Neutrosophic Weakly π Generalized Continuous Mapping

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Abstract- Aim of this present paper is, we introduce and investigate about new kind of Neutrosophic continuity is called Neutrosophic weakly π generalized continuous in Neutrosophic topological spaces and also discussed about properties and characterization Neutrosophic weakly π generalized continuous

Keywords – NS WπG open set, NS WπG closed set Neutrosophic weakly π generalized continuous, Neutrosophic topological spaces

I. Introduction

A.A.Salama introduced Neutrosophic topological spaces by using Smarandache's Neutrosophic sets. I.Arokiarani.[2] et al, introduced Neutrosophic α-closed sets.P. Ishwarya, [8]et.al, introduced and studied about on Neutrosophic semi-open sets in Neutrosophic topological spaces. Aim of this present paper is, we introduce and investigate about new kind of Neutrosophic continuity is called Neutrosophic weakly π generalized continuous in Neutrosophic topological spaces and also discussed about properties and characterization Neutrosophic weakly π generalized continuous

II. PRELIMINARIES

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

Definition 2.1 [7]

Let X be a non-empty fixed set. A Neutrosophic set A is an object having the form

$A = \{<x, \eta_A(x), \sigma_A(x), \gamma_A(x)>: x\in X\}$

Where $\eta_A(x)$, $\sigma_A(x)$ and $\gamma_A(x)$ which represent Neutrosophic topological spaces the degree of membership function, the degree indeterminacy and the degree of non-membership function respectively of each element $x \in X$ to the set A.

Remark 2.2 [7]

A Neutrosophic set $A=\{<x, \eta_A(x), \sigma_A(x), \gamma_A(x)>: x\in X\}$ can be identified to an ordered triple $<\eta_A, \sigma_A, \gamma_A>$ in $]^-0,1^+[$ on X.

Remark 2.3[7]

We shall use the symbol

$A = <x, \eta_A, \sigma_A, \gamma_A>$ for the Neutrosophic set $A = \{<x, \eta_A(x), \sigma_A(x), \gamma_A(x)>: x\in X\}$.

Example 2.4 [7]

Every Neutrosophic set A is a non-empty set in X is obviously on Neutrosophic set having the form $A=\{ <x, \eta_A(x), 1-((\eta_A(x) + \gamma_A(x)), \gamma_A(x)>: x\in X\}$. Since our main purpose is to construct the tools for developing Neutrosophic set and Neutrosophic topology, we must introduce the Neutrosophic set 0_N and 1_N in X as follows:

0_N may be defined as:

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

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

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

(0_4) $0_N=\{<x, 0, 0, 0>: x \in X\}$

1_N may be defined as :

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

(1_2) 1_N ={<x, 1, 0, 1 >: x∈X}
(1_3) 1_N ={<x, 1, 1, 0 >: x∈X}
(1_4) 1_N ={<x, 1, 1, 1 >: x∈X}

Definition 2.5 [7]
Let A=<η_A, σ_A,γ_A> be a Neutrosophic set on X, then the complement of the set A
A^C defined as
A^C={<x , γ_A(x) ,1- σ_A(x), η_A(x) >: x ∈X}

Definition 2.6 [7]
Let X be a non-empty set, and Neutrosophic sets A and B in the form
A ={<x, η_A(x), σA(x), γA(x)>:x∈X} and
B ={<x, η_B(x), σ_B(x), γ_B(x)>: x∈X}.
Then we consider definition for subsets (A⊆B).
A⊆B defined as: A⊆B ⟺$\eta_A(x) \leq \eta_B(x)$, $\sigma_A(x) \leq \sigma_B(x)$ and $\gamma_A(x) \geq \gamma_B(x)$ for all x∈X

Proposition 2.7 [7]
For any Neutrosophic set A, then the following condition are holds:
(i) 0_N⊆A, 0_N⊆ 0_N
(ii) A⊆1_N, 1_N⊆ 1_N

Definition 2.8 [7]
Let X be a non-empty set, and A=<x, η_B(x),σ_A(x), γ_A(x)> , B =<x, η_B(x), σ_B(x), γ_B(x)> be two Neutrosophic sets. Then
(i) A∩B defined as :A∩B =<x, $\eta_A(x)\wedge\eta_B(x)$, $\sigma_A(x)\wedge\sigma_B(x)$,$\gamma_A(x)\vee\gamma_B(x)$>
(ii) A∪B defined as :A∪B =<x, $\eta_A(x)\vee\eta_B(x)$, $\sigma_A(x)\vee\sigma_B(x)$, $\gamma_A(x)\wedge\gamma_B(x)$>

Proposition 2.9 [7]
For all A and B are two Neutrosophic sets then the following condition are true:
(i) $(A\cap B)^C=A^C\cup B^C$
(ii) $(A\cup B)^C=A^C\cap B^C$.

