity maps but not a Neu-αGS continuity maps.
Theorem 3.17.
Every Neu-αGS continuity maps is a Neu-Gα continuity maps.
Proof.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps. Let λ be a Neu-CS in E_2. Since f is Neu-αGS continuity maps, $f^{-1}(\lambda)$is a Neu-αGSCS in E_1. Since every Neu-αGSCS is a Neu-GαCS, $f^{-1}(\lambda)$ is a Neu-GαCS in E_1. Hence f is a Neu-Gα continuity maps.
Example 3.18.
Neu-Gα continuity maps is not Neu-αGS continuity maps Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1, (.5,.5,.7), (.3,.5, .9)> and V=< e_2 ,(.6,.5,.6), (.5,.5,.7)>.Then τ_N={0_N,U,1_N } and σ_N={0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2. Since the Neutrosophic set λ=<y,(.6,.5,.6), (.7,.5, .5)> is Neu-CS in E_2, $f^{-1}(\lambda)$is Neu-Gα CS in E_1 but not Neu-αGSCS in E_1. Therefore f is a Neu-Gα continuity maps but not a Neu-αGS continuity maps.
Remark 3.19.
We obtain the following diagram from the results we discussed above.



Theorem 3.20.
A maps f:(E_1,τ_N)→(E_2,σ_N)is Neu-αGS continuity if and only if the inverse image of each Neutrosophic set in E_2 is a Neu-αGSOS in E_1.
Proof.
first part Let λ be a Neutrosophic set in E_2. This implies λ^C is Neu-CS in E_2. Since f is Neu-αGS continuity, $f^{-1}(\lambda^C)$ is Neu-αGSCS in E_1. Since $f^{-1}(\lambda^C)=(f^{-1}(\lambda))^C$, $f^{-1}(\lambda)$ is a Neu-αGSOS in E_1.
Converse part Let λ be a Neu-CS in E_2. Then λ^C is a Neutrosophic set in E_2. By hypothesis $f^{-1}(\lambda^C)$ is Neu-αGSOS in E_1. Since $f^{-1}(\lambda^C)=(f^{-1}(\lambda))^C$, $(f^{-1}(\lambda))^C$ is a Neu-αGSOS in E_1. Therefore $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1. Hence f is Neu-αGS continuity.
Theorem 3.21.
Let f:(E_1, τ_N)→(E_2, σ_N)be a maps and $f^{-1}(\lambda)$ be a Neu-RCS in $E_1$for every Neu-CS λ in E_2. Then f is a Neu-αGS continuity maps.
Proof.
Let λ be a Neu-CS in E_2 and $f^{-1}(\lambda)$ be a Neu-RCS in E_1. Since every Neu-RCS is a Neu-αGSCS, $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1. Hence f is a Neu-αGS continuity maps.
Definition 3.22.
A Neutrosophic Topology (E, τ_N) is said to be an
(i)Neu-$_{\alpha ga}U_{1/2}$(in short Neu- $_{\alpha ga}U_{1/2}$) space ,if every Neu-αGSCS in E is a Neu-CS in E,
(ii)Neu-$_{\alpha gb}U_{1/2}$(in short Neu- $_{\alpha gb}U_{1/2}$) space ,if every Neu-αGSCS in E is a Neu-GCS in E,
(iii)Neu-$_{\alpha gc}U_{1/2}$(in short Neu- $_{\alpha gc}U_{1/2}$) space, if every Neu-αGSCS in E is a Neu-GSCS in E.
Theorem 3.23.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps, then f is a Neu-continuity maps if E_1 is a Neu-$_{\alpha ga}U_{1/2}$ space.
Proof.
Let λ be a Neu-CS in E_2. Then $f^{-1}(\lambda)$is a Neu-αGSCS in E_1, by hypothesis.Since E_1 is a Neu-$_{\alpha ga}U_{1/2}$,$f^{-1}(\lambda)$ is a Neu-CS in E_1. Hence f is a Neu-continuity maps.
Theorem 3.24.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps, then f is a Neu-G continuity maps if E_1 is a Neu-$_{\alpha gb}U_{1/2}$ space.
Proof.
Let λ be a Neu-CS in E_2. Then $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1, by hypothesis. Since E_1 is a Neu- $_{\alpha gb}U_{1/2}$,$f^{-1}(\lambda)$ is a Neu-GCS in E_1. Hence f is a Neu-G continuity maps.
Theorem 3.25.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps, then f is a Neu-GS continuity maps if E_1 is a Neu-$_{\alpha gc}U_{1/2}$ space.
Proof.
Let λ be a Neu-CS in E_2. Then $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1, by hypothesis. Since E_1 is a Neu- $_{\alpha gc}U_{1/2}$,$f^{-1}(\lambda)$ is a Neu-GSCS in E_1. Hence f is a Neu-GS continuity maps.
Theorem 3.26.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps and g:(E_2, σ_N)→(E_3, ρ_N) be an Neutrosophic continuity, then g∘f :(E_1, τ_N)→(E_3, ρ_N) is a Neu-αGS continuity.
Proof.
Let λ be a Neu-CS in E_3. Then $g^{-1}(\lambda)$is a Neu-CS in E_2, by hypothesis. Since f is a Neu-αGS continuity maps, $f^{-1}(g^{-1}(\lambda))$ is a Neu-αGSCS in E_1. Hence g∘f is a Neu-αGS continuity maps.
Theorem 3.27.
Let f:(E_1, τ_N)→(E_2, σ_N)be a maps from Neutrosophic Topology in E_1 in to a Neutrosophic Topology E_2. Then the following conditions set are equivalent if E_1 is a Neu-$_{\alpha ga}U$ $_{1/2}$ space.
(i) f is a Neu-αGS continuity maps.
(ii) if μ is a Neutrosophic set in E_2 then $f^{-1}(\mu)$ is a Neu-αGSOS in E_1.
(iii) f^{-1}(Neu-int(μ))⊆Neu-int(Neu-Cl(Neu-int($f^{-1}(\mu)$))) for every Neutrosophic set μ in E_2.
Proof.

