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Neutrosophic weakly G*-Closed Sets

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Abstract— Aim of this present paper is, we introduce and investigate about new kind of Neutrosophic closed set is called Neutrosophic weakly g*-closed setsin Neutrosophic topological spaces and also discussed about properties and characterization

Keywords— Nu.g* open set, Nu.g*closed set ,Nu.weakly g* open set, Nu.weakly g*closed set, Neutrosophic topological spaces

I. Introduction

A.A.Salama introduced Neutrosophic topological spaces by using Smarandache's Neutrosophic sets. Neutrosophic g closed set introduced by.R. Dhavasheelan et.al. andNeutrosophic g*-closed sets presented by A.Atkinswesley et.al. Aim of this present paper is, we introduce and investigate about new kind of Neutrosophic closed set is called Neutrosophic weakly g*-closed setsin Neutrosophic topological spaces and also discussed about properties and characterization

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

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1_N may be defined as :

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

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

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

(1_4) $1_N =\{<x, 1, 1, 1 >: x\in X\}$

Definition 2.5 [8]

Let $A=<\eta_A, \sigma_A,\gamma_A>$ be a Neutrosophic set on X, then the complement of the set A A^C defined as

$A^C=\{<x , \gamma_A(x) ,1- \sigma_A(x), \eta_A(x) >: x \in X\}$

Definition 2.6 [8]

Let X be a non-empty set, and Neutrosophic sets A and B in the form

$A =\{<x, \eta_A(x), \sigma A(x), \gamma A(x)>:x\in X\}$ and

$B =\{<x, \eta_B(x), \sigma_B(x), \gamma_B(x)>: x\in X\}$.

Then we consider definition for subsets ($A\subseteq B$).

$A\subseteq B$ defined as: $A\subseteq B \Leftrightarrow \eta_A(x) \leq \eta_B(x), \sigma_A(x) \leq \sigma_B(x)$ and $\gamma_A(x) \geq \gamma_B(x)$ for all $x\in X$

Proposition 2.7 [8]

For any Neutrosophic set A, then the following condition are holds:

(i) $0_N\subseteq A$, $0_N\subseteq 0_N$

(ii) $A\subseteq 1_N$, $1_N\subseteq 1_N$

Definition 2.8 [8]

Let X be a non-empty set, and $A=<x, \eta_B(x),\sigma_A(x), \gamma_A(x)>$, $B =<x, \eta_B(x), \sigma_B(x), \gamma_B(x)>$ be two Neutrosophic sets. Then

(i) $A\cap B$ defined as :$A\cap B =<x, \eta_A(x)\wedge\eta_B(x), \sigma_A(x)\wedge\sigma_B(x),\gamma_A(x)\vee\gamma_B(x)>$

(ii) $A\cup B$ defined as :$A\cup B =<x, \eta_A(x)\vee\eta_B(x), \sigma_A(x)\vee\sigma_B(x), \gamma_A(x)\wedge\gamma_B(x)>$

Proposition 2.9 [8]

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 [8]

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, $1_N \in\tau_N$,

(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 $\{G_i| \ i\in J \}\subseteq\tau_N$.

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

$A_1= \{<x, 0.5, 0.6, 0.5>:x\in X\}$

$A_2= \{<x, 0.4, 0.7, 0.8>:x\in X\}$

$A_3= \{<x, 0.5, 0.7, 0.5>:x\in X\}$

$A_4= \{<x, 0.4, 0.6, 0.8>:x\in X\}$

Then the family $\tau_N=\{0_N, 1_N,A_1, A_2, A_3, A_4\}$is called a Neutrosophic topological space on X.

Definition 2.12[11]

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Let (X, $Nu._{\tau}$) 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-Nu-cl(A)=∩{K:K is a Neutrosophic closed set in X and A⊆K}
Neu-Nu-int(A)=∪{G:G is a Neutrosophic open set in X and G⊆A}.