Definition 2.10 [11]
A Neutrosophic topology is a non-empty set X is a family τ_N of Neutrosophic subsets in X satisfying the following axioms:
(i) 0_N, 1_N ∈τ_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| i∈J }⊆τ_N.
the pair (X, τ_N) is called a Neutrosophic topological space.
The element Neutrosophic topological spaces of τ_N are called Neutrosophic open sets.
A Neutrosophic set A is closed if and only if A^C is Neutrosophic open.

Example 2.11[11]
Let X={x} and
A_1= {<x, 0.6, 0.6, 0.5>:x∈X}
A_2= {<x, 0.5, 0.7, 0.9>:x∈X}
A_3= {<x, 0.6, 0.7, 0.5>:x∈X}
A_4= {<x, 0.5, 0.6, 0.9>:x∈X}
Then the family τ_N={0_N, 1_N,A_1, A_2, A_3, A_4}is called a Neutrosophic topological space on X.

Definition 2.12[11]
Let (X, τ_N) be Neutrosophic topological spaces and A={<x,η_A(x),σ_A(x),γ_A(x)>:x∈X} be a Neutrosophic set in X. Then the Neutrosophic closure and Neutrosophic interior of A are defined by
Neu-cl(A)=∩{K:K is a Neutrosophic closed set in X and A⊆K}
Neu-int(A)=∪{G:G is a Neutrosophic open set in X and G⊆A}.

Definition 2.13
Let (X, τ_N) be a Neutrosophic topological space. Then A is called
(i) Neutrosophic regular Closed set [2] (Neu-RCS in short) if A=Neu-Cl(Neu-Int(A)),
(ii) Neutrosophic α-Closed set[2] (Neu-αCS in short) if Neu-Cl(Neu-Int(Neu-Cl(A)))⊆A,
(iii) Neutrosophic semi Closed set [9] (Neu-SCS in short) if Neu-Int(Neu-Cl(A))⊆A ,
(iv) Neutrosophic pre Closed set [12] (Neu-PCS in short) if Neu-Cl(Neu-Int(A))⊆A,

Definition 2.14
Let (X, τ_N) be a Neutrosophic topological space. Then A is called

(i). Neutrosophic regular open set [2](Neu-ROS in short) if A=Neu-Int(Neu-Cl(A)),
(ii). Neutrosophic α-open set [2](Neu-αOS in short) if A⊆Neu-Int(Neu-Cl(Neu-Int(A))),
(iii). Neutrosophic semi open set [9](Neu-SOS in short) if A⊆Neu-Cl(Neu-Int(A)),
(iv).Neutrosophic pre open set [13] (Neu-POS in short) if A⊆Neu-Int(Neu-Cl(A)),

Definition 2.15

Let (X, τ_N) be a Neutrosophic topological space. Then A is called
(i).Neutrosophic generalized closed set[4](Neu-GCS in short) if Neu-cl(A)⊆U whenever A⊆U and U is a Neu-OS in X ,
(ii).Neutrosophic generalized semi closed set[12] (Neu-GSCS in short) if Neu-scl(A)⊆U Whenever A⊆U and U is a Neu-OS in X,
(iii).Neutrosophic α generalized closed set [8](Neu-αGCS in short) if Neu-αcl(A)⊆U whenever A⊆U and U is a Neu-OS in X ,
(iv).Neutrosophic generalized alpha closed set [8] (Neu-GαCS in short) if Neu-αcl(A)⊆U whenever A⊆U and U is a Neu-αOS in X .

The complements of the above mentioned Neutrosophic closed sets are called their respective Neutrosophic open sets.

Definition 2.18:[5]

Let f be a mapping from an NSTS (X, NS_τ) into NSTS Y,σ . Then f is said to be Neutrosophic generalized continuous (NSG cts) if,f^{-1}(B)∈ NSGCS (X) for every NSCS, B in Y.

Definition 2.18:[5]

Let f be a mapping from an NSTS (X, NS_τ) into NSTS (Y,NS_σ). Then f is said to be Neutrosophic continuous (NS cts) if, f^{-1}(B)∈ NSOS (X) for every B∈ σ.