(i)→ (ii): is obviously true.
(ii)→ (iii): Let μ be any Neutrosophic set in E_2. Then Neu-int(μ) is a Neutrosophic set in E_2. Then f^{-1}(Neu-int(μ)) is a Neu-αGSOS in E_1. Since E_1 is a Neu-$_{\alpha ga}U_{1/2}$ space, f^{-1}(Neu-int(μ))is a Neutrosophic set in E_1.Therefore f^{-1}(Neu-int(μ))=Neu-int(f^{-1}(Neu-int(μ)))⊆Neu-int(Neu-Cl(Neu-int(f^{-1}(μ)))).
(iii)→(i) Let μ be a Neu-CS in E_2. Then its complement μ^C is a Neutrosophic set in E_2. By Hypothesis f^{-1}(Neu-int(μ^C))⊆Neu-int(Neu-Cl(Neu-int(f^{-1}(Neu-int(μ^C))))).This implies that $f^{-1}(\mu^C)$⊆Neu-int(Neu-Cl(Neu-int(f^{-1}(Neu-int(μ^C))))).Hence $f^{-1}(\mu^C)$ is a Neu-αOS in E_1. Since every Neu-αOS is a Neu-αGSOS, $f^{-1}(\mu^C)$is a Neu-αGSOS in E_1. Therefore $f^{-1}(\mu)$ is a Neu-αGSCS in E_1. Hence f is a Neu-αGS continuity maps.

Theorem 3.28.
Let f:(E_1, τ_N)→(E_2, σ_N)be a maps. Then the following conditions set are equivalent if E_1 is a Neu- $_{\alpha ga}U_{1/2}$ space.
(i) f is a Neu-αGS continuity maps.
(ii) $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1 for every Neu-CS λ in E_2.
(iii) Neu-Cl(Neu-int(Neu-Cl($f^{-1}(\lambda)$)))⊆f^{-1}(Neu-Cl(λ)) for every Neutrosophic set λ in E_2.

Proof.
(i)→ (ii): is obviously true.
(ii)→ (iii): Let λ be a Neutrosophic set in E_2.Then Neu-Cl(λ) is a Neu-CS in E_2. By hypothesis,f^{-1}(Neu-Cl(λ))is a Neu-αGSCS in E_1. Since E_1 is a Neu-$_{\alpha ga}U_{1/2}$ space, f^{-1}(Neu- Cl(λ)) is a Neu-CS in E_1. Therefore Neu-Cl(f^{-1}(Neu-Cl(λ)))=f^{-1}(Neu-Cl(λ)).NowNeu-Cl(Neu-int(Neu-Cl($f^{-1}(\lambda)$)))⊆Neu-Cl(Neu-int(Neu-Cl(f^{-1}(Neu-Cl(λ))))) ⊆f^{-1}(Neu-Cl(λ)).
(iii)→(i): Let λ be a Neu-CS in E_2. By hypothesis Neu-Cl(Neu-int(Neu-Cl($f^{-1}(\lambda)$)))⊆f^{-1}(Neu-Cl(λ))=$f^{-1}(\lambda)$.This implies $f^{-1}(\lambda)$ is a Neu-αCS in E_1 and hence it is a Neu-αGSCS in E_1. Therefore f is a Neu-αGS continuity maps.