Definition 2.13

Let (X, $Nu._{\tau}$) be a Neutrosophic topological space. Then A is called
(i) Neutrosophic regular Closed set [1] (Neu-RCS in short) if A=Neu-Cl(Neu-Int(A)),
(ii) Neutrosophic α-Closed set[1] (Neu-αCS in short) if Neu-Cl(Neu-Int(Neu-Cl(A)))⊆A,
(iii) Neutrosophic semi Closed set [8] (Neu-SCS in short) if Neu-Int(Neu-Cl(A))⊆A ,
(iv) Neutrosophic pre Closed set [18] (Neu-PCS in short) if Neu-Cl(Neu-Int(A))⊆A,

Definition 2.14

Let (X, $Nu._{\tau}$) be a Neutrosophic topological space. Then A is called

a) Neutrosophic regular open set [1](Neu-ROS in short) if A=Neu-Int(Neu-Cl(A)),
b) Neutrosophic α-open set [1](Neu-αOS in short) if A⊆Neu-Int(Neu-Cl(Neu-Int(A))),
c) Neutrosophic semi open set [8](Neu-SOS in short) if A⊆Neu-Cl(Neu-Int(A)),
d) Neutrosophic pre open set [18] (Neu-POS in short) if A⊆Neu-Int(Neu-Cl(A)),

Definition 2.15:

An Neutrosophic set A of an Neutrosophic topological space (X,ℑ) is called:

(a) Neutrosophic g-closed [4] if Nu-cl (A) ⊆G whenever A ⊆G and Gis Neutrosophic open.
(b) Neutrosophic sg-closed [17]if Nu-scl (A) ⊆G whenever A ⊆G and G is Neutrosophic semi open.
(c) Neutrosophic g*-closed [2]if Nu-cl (A) ⊆G whenever A ⊆G and G is Neutrosophic g-open.
(d) Neutrosophic αg-closed[9] if Nu-αcl (A) ⊆Gwhenever A ⊆G and G is Neutrosophic - open.
(e) Neutrosophic gα-closed [5]if Nu-αcl (A) ⊆G whenever A ⊆G and G is Neutrosophic α- open.
(f) Neutrosophic w-closed[16] if Nu-cl (A) ⊆Gwhenever A ⊆G and G is Neutrosophic semi open.
(g) Neutrosophic gp-closed [10]if Nu-pcl (A) ⊆G whenever A ⊆Gand G is Neutrosophic open.
(h) Neutrosophic gs-closed [17]if Nu-scl (A) ⊆G whenever A ⊆G and G is Neutrosophic open.
The complements of the above mentioned closed set are their respective open sets.

Definition 2.16[4]

If A is an Neutrosophic set in Neutrosophic topological space(X,ℑ) then

(a) Nu-scl (A)=∩{ F:A⊆F, F is Neutrosophic semi closed}
(b) Nu-pcl (A)=∩{ F:A⊆F, F is Neutrosophic pre closed}
(c) Nu-αcl (A)=∩{ F:A⊆F, F is Neutrosophic α closed}

Remark 2.17:

(a) Every Neutrosophic closed set is Neutrosophic g-closed set.
(b) Every Neutrosophic α-closed set is Neutrosophic αg-closed set.
(c) Every Neutrosophic g-closed is Neutrosophic gα-closed set.
(d) Every Neutrosophic αg-closed is Neutrosophic gα-closed set.
(e) Every Neutrosophic w-closed set is Neutrosophic g-closed
(f) Every Neutrosophic w-closed set is Neutrosophic sg-closed set.
(i) Every Neutrosophic sg-closed set is Neutrosophic gs-closed set.

Lemma 2.18[8]**:** Let A and B be any two Neutrosophic sets of an Neutrosophic topological space (X,ℑ). Then:
(a) A is an Neutrosophic closed set in X ⇔Nu-cl (A) = A

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(b) A is an Neutrosophic open set in X ⇔Nu-int (A) = A.

(c) Nu-cl(A^C) = (Nu-int (A))^C.

(d)Nu- int (A^C) = (Nu-cl (A))^C.

(e) A ⊆ B ⇒Nu-int (A) ⊆Nu-int (B).