Definition 2.19:[12]

A mapping f: (X, NS_τ)→(Y,NS_σ) is called Neutrosophic generalized semi continuous (NSGS cts) if, f^{-1}(B) is an NSGSCS in (X, NS_τ) for every NSCS, B of (Y,NS_σ).

Definition 2.20:

A mapping f: (X, NS_τ)→(Y,NS_σ) is called Neutrosophic α generalized continuous (NSαGS cts) if, f^{-1}(B) is an NSαGCS in (X, NS_τ) for every NSCS, B of (Y,NS_σ).

Definition 2.17:

Let f be a mapping from an NSTS (X, NS_τ) into NSTS (Y,NS_σ). Then f is said to be
i) Neutrosophic semi continuous [15] (NS(S) cts) if, f^{-1}(B)∈ NS(S)O(X) for every B∈ σ,
ii) Neutrosophic α continuous [15] (NS(α) cts) if, f^{-1}(B)∈ NS(α)O(X) for every B∈ σ,
iii)Neutrosophic pre continuous [15] (NS(P) cts) if, f^{-1}(B)∈ NS(P)O(X) for every B∈ σ,
iv)Neutrosophic regular continuous [15] (NS(R) cts) if, f^{-1}(B)∈ NSRO(X) for every B∈ σ.

3. NEUTROSOPHIC WEAKLY π GENERALIZED CONTINUOUS MAPPINGS

In this section, Neutrosophic weakly π generalized continuous mappings is defined. Some of its properties are derived.

Definition 3.1:

A mapping f: (X, NS_τ)→(Y,NS_σ) is called an Neutrosophic weakly π generalized continuous mapping (NS(WπG) cts) if, f^{-1}(B) is a NS(WπG)CS in *(X, NS_τ)* for every NSCS, B of (Y, NS_σ).

Example 3.2:

Let X= {a,b},Y={u,v} and
G_1= $<x, \left(\frac{2}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{2}{10},\frac{5}{10},\frac{7}{10}\right)>$,
G_2= $<y, \left(\frac{6}{10},\frac{5}{10},\frac{4}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right)>$. Then
NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ= { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: (X, NS_τ) →(Y, NS_σ) by f(a)=u and f(b)=v.
Then f is a NS(WπG)CTS mapping.

Proposition 3.3:

Every NSCTS mapping is a NS(WπG)CTS mapping but not conversely.

Proof:

Let f: (X, NS_τ) →(Y, NS_σ) be a NSCTS mapping. Let B be a NSCS in Y. Since f is NSCTS mapping, f^{-1}(B) is a NSCS in X. Since every NSCS is a NS(WπG)CS, f^{-1}(B) is a NS(WπG)CS in X. Therefore f is a NS(WπG)CTS mapping.

Example 3.4:
Let X= {a,b},Y={u,v} and
G₁= <$x\left(\frac{1}{10},\frac{5}{10},\frac{8}{10}\right),\left(\frac{2}{10},\frac{5}{10},\frac{7}{10}\right)$>,
G₂= <$y,\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{3}{10}\right)$>. Then
NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.
The NSS, B= <$y,\left(\frac{1}{10},\frac{5}{10},\frac{8}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{7}{10}\right)$> is NSCS in Y. Then $f^{-1}(B)$ is NS(WπG)CS in X, but not NSCS in X. Therefore f is a NS(WπG)CTS mapping but not a NSCTS mapping.

Proposition 3.5:
Every NS(α) continuous mapping is a NS(WπG)CTS mapping but not conversely.

Proof:
Let f: $(X, NS_\tau) \to (Y, NS_\sigma)$ be a NS(α) continuous mapping. Let B be a NSCS in Y. Then by definition $f^{-1}(B)$ is a NS(α)CS in X. Since every NS(α)CS is a NS(WπG)CS, $f^{-1}(B)$ is a NS(WπG)CS in X. Thus f is a NS(WπG)CTS mapping.

Example 3.6:
Let X= {a,b},Y={u,v} and
G₁= <$x,\left(\frac{4}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{5}{10}\right)$> ,
G₂= <$y,\left(\frac{2}{10},\frac{5}{10},\frac{5}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{4}{10}\right)$>.
Then NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.
The NSS, B= <$y,\left(\frac{5}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{4}{10},\frac{5}{10},\frac{3}{10}\right)$> is NSCS in Y. Then $f^{-1}(B)$ is NS(WπG)CS in X, but not NS(α)CS in X. Then f is a NS(WπG)CTS mapping but not a NS(α) continuous mapping.

