On neutrosophic nano $\alpha g^{\#}\psi$-closed sets in neutrosophic nano topological spaces

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Abstract

The object of the present paper is to introduce neutrosophic nano $\alpha g^{\#}\psi$-closed sets in neutrosophic nano topological spaces and characterize some of its basic properties in neutrosophic nano topological spaces.
Keywords: Neutrosophic set, Neutrosophic topology, neutrosophic nano topology, neutrosophic nano $\alpha g^{\#}\psi$-closed set.

1 Introduction

The first successful attempt towards containing non-probabilistic uncertainty, i.e. uncertainty which is not incite by randomness of an event, into mathematical modeling was made in 1965 by Zadeh[17] through his significant theory on fuzzy sets. A fuzzy set is a set where each element of the universe belongs to it but with some value or degree of belongingness which lies between 0 and 1 and such values are called membership value of an element in that set. Later on Chang[3] was the first to introduce the concept of fuzzy topology.

Further generalization of this fuzzy set was introduced by Atanassov[1,2] in 1986, which is known as Intuitionistic fuzzy sets. In intuitionistic fuzzy set, instead of one membership value there is also a non-membership value devoted to each element. Further there is a restriction that the sum of these two values is less or equal to unity. In Intuitionistic fuzzy set the degree of non-belongingness is not independent but it is dependent on the degree of belongingness. Fuzzy set theory can be considered as a special case of an Intuitionistic fuzzy set where the degree of non-belongingness of an element is exactly equal to 1 minus the degree of belongingness. Along with these IFS are also studied extensively in the topological framework introduced by Coker[4].

Neutrosophic logic was introduced by Smarandache[15] in 1995. It's a logic during which each proposition is calculated to possess a degree of truth, a degree of indeterminacy and a degree of falsity. In 2012, Salama et.al[16] introduced the neutrosophic topological spaces as sort of a generalization concerning intuitionistic fuzzy topological space and a neutrosophic set without the degree concerning membership, the degree of indeterminacy and therefore the degree regarding non-membership over each element.

The neutrosophic concept have wide range of real time applications for the fields of [7,10,12,13] Information Systems, Computer Science, Artificial Intelligence, Applied Mathematics, decision making. Mechanics, Electrical Electronic, Medicine and Management Science etc,.

Rough set theory is introduced by Pawlak[11] as a replacement mathematical tool for representing reasoning and deciding handling vagueness and uncertainty. This theory provides the approximation of sets by means of equivalence relations and is taken into account together of the primary non-statistical approaches in data analysis. A rough set are often described by a pair of definable sets called lower and upper approximations. The lower approximation is that the greatest definable set contained within the given set of objects while the upper approximation is that the smallest definable set that contains the given set. Rough set concept are often defined quite generally by means of topological operations, interior and closure, called approximations.

In 2013, a new topology called Nano topology was introduced by Lellis Thivagar[5] which is an extension of rough set theory. He also introduced Nano topological spaces which were defined in terms of approximations and boundary region of a subset of a universe using an equivalence relation on it. The elements of a

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Nano topological space are called the Nano open sets and its complements are called the Nano closed sets. Nano means something very small. Nano topology thus literally means the study of very small surface. The fundamental ideas in Nano topology are those of approximations and indiscernibility relation.

Now Lellis Thivagar et.al[6] explored a new concept of neutrosophic nano topology. In that paper he discussed about neutrosophic nano interior and neutrosophic nano closure.

In this article, we introduce neutrosophic nano $\alpha g^{\#}\psi(N_{N-\alpha g^{\#}\psi})$-closed sets and study some basic properties in neutrosophic nano topological spaces.

2 Preliminaries

Definition 2.1 (14)**.** A neutrosophic set $\mathcal{S}$ is an object of the following form

$$A = \{\langle s, \mathcal{P}_A(s), \mathcal{Q}_A(s), \mathcal{R}_A(s) : s \in \mathcal{S}\rangle\}$$

where $\mathcal{P}_A(s)$, $\mathcal{Q}_A(s)$ and $\mathcal{R}_A(s)$ denote the degree of membership, the degree of indeterminacy and the degree of nonmembership for each element $s \in \mathcal{S}$ to the set A, respectively.