Definition 3.29.
Let (E, τ_N) be a Neutrospohic topology.The Neutrospohic alpha generalized semi closure (Neu-αGSCl(λ)in short) for any Neutrosophic set λ is Defined as follows. Neu-αGSCl(λ)=∩{ K|*K*is a Neu-αGSCS in $E_1$and λ ⊆K}. If λ is Neu-αGSCS, then Neu-αGSCl(λ)=λ.

Theorem 3.30.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS continuity maps. Then the following conditions set are hold.
(i) f(Neu-αGSCl(λ))⊆Neu-Cl(f(λ)), for every Neutrosophic set λ in E_1.
(ii) Neu-αGSCl($f^{-1}(\mu)$)⊆f^{-1}(Neu-Cl(μ)),for every Neutrosophic set μ in E_2.

Proof.
(i) Since Neu-Cl(f(λ))is a Neu-CS in E_2 and f is a Neu-αGS continuity maps, f^{-1}(Neu-Cl(f(λ)))is Neu-αGSCS in E_1. That is Neu-αGSCl(λ)⊆f^{-1}(Neu-Cl(f(λ))). Therefore f(Neu-αGSCl(λ)) ⊆Neu-Cl(f(λ)),for every Neutrosophic set λ in E_1.
(ii) Replacing λ by $f^{-1}(\mu)$ in (i) we get f(Neu-αGSCl($f^{-1}(\mu)$))⊆Neu-Cl(f($f^{-1}(\mu)$))⊆Neu-Cl(μ).Hence Neu-αGSCl($f^{-1}(\mu)$)⊆f^{-1}(Neu-Cl(μ)), for every Neutrosophic set μ in E_2.

4. Neutrosophic α-Generalized Semi Irresolute Maps

In this section we Introduce Neutrosophic α-generalized semi irresolute maps and study some of its characterizations.

Definition 4.1.
A maps f:(E_1, τ_N)→(E_2, σ_N)is called a Neutrosophic alpha-generalized semi irresolute (Neu-αGS irresolute) maps if $f^{-1}(\lambda)$ is a Neu-αGSCSin (E_1, τ_N) for every Neu-αGSCS λ of (E_2, σ_N)

Theorem 4.2.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS irresolute, then f is a Neu-αGS continuity maps.

Proof.
Let f be a Neu-αGS irresolute maps. Let λ be any Neu-CS in E_2. Since every Neu-CS is a Neu-αGSCS, λ is a Neu-αGSCS in E_2. By hypothesis $f^{-1}(\lambda)$ is a Neu-αGSCS in E_2. Hence f is a Neu-αGS continuity maps.

Example 4.3.
Neu-αGS continuity maps is not Neu-αGS irresolute maps.
Let E_1={a_1, a_2}, E_2={b_1, b_2}, U=< e_1,(.4,.5, .7), (.5,.5,.6)> and V=< e_2 ,(.8,.5,.3), (.4,.6, .7)>. Then τ_N={0_N,U,1_N} and σ_N = {0_N,V,1_N} are Neutrosophic Topologies on E_1 and E_2 respectively. Define a maps f:(E_1, τ_N)→(E_2, σ_N)by f(a_1)=b_1 and f(a_2)=b_2. Then f is a Neu-αGS continuity. We have μ=< e_2,(.2,.5, .9), (.6,.5, .5)> is a Neu-αGSCS in E_2 but $f^{-1}(\mu)$ is not a Neu-αGSCS in E_1. Therefore f is not a Neu-αGS irresolute maps.

Theorem 4.4.
Let f:(E_1, τ_N)→(E_2, σ_N)be a Neu-αGS irresolute, then f is a Neutrosophic irresolute maps if E_1 is a Neu- $_{\alpha ga}U_{1/2}$ space.

Proof.
Let λ be a Neu-CS in E_2. Then λ is a Neu-αGSCS in E_2. Therefore $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1, by hypothesis. Since E_1 is a Neu-$_{\alpha ga}U_{1/2}$ space, $f^{-1}(\lambda)$ is a Neu-CS in E_1. Hence f is a Neutrosophic irresolute maps.

Theorem 4.5.

Let $f:(E_1, \tau_N)\to(E_2, \sigma_N)$ and $g:(E_2, \sigma_N)\to(E_3, \rho_N)$ be Neu-αGS irresolute maps, then $g\circ f:(E_1, \tau_N)\to(E_3, \rho_N)$ is a Neu-αGS irresolute maps.

Proof.

Let λ be a Neu-αGSCS in E_3. Then $g^{-1}(\lambda)$ is a Neu-αGSCS in E_2. Since f is a Neu-αGS irresolute maps. $f^{-1}((g^{-1}(\lambda)))$ is a Neu-αGSCS in E_1. Hence $g\circ f$ is a Neu-αGS irresolute maps.

Theorem 4.6.