Proposition 3.7:
Every NS(R) CTS mapping is a NS(WπG)CTS mapping but not conversely.

Proof:
Let f: $(X, NS_\tau) \to (Y, NS_\sigma)$ be a NS(R)CTS mapping. Let B be a NSCS in Y. Then by definition $f^{-1}(B)$ is a NS(R)CS in X. Since every NS(R)CS is a NS(WπG)CS, $f^{-1}(B)$ is a NS(WπG)CS in X. So, f is a NS(WπG)CTS mapping.

Example3.8:
Let X= {a,b},Y={u,v} and
G₁= <$x,\left(\frac{5}{10},\frac{5}{10},\frac{4}{10}\right),\left(\frac{4}{10},\frac{5}{10},\frac{5}{10}\right)$>,
G₂= <$y,\left(\frac{5}{10},\frac{5}{10},\frac{4}{10}\right),\left(\frac{5}{10},\frac{5}{10},\frac{3}{10}\right)$>. Then
NS_τ={0_{NS} ,G_1,1_{NS}} and NS_σ={0_{NS} , G_2,1_{NS}} are NSTs on X and Y respectively.
Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.
The NSS, B= <$y,\left(\frac{4}{10},\frac{5}{10},\frac{5}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{5}{10}\right)$> is NSCS in Y. Then $f^{-1}(B)$ is NS(WπG)CS in X, but not NS(R)CS in X. Therefore f is NS(WπG)CTS mapping but not a NS(R) CTS mapping.

Proposition 3.9:
Every NS(P)CTS mapping is a NS(WπG)CTS mapping but not conversely.

Proof:
Let f: $(X, NS_\tau) \to (Y, NS_\sigma)$ be a NS(P) CTS mapping. Let B be a NSCS in Y. Then $f^{-1}(B)$ is a NS(P)CS in X. Since every NS(P)CS is a NS(WπG)CS, $f^{-1}(B)$ is a NS(WπG)CS in X. Therefore f is a NS(WπG)CTS mapping.

Example 3.10:
Let X= {a,b},Y={u,v} and
G₁= <$x,\left(\frac{4}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{7}{10}\right)$>,
G₂= <$y,\left(\frac{6}{10},\frac{5}{10},\frac{4}{10}\right),\left(\frac{4}{10},\frac{5}{10},\frac{4}{10}\right)$ >.
Then NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.
The NSS, B= <$y,\left(\frac{4}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{4}{10},\frac{5}{10},\frac{4}{10}\right)$> is NSCS in Y. Then $f^{-1}(B)$ is NS(WπG)CS in X, but not NS(P)CS in X. Therefore f is NS(WπG)CTS mapping but not a NS(P) CTS mapping.