Definition 2.2 (14)**.** Let A and B be Neutrosophic sets of the form
$A = \{\langle s, \mathcal{P}_A(s), \mathcal{Q}_A(s), \mathcal{R}_A(s) : s \in \mathcal{S}\rangle\}$ and
$B = \{\langle s, \mathcal{P}_B(s), \mathcal{Q}_B(s), \mathcal{R}_B(s) : s \in \mathcal{S}\rangle\}$. Then
(i) $A \subseteq B$ if and only if $\mathcal{P}_A(s) \leq \mathcal{P}_B(s)$, $\mathcal{Q}_A(s) \leq \mathcal{Q}_B(s)$ and $\mathcal{R}_A(s) \geq \mathcal{R}_B(s)$;
(ii) $\overline{A} = \{\langle x, \mathcal{R}_A(s), \mathcal{Q}_A(s), \mathcal{P}_A(s) : s \in \mathcal{S}\rangle\}$;
(iii) $A \cup B$=$\{\langle s, \mathcal{P}_A(s) \vee \mathcal{P}_B(s), \mathcal{Q}_A(s) \wedge \mathcal{Q}_B(s), \mathcal{R}_A(s) \wedge \mathcal{R}_B(s)\rangle : s \in \mathcal{S}\}$;
(iv) $A \cap B$=$\{\langle s, \mathcal{P}_A(s) \wedge \mathcal{P}_B(s), \mathcal{Q}_A(s) \vee \mathcal{Q}_B(s), \mathcal{R}_A(s) \vee \mathcal{R}_B(s)\rangle : s \in \mathcal{S}\}$.

Definition 2.3 (16)**.** A neutrosophic topology on a non-empty set X is a family τ of neutrosophic sets in X satisfying the following axioms:

i. $0_N, 1_N \in \tau$,

ii. $\mathcal{G}_1 \cap \mathcal{G}_2 \in \tau$ for any $\mathcal{G}_1, \mathcal{G}_2 \in \tau$,

iii. $\cup \mathcal{G}_i \in \tau$ for arbitrary family $\{\mathcal{G}_i | i \in j\} \subseteq \tau$.

Definition 2.4 (6)**.** Let $\mathcal{U}$ be a universe and $\mathcal{R}$ be an equivalence relation on $\mathcal{U}$ and Let $\mathcal{S}$ be a neutrosophic subset of $\mathcal{U}$. Then the neutrosophic nano topology is defined by $\tau_N(\mathcal{S}) = \{0_N, 1_N, \overline{N}(\mathcal{S}), \underline{N}(\mathcal{S}), B_N(\mathcal{S})\}$, where

i. $\underline{N}(\mathcal{S})$=$\{\langle y, \mathcal{M}_{\underline{\mathcal{R}}(y)}, \mathcal{I}_{\underline{\mathcal{R}}(y)}, \mathcal{N}_{\underline{\mathcal{R}}(y)}\rangle / z \in [y]\mathcal{R}, y \in \mathcal{U}\}$.

ii. $\overline{N}(\mathcal{S})$ =$\{\left\langle y, \mathcal{M}_{\overline{\mathcal{R}}(y)}, \mathcal{I}_{\overline{\mathcal{R}}(y)}, \mathcal{N}_{\overline{\mathcal{R}}(y)}\right\rangle / z \in [y]\mathcal{R}, y \in \mathcal{U}\}$.

iii. $B_N(S)$=$\underline{N}(S) - \overline{N}(S)$.
where $\mathcal{M}_{\underline{\mathcal{R}}(y)} = \wedge_{z\in[y]\mathcal{R}} \mathcal{M}_S(z)$, $\mathcal{I}_{\underline{\mathcal{R}}(y)} = \wedge_{z\in[y]\mathcal{R}} \mathcal{I}_S(z)$, $\mathcal{N}_{\underline{\mathcal{R}}(y)} = \vee_{z\in[y]\mathcal{R}} \mathcal{N}_S(z)$, $\mathcal{M}_{\overline{\mathcal{R}}(y)} = \vee_{z\in[y]\mathcal{R}} \mathcal{M}_S(z)$, $\mathcal{I}_{\overline{\mathcal{R}}(y)} = \vee_{z\in[y]\mathcal{R}} \mathcal{I}_S(z)$, $\mathcal{N}_{\overline{\mathcal{R}}(y)} = \wedge_{z\in[y]\mathcal{R}} \mathcal{N}_S(z)$.