(f) A ⊆ B ⇒Nu-cl (A) ⊆Nu-cl (B).

(g) Nu-cl (A∪ B) = Nu-cl (A) ∪Nu-cl(B).

(h)Nu- int(A ∩ B) = Nu-int (A) ∩Nu-int(B)

I. NEUTROSOPHICWEAKLY g* -CLOSED SET

Definition 3.1:

An Neutrosophic set A of an Neutrosophic topological space (X,ℑ) is called anNeutrosophicweakly g*-closed if Nu-cl (Nu-int(A))⊆G whenever A ⊆G and G is Neutrosophic g-open in X.

Theorem 3.2:

Every Neutrosophic w-closed set is Neutrosophicweakly g*-closed -closed.

Proof:

Let A is Neutrosophic w-closed set. Let A⊆U and U Neutrosophic semi-open sets in X. Sinceevery Neutrosophic semi open set is Neutrosophic g-open sets U is Neutrosophic g-open sets. Now by definition of Neutrosophic w-closed sets Nu-cl(A) ⊆ U. But Nu-cl(Nu-int(A)) ⊆Nu-cl(A) ⊆ U. We have Nu-cl(Nu-int(A)) ⊆ U whenever A ⊆ U and U is Neutrosophic g-open in X. Therefore A is Neutrosophicweakly g*-closed set.

Remark 3.3:

The converse of above theorem need not be true as from the following example.

Example 3.4:

Let X = {a, b} andℑ= {0,U, 1} be an Neutrosophic topology on X, where

U=⟨x, $\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{3}{10}\right)$⟩Then the Neutrosophic set

A = ⟨x, $\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right)$⟩is Neutrosophicweakly g* -closed but it is not Neutrosophic w-closed.

Theorem 3.5:

Every Neutrosophic g*-closed set is Neutrosophicweakly g*-closed sets..

Proof:

Let A is Neutrosophic g*-closed set. Let A⊆U and U is Neutrosophic g–open sets in X. Nowby definition of Neutrosophic g*-closed sets Nu-cl(A) ⊆ U. But Nu-cl(Nu-int(A)) ⊆Nu-cl(A) ⊆ U. We have Nu-cl(Nu-int(A)) ⊆ U whenever A ⊆ U and U is Neutrosophic g-open in X. Therefore A is Neutrosophicweakly g*-closed set.

Remark 3.6:

The converse of above theorem need not be true as from the following example.

Example 3.7:

Let X = {a, b, c, d } and Neutrosophic sets A_1,A_2, A_3,A_4 defined as follows

A_1 = { ⟨x, $\left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)$⟩

$$A_2 = \langle x, \left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

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$$A_3 = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$
$$A_4 = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

$\mathfrak{I}$ = {0 , A_1,A_2, A_3,A_4, 1} be an Neutrosophic topology on X. Then the Neutrosophic set $A = \langle x, \left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$ is Neutrosophicweakly g* -closed but it is not Neutrosophic g*-closed.

Theorem 3.8:

Every Neutrosophic g-closed set is Neutrosophicweakly g*-closed sets.

Proof:

Let A is Neutrosophic g-closed set. Let A⊆U and U Neutrosophic-open sets in X. Since everyNeutrosophic open set is Neutrosophic g-open sets U is Neutrosophic g-open sets. Now by definition of Neutrosophic g-closed sets Nu-cl(A) ⊆ U. But Nu-cl(Nu-int(A)) ⊆Nu-cl(A) ⊆ U. We have Nu-cl(Nu-int(A)) ⊆ U whenever A ⊆ U and U is Neutrosophic g-open in X. Therefore A is Neutrosophicweakly g*-closed set.

Remark 3.9:

The converse of above theorem need not be true as from the following example

Example 3.10:

Let X = {a, b, c, d, e} and Neutrosophic sets A_1,A_2, A_3,defined as follows

$A_1 = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$

A_2

A_3

Let $\mathfrak{I}$ = {0 , A_1,A_2, $A_3$1 } be an Neutrosophic topology on X. Then the Neutrosophic set $A = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$is Neutrosophicweakly g* -closed but it is not Neutrosophic g-closed.