Proposition 3.11:
Every NS(G)CTSmapping is a NS(WπG)CTS mapping but not conversely.
Proof:
Let f: (X, NS_τ) →(Y, NS_σ) be a NS(G)CTS mapping. Let B be a NSCS in Y. Since f is a NS(G)CTS mapping, f^{-1}(B) is a NS(G)CS in X. Since every NS(G)CS is a NS(WπG)CS, f^{-1}(B) is a NS(WπG)CS in X. Thus f is a NS(WπG)CTS mapping.
Example 3.12: Let X= {a,b},Y={u,v} and
G_1= < $x, \left(\frac{2}{10}, \frac{5}{10}, \frac{7}{10}\right), \left(\frac{3}{10}, \frac{5}{10}, \frac{6}{10}\right)$> ,
G_2= < $y, \left(\frac{8}{10}, \frac{5}{10}, \frac{2}{10}\right), \left(\frac{7}{10}, \frac{5}{10}, \frac{2}{10}\right)$ >.
Then NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: (X, NS_τ) →(Y, NS_σ) by f(a)=u and f(b)=v.
The NSS, B= < $y, \left(\frac{2}{10}, \frac{5}{10}, \frac{8}{10}\right), \left(\frac{2}{10}, \frac{5}{10}, \frac{7}{10}\right)$ > is NSCS in Y, f^{-1}(B) is NS(WπG)CS in X but not NS(G)CS in X. Therefore f is NS(WπG)CTS mapping but not a NS(G)CTS mapping.
Proposition 3.13:
Every NS(αG) continuous mapping is a NS(WπG)CTS mapping but not conversely.
Proof:
Let f: (X, NS_τ) →(Y, NS_σ) be a NS(αG) continuous mapping. Let B be a NSCS in Y. Then by definition, f^{-1}(B) is a NS(αG)CS in X. Since every NS(αG)CS is a NS(WπG)CS,f^{-1}(B) is a NS(WπG)CS in X. So, f is a NS(WπG)CTS mapping.
Example 3.14:
Let X= {a,b},Y={u,v} and
G_1= < $x, \left(\frac{4}{10}, \frac{5}{10}, \frac{2}{10}\right), \left(\frac{6}{10}, \frac{5}{10}, \frac{2}{10}\right)$> ,
G_2= < $y, \left(\frac{6}{10}, \frac{5}{10}, \frac{4}{10}\right), \left(\frac{2}{10}, \frac{5}{10}, \frac{3}{10}\right)$>. Then NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ= { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: (X, NS_τ) →(Y, NS_σ) by f(a)=u and f(b)=v.
The NSS, B= < $y, \left(\frac{4}{10}, \frac{5}{10}, \frac{6}{10}\right), \left(\frac{3}{10}, \frac{5}{10}, \frac{2}{10}\right)$> is NSCS in Y. Then f^{-1}(B) is NS(WπG)CS in X, but not NS(αG)CS in X. Therefore f is NS(WπG) CTS mapping but not a NS(αG) continuous mapping.
Remark 3.15:
NSS continuous mapping and NS(WπG)CTS mapping are independent to each other.
Example 3.8: Let X= {a,b},Y={u,v} and
G_1= < $x, \left(\frac{4}{10}, \frac{5}{10}, \frac{6}{10}\right), \left(\frac{3}{10}, \frac{5}{10}, \frac{7}{10}\right)$ > ,
G_2= < $y, \left(\frac{6}{10}, \frac{5}{10}, \frac{4}{10}\right), \left(\frac{7}{10}, \frac{5}{10}, \frac{3}{10}\right)$ >.
Then NS_τ = { 0_{NS} , G_1,1_{NS} } and NS_σ ={0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: (X, NS_τ) →(Y, NS_σ) by f(a)=u and f(b)=v.
Then f is NSS continuous mapping but not a NS(WπG)CTS mapping,
since B= < $y, \left(\frac{4}{10}, \frac{5}{10}, \frac{6}{10}\right), \left(\frac{3}{10}, \frac{5}{10}, \frac{2}{10}\right)$ > is a NSSCS in Y,
but f^{-1}(B) = < $x, \left(\frac{4}{10}, \frac{5}{10}, \frac{6}{10}\right), \left(\frac{3}{10}, \frac{5}{10}, \frac{2}{10}\right)$ > is not a NS(WπG)CS in X.
Example 3.16:
Let X= {a,b},Y={u,v} and
G_1= < $x, \left(\frac{9}{10}, \frac{5}{10}, \frac{1}{10}\right), \left(\frac{7}{10}, \frac{5}{10}, \frac{2}{10}\right)$ > ,
G_2= < $y, \left(\frac{3}{10}, \frac{5}{10}, \frac{4}{10}\right), \left(\frac{7}{10}, \frac{5}{10}, \frac{6}{10}\right)$>.
Then NS_τ={ 0_{NS} , G_1, 1_{NS} } and NS_σ={ 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.
Define a mapping f: (X, NS_τ) →(Y, NS_σ) by f(a)=u and f(b)=v. Then f is NS(WπG)CTS mapping, but not a NSS continuous mapping, since B= < $y, \left(\frac{7}{10}, \frac{5}{10}, \frac{3}{10}\right), \left(\frac{6}{10}, \frac{5}{10}, \frac{4}{10}\right)$ > is a NS(WπG)CS in Y,
but f^{-1}(B) = < $x, \left(\frac{7}{10}, \frac{5}{10}, \frac{3}{10}\right), \left(\frac{6}{10}, \frac{5}{10}, \frac{4}{10}\right)$ > is not a NSSCS in X.
Remark 3.17: NS(GS) CTS mapping and NS(WπG)CTS mapping are independent to each other.
Example 3.18: Let X= {a,b},Y={ u,v} and

$G_1= <x, \left(\frac{2}{10},\frac{5}{10},\frac{5}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{5}{10}\right)>$,

$G_2= <y, \left(\frac{5}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{5}{10},\frac{5}{10},\frac{3}{10}\right)>$. Then

NS_τ = { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} ,G_2, 1_{NS} } are NSTs on X and Y respectively.

Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.