Definition 2.5 (6)**.** Let A be a neutrosophic set in a neutrosophic nano topological space (X, τ). Then

i. $\mathcal{N}_N int(A) = \bigcup\{\mathcal{G} | \mathcal{G}$ is a neutrosophic nano open set in (X, τ) and $\mathcal{G} \subseteq A$ is called the neutrosophic nano interior of A.

ii. $\mathcal{N}_N cl(A) = \bigcap\{\mathcal{H} | \mathcal{H}$ is a neutrosophic nano closed set in (X, τ) and $\mathcal{H} \supseteq A$ is called the neutrosophic nano closure of A.

Definition 2.6 (9)**.** A neutrosophic set A in a neutrosophic nano topological space (X, τ) is called,

i. a neutrosophic nano semi-open set if $A \subseteq \mathcal{N}_N cl(\mathcal{N}_N int(A))$.

ii. a neutrosophic nano α-open set if $A \subseteq \mathcal{N}_N int(\mathcal{N}_N cl(\mathcal{N}_N int(A)))$.

iii. a neutrosophic nano pre-open set if $A \subseteq \mathcal{N}_N int(\mathcal{N}_N cl(A))$.

iv. a neutrosophic nano regular-open set if $A = \mathcal{N}_N int(\mathcal{N}_N cl(A))$.

Definition 2.7. A subset A of a space (X, τ) is called

i. a neutrosophic $\alpha g^{\#}\psi$-closed set[8] if $\mathcal{N}\alpha cl(A) \subseteq \mathcal{U}$ whenever $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic $g^{\#}\psi$-open in (X, τ)

ii. a neutrosophic nano semi-generalized closed set[9] if $\mathcal{N}_N scl(A) \subseteq \mathcal{U}$ whenever $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano semi-open in (X, τ),

iii. a neutrosophic nano ψ-closed set[9] if $\mathcal{N}_N scl(A) \subseteq \mathcal{U}$ whenever $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano sg-open in (X, τ),

3 Basic Properties of $N_{N-\alpha g^{\#}\psi}$-closed sets

Definition 3.1. A subset A of (X, τ) is called

i. a neutrosophic nano $g^{\#}\psi$-closed set if $\mathcal{N}_N\psi cl(A) \subseteq \mathcal{U}$ whenever $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano ψ-open in (X, τ).

ii. a $N_{N-\alpha g^{\#}\psi}$-closed set if $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$ whenever $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open in (X, τ).

Theorem 3.2. *Every neutrosophic nano closed set is $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open in (X, τ). Since A is neutrosophic nano closed set, then $\mathcal{N}_N cl(A) = A$. But $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{N}_N cl(A)$, then $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. Hence A is $N_{N-\alpha g^{\#}\psi}$-closed.

Theorem 3.3. *Every neutrosophic nano regular-closed set is $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open in (X, τ). Since A is neutrosophic nano regular-closed set, then $\mathcal{N}_N rcl(A) = A$. But $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{N}_N rcl(A)$, then $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. Hence A is $N_{N-\alpha g^{\#}\psi}$-closed.

Theorem 3.4. *Every neutrosophic nano α-closed set is $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open in (X, τ). Since A is neutrosophic nano α-closed set, then $\mathcal{N}_N\alpha cl(A) = A$. But $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. Hence A is $N_{N-\alpha g^{\#}\psi}$-closed.

Theorem 3.5. *Every $N_{N-\alpha g^{\#}\psi}$-closed set is neutrosophic nano sg-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano semi-open in (X, τ). Since every neutrosophic nano semi-open set is neutrosophic nano $g^{\#}\psi$-open, $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open. Since A is $N_{N-\alpha g^{\#}\psi}$-closed, $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. But $\mathcal{N}_N scl(A) \subseteq \mathcal{N}_N\alpha cl(A)$, then $\mathcal{N}_N scl(A) \subseteq \mathcal{U}$. Therefore, A is neutrosophic nano sg-closed.