Theorem 3.11:

Every Neutrosophic αg-closed set is Neutrosophicweakly g*-closed sets.

Proof:

Let Ais Neutrosophic αg-closed set. Let A⊆U and U Neutrosophic -open sets in X. Since everyNeutrosophic open set is Neutrosophic g-open sets U is Neutrosophic g-open sets. Now by definition of Neutrosophic αg-closed sets Nu-αcl(A)⊆U. But Nu-αcl(A)⊆Nu-cl(A) therefore Nu-cl(A)⊆ A. NowNu-cl(Nu-int(A)) ⊆Nu-cl(A)⊆U. We have Nu-cl(Nu-int(A))⊆U whenever A⊆U and U is Neutrosophic g-open in X. Therefore A is Neutrosophicweakly g*-closed set.

Remark 3.12:

The converse of above theorem need not be true as from the following example

Example 3.13:

Let X = {a, b, c, d} and Neutrosophic sets A_1,A_2 defined as follows

A_1= { $\langle x, \left(\frac{7}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$

$$A_2 = \langle x, \left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

Let $\mathfrak{I}$ = {0 , A_1,A_2, 1 } be an Neutrosophic topology on X. Then the Neutrosophic set

$$A = \langle x, \left(\frac{7}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

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is Neutrosophicweakly g* -closed but it is not Neutrosophic αg-closed.

Theorem 3.14:

Every Neutrosophic gα-closed set is Neutrosophicweakly g*-closed sets.

Proof:

It follows from theorem 3.11the fact that every Neutrosophic gα-closed set is Neutrosophic αg-closed sets.

Theorem 3.15:

Every Neutrosophic gp-closed set is Neutrosophicweakly g*-closed sets.

Proof:

Let A is Neutrosophic gp-closed set. Let A⊆U and U Neutrosophic-open sets in X. Since everyNeutrosophic open set is Neutrosophic g-open sets U is Neutrosophic g-open sets. Now by definition of Neutrosophic gp-closed sets Nu-pcl(A)⊆U. But Nu-pcl(A)⊆Nu-cl(A) therefore Nu-cl(A)⊆ A. Now Nu-cl(Nu-int(A))⊆Nu-cl(A)⊆U. We have Nu-cl(Nu-int(A))⊆U whenever A⊆U and U is Neutrosophic g-open in X. Therefore A is Neutrosophicweakly g*-closed set.

Remark 3.16:

The converse of above theorem need not be true as from the following example.

Example 3.17:

Let X = {a, b} and$\Im$= {0_N,A_1, 1_N} be an Neutrosophic topology on X, where

A_1=⟨x, $\left(\frac{4}{10},\frac{5}{10},\frac{3}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{3}{10}\right)$⟩.Then the Neutrosophic set

A_2 =⟨x, $\left(\frac{4}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{1}{10}\right)$⟩ is Neutrosophicweakly g* -closed but it is not Neutrosophic gp-closed.

Corollary 3.20:

Every Neutrosophic closed set is Neutrosophicweakly g*-closed set.

Every Neutrosophicα-closed set is Neutrosophicweakly g*-closed set.

Every Neutrosophic pre-closed set is Neutrosophic weakly g*-closed set.

Every Neutrosophic regular-closed set is Neutrosophic weakly g*-closed set.

Proof: Obvious

Remark 3.25: The intersection of two Neutrosophicweakly g*-closed sets in an Neutrosophic topologicalspace (X,$\Im$) may not be Neutrosophicweakly g*-closed. For,

Example 3.26: Let X = {a, b, c, d } and Neutrosophic sets A_1,A_2, A_3,A_4 defined as follows

A_1 = ⟨x, $\left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)$⟩

$$A_2 = \langle x, \left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

$$A_3 = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

$$A_4 = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

$\Im$ = {0 , A_1,A_2, A_3,A_4 1 ,} be an Neutrosophic topology on X. Then the Neutrosophic set

A = ⟨x, $\left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{8}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right)$⟩

$$B = \langle x, \left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{0}{10},\frac{5}{10},\frac{1}{10}\right),\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{9}{10},\frac{5}{10},\frac{1}{10}\right)\rangle$$

are Neutrosophicweakly g*-closed in (X,$\Im$) but A∩B is not Neutrosophicweakly g*-closed.