Then f is NS(GS) CTS mapping, but not a NS(WπG)CTS mapping,

since $B= <y, \left(\frac{2}{10},\frac{5}{10},\frac{5}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{5}{10}\right)>$ is a NS(GS)CS in Y,

but $f^{-1}(B) = <x, \left(\frac{2}{10},\frac{5}{10},\frac{5}{10}\right),\left(\frac{3}{10},\frac{5}{10},\frac{5}{10}\right)>$ is not a NS(WπG)CS in X.

Example 3.19:

Let X= {a,b},Y= {u,v} and

$G_1= <x, \left(\frac{5}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{2}{10}\right)>$,

$G_2= <y, \left(\frac{6}{10},\frac{5}{10},\frac{3}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{2}{10}\right)>$.

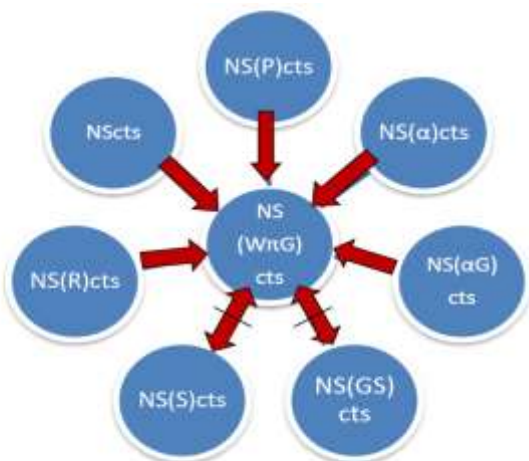
Then NS_τ= { 0_{NS} , G_1, 1_{NS} } and NS_σ = { 0_{NS} , G_2, 1_{NS} } are NSTs on X and Y respectively.

Define a mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ by f(a)=u and f(b)=v.

Then f is NS(WπG)CTS mapping, but not a NS(GS) CTS mapping,

since $B= <y, \left(\frac{3}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{2}{10},\frac{5}{10},\frac{6}{10}\right)>$ is a NS(WπG)CS in Y

but $f^{-1}(B)= <x, \left(\frac{3}{10},\frac{5}{10},\frac{6}{10}\right),\left(\frac{2}{10},\frac{5}{10},\frac{6}{10}\right)>$ is not a NS(GS)CS in X.



4.APPLICATIONS OF NEUTROSOPHIC WEAKLY π GENERALIZED CLOSED MAPPING

Definition 4.1:

An NSTS (X, NS_τ) is called an Neutrosophic wπT1/2 space (NSwπT1/2) if every NSWπGCS in X is an NSCS in X.

Proposition 4.2:

A mapping f: $(X, NS_\tau) \to (Y, NS_\sigma)$ is NS(WπG) CTS, then the inverse image of each NSOS in Y is a NS(WπG)OS in X.

Proof:

Let B be a NSOS in Y. This implies B^C is NSCS in Y. Since f is NS(WπG) CTS, $f^{-1}(B^C)$ is NS(WπG)CS in X. Since $f^{-1}(B^C)= (f^{-1}(B))^C$, $f^{-1}(B)$ is a NS(WπG)OS in X.

Proposition 4.3:

Let f: X→Y be a NS(WπG)CTS mapping and X be a NSwπT1/2 space. Then f is a NSCTS mapping.

Proof:
Let X be a NSwπT1/2 space and B be a NSCS in Y. Then by definition (4.1), $f^{-1}(B)$ is a NS(WπG)CS in X. So, $f^{-1}(B)$ is a NSCS in X. Therefore f is a NSCTS mapping.

Proposition 4.4:
A mapping f: $(X, NS_\tau) \rightarrow (Y, NS_\sigma)$ be a NS(WπG)CTS mapping and g∘ f: $(Y, NS_\sigma) \rightarrow (Z, NS_\delta)$ is NS continuous, then g∘f:$(X, NS_\tau) \rightarrow (Z, NS_\delta)$is a NS(WπG) CTS.

Proof:
Let D be a NSCS in Z. Then by definition $g^{-1}(D)$ is a NSCS in Y. Since f is a NS(WπG)CTS mapping, inverse image of a NSCS in Y is a NS(WπG)CS in X. ie., $f^{-1}\circ g^{-1}(D) = (g\circ f)^{-1}(D)$is a NS(WπG)CS in X. Therefore g∘f is a NS(WπG)CTS mapping.

V.CONCLUSION

Many different forms of closed sets have been introduced over the years. Various interesting problems arise when one considers openness. Its importance is significant in various areas of mathematics and related sciences, In this paper, we introduced the concept of NS(WπG)CTS in Neutrosophic Topological Spaces.This shall be extended in the future Research with some applications

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