Let $f:(E_1, \tau_N)\to(E_2, \sigma_N)$ be a Neu-αGS irresolute and $g:(E_2, \sigma_N)\to(E_3, \rho_N)$ be Neu-αGS continuity maps, then $g\circ f:(E_1, \tau_N)\to(E_3, \rho_N)$ is a Neu-αGS continuity maps.

Proof.

Let λ be a Neu-CS in E_3. Then $g^{-1}(\lambda)$ is a Neu-αGSCS in E_2. Since f is a Neu-αGS irresolute, $f^{-1}((g^{-1}(\lambda))$ is a Neu-αGSCS in E_1. Hence $g\circ f$ is a Neu-αGS continuity maps.

Theorem 4.7.

Let $f:(E_1, \tau_N)\to(E_2, \sigma_N)$ be a Neu-αGS irresolute, then f is a Neu-G irresolute maps if E_1 is a Neu-${}_{\alpha gb}U_{1/2}$ space.

Proof.

Let λ be a Neu-αGSCS in E_2. By hypothesis, $f^{-1}(\lambda)$ is a Neu-αGSCS in E_1. Since E_1 is a Neu- ${}_{\alpha gb}U_{1/2}$ space, $f^{-1}(\lambda)$ is a Neu-GCS in E_1. Hence f is a Neu-G irresolute maps.

Theorem 4.8.

Let $f:(E_1, \tau_N)\to(E_2, \sigma_N)$ be a maps from a Neutrosophic Topology E_1 Into a Neutrosophic Topology E_2. Then the following conditions set are equivalent if E_1 and E_2 are Neu- ${}_{\alpha ga}U_{1/2}$ spaces.

(i) f is a Neu-αGS irresolute maps.

(ii) $f^{-1}(\mu)$ is a Neu-αGSOS in E_1 for each Neu-αGSOS μ in E_2.

(iii) Neu-Cl($f^{-1}(\mu)$)⊆f^{-1}(Neu-Cl(μ)) for each Neutrosophic set μ of E_2.

Proof.

(i) →(ii) : Let μ be any Neu-αGSOS in E_2. Then μ^C is a Neu-αGSCS in E_2.Since f is Neu-αGS irresolute, $f^{-1}(\mu^C)$ is a Neu-αGSCS in E_1. But $f^{-1}(\mu^C)=(f^{-1}(\mu))^C$.Therefore $f^{-1}(\mu)$ is a Neu-αGSOS in E_1.

(ii)→(iii) : Let μ be any Neutrosophic set in $E_2$and μ⊆Neu-Cl(μ). Then $f^{-1}(\mu)\subseteq f^{-1}$(Neu-Cl(μ)). Since Neu-Cl(μ) is a Neu-CS in E_2, Neu-Cl(μ) is a Neu-αGSCS in E_2. Therefore $(\text{Neu-Cl}(\mu))^C$ is a Neu-αGSOS in E_2. By hypothesis, $f^{-1}((\text{Neu-Cl}(\mu))^C)$ is a Neu-αGSOS in E_1. Since $f^{-1}((\text{Neu-Cl}(\mu))^C)=(f^{-1}(\text{Neu-Cl}(\mu)))^C$,$f^{-1}$(Neu-Cl(μ)) is a Neu-αGSCS in E_1. Since E_1 is Neu- ${}_{\alpha ga}U_{1/2}$ space,f^{-1}(Neu-Cl(μ)) is a Neu-CS in E_1. Hence Neu-Cl($f^{-1}(\mu)$)⊆Neu-Cl(f^{-1}(Neu-Cl(μ)))=f^{-1}(Neu-Cl(μ)). That is Neu-Cl($f^{-1}(\mu)$)⊆f^{-1}(Neu-Cl(μ)).

(iii)→(i) : Let μ be any Neu-αGSCS in E_2. Since E_2 is Neu-${}_{\alpha ga}U_{1/2}$ space, μ is a Neu-CS in E_2 and Neu-Cl(μ)=μ.Hence $f^{-1}(\mu)=f^{-1}$(Neu-Cl(μ) ⊇ Neu-Cl($f^{-1}(\mu)$). But clearly $f^{-1}(\mu)$⊆Neu-Cl($f^{-1}(\mu)$). Therefore Neu-Cl($f^{-1}(\mu)$)=$f^{-1}(\mu)$. This implies $f^{-1}(\mu)$ is a Neu-CS and hence it is a Neu-αGSCS in E_1. Thus f is a Neu-αGS irresolute maps.

Conclusion

In this research paper using Neu-αGSCS(Neutrosophic αgs-closed sets) we are defined Neu-αGS continuity maps and analyzed its properties.after that we were compared already existing Neutrosophic continuity maps to Neu-αGSCS continuity maps. Furthermore we were extended to this maps to Neu-αGS irresolute maps , Finally This concepts can be extended to future Research for some mathematical applications.

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