Theorem 3.27:

Let A be an Neutrosophicweakly g*-closed set in an Neutrosophic topological space(X,$\Im$) and A⊆ B⊆Nu-cl (Nu-int(A)). Then B is Neutrosophicweakly g*-closed in X.

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Proof:

Let G be an Neutrosophic g-open set in X such that B⊆G. Then A⊆Gand since A is Neutrosophicweakly g*-closed, Nu-cl(Nu-int(A))⊆G. Now B⊆Nu-cl (Nu-int(A)) ⇒Nu-cl(Nu-int(B)) ⊆Nu-cl(Nu-int(Nu-cl(Int(A)))) =Nu-cl(Nu-int(A)), Nu-cl(Nu-int(B))⊆Nu-cl(Nu-int(A)) ⊆G. Consequently B is Neutrosophicweakly g*-closed.

Definition 3.28: An Neutrosophic set A of an Neutrosophic topological space (X,$\Im$) is called Neutrosophic g*-open if and only if its complement A^C is Neutrosophicweakly g*-closed.

Remark 3.29:

Every Neutrosophic w-open set is Neutrosophicweakly g*-open but its converse may notbe true.

Example 3.30:

Let X = {a, b} and $\Im$ = {0 , A_1,1 } be an Neutrosophictopology on X, where A_1=⟨ x, $\left(\frac{7}{10},\frac{5}{10},\frac{2}{10}\right),\left(\frac{6}{10},\frac{5}{10},\frac{3}{10}\right)$⟩.Then the Neutrosophic set A_2=⟨x, $\left(\frac{2}{10},\frac{5}{10},\frac{7}{10}\right),\left(\frac{1}{10},\frac{5}{10},\frac{8}{10}\right)$⟩ is Neutrosophicweakly g*-open in (X, $\Im$) but it is not Neutrosophic w-open in (X, $\Im$).

Theorem 3.31:

An Neutrosophic set A of an Neutrosophic topological space (X,$\Im$) is Neutrosophicweakly g*-open if F ⊆Nu-cl(Nu-int (A)) whenever F is Neutrosophic g-closed and F ⊆ A.

Proof: Follows from definition 3.1 and Lemma 2.18

Theorem 3.32:

Let A be an Neutrosophicweakly g*-open set of an Neutrosophic topological space(X,$\Im$) and Nu-cl(Nu-int (A)) ⊆ B ⊆ A. Then B is Neutrosophicweakly g*-open.

Proof:

Suppose A is an Neutrosophicweakly g*-open in X and Nu-cl(Nu-int(A))⊆B⊆A.⇒A^C⊆B^C⊆(Nu-cl(Nu-int(A)))^C⊆A^C⊆ B^C⊆Nu-cl(Nu-int(A^C) by Lemma 2.18and A^C is Neutrosophicweakly g*-closed it follows from theorem that B^c is Neutrosophicweakly g*-closed . Hence B is Neutrosophicweakly g*-open.

IV. CONCLUSION

The theory of g-closed sets plays an important role in general topology. Since its inception many weak and strong forms of g-closed sets have been introduced in general topology as well as fuzzy topology and Neutrosophic topology. The present paper investigated a new weak form of Neutrosophic g-closed sets called Neutrosophicweakly g*-closed sets which has been compared with the classes of Neutrosophic closed sets, Neutrosophic pre closed sets, Neutrosophic α-closed sets, Neutrosophic w-closed sets, Neutrosophic gp-closed sets , Neutrosophic αg-closed sets, Neutrosophic gα-closed sets , Neutrosophic g*- closed sets. Several properties and application of Neutrosophicweakly g*-closed sets are studied. Many examples are given to justify the result.

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