Theorem 3.6. *Every $N_{N-\alpha g^{\#}\psi}$-closed set is neutrosophic nano ψ-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano sg-open in (X, τ). Since every neutrosophic nano sg-open set is neutrosophic nano $g^{\#}\psi$-open, $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open. Since A is $N_{N-\alpha g^{\#}\psi}$-closed, $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. But $\mathcal{N}_N scl(A) \subseteq \mathcal{N}_N\alpha cl(A)$, then $\mathcal{N}_N scl(A) \subseteq \mathcal{U}$. Therefore, A is neutrosophic nano ψ-closed.

Theorem 3.7. *Every $N_{N-\alpha g^{\#}\psi}$-closed set is neutrosophic nano $g^{\#}\psi$-closed set.*

Proof: Let $A \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano ψ-open in (X, τ). Since every neutrosophic nano ψ-open set is neutrosophic nano $g^{\#}\psi$-open, $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open. Since A is $N_{N-\alpha g^{\#}\psi}$-closed, $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. But $\mathcal{N}_N\psi cl(A) \subseteq \mathcal{N}_N\alpha cl(A)$, then $\mathcal{N}_N\psi cl(A) \subseteq \mathcal{U}$. Therefore, A is neutrosophic nano $g^{\#}\psi$-closed.

Remark 3.8. The reverse implication of the above theorems is not true as shown in the following example.

Example 3.9. Assume $\mathcal{U} = \{p, q, r\}$ be the universe set and the equivalence relation is $\mathcal{U}/\mathcal{R} = \{\{p, r\}, \{r\}\}$. Let
$\mathcal{A} = \{\langle p, (0.4, 0.4, 0.3)\rangle, \langle q, (0.3, 0.4, 0.2)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$
be a neutrosophic nano subset of $\mathcal{U}$. Then
$\underline{N}(\mathcal{A}) = \{\langle p, (0.3, 0.4, 0.3)\rangle, \langle q, (0.3, 0.4, 0.3)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$

$\overline{N}(\mathcal{A}) = \{\langle p, (0.4, 0.4, 0.2)\rangle, \langle q, (0.4, 0.4, 0.2)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$
$\mathcal{B}(\mathcal{A}) = \{\langle p, (0.2, 0.4, 0.4)\rangle, \langle q, (0.2, 0.4, 0.4)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$
N_r-closed set=
$D_1 = \{\langle p, (0.3, 0.4, 0.3)\rangle, \langle q, (0.3, 0.4, 0.3)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$
neutrosophic nano α-closed set=
$D_2 = \{\langle p, (0.3, 0.4, 0.3)\rangle, \langle q, (0.3, 0.4, 0.3)\rangle, \langle r, (0.4, 0.3, 0.4)\rangle\}$
neutrosophic nano sg-closed set=
$D_3 = \{\langle p, (0.2, 0.3, 0.4)\rangle, \langle q, (0.2, 0.3, 0.4)\rangle, \langle r, (0.3, 0.2, 0.4)\rangle\}$
neutrosophic nano ψ-closed set=
$D_4 = \{\langle p, (0.2, 0.2, 0.2)\rangle, \langle q, (0.2, 0.2, 0.2)\rangle, \langle r, (0.3, 0.2, 0.4)\rangle\}$
neutrosophic nano $g^{\#}\psi$-closed set=
$D_5 = \{\langle p, (0.2, 0.1, 0.3)\rangle, \langle q, (0.2, 0.2, 0.3)\rangle, \langle r, (0.3, 0.2, 0.4)\rangle\}$
$N_{N-\alpha g^{\#}\psi}$-closed set=$D_6 = \{\langle p, (0.2, 0.1, 0.4)\rangle, \langle q, (0.2, 0.2, 0.4)\rangle, \langle r, (0.3, 0.2, 0.4)\rangle\}$
Let $\tau = \{0_N, \underline{N}(\mathcal{A}), \overline{N}(\mathcal{A}), \mathcal{B}(\mathcal{A}), 1_N\}$. Here $(D_5)^c$ is neutrosophic nano $g^{\#}\psi$-open set, $N\alpha cl(D_6) \subseteq (D_5)^c$. Then D_6 is $N_{N-\alpha g^{\#}\psi}$-closed set in $(X, \mathcal{T})$ but not neutrosophic closed set, N_r-closed set and neutrosophic nano α-closed set.
Here D_3, D_4 and D_5 are neutrosophic nano sg-closed set, neutrosophic nano ψ-closed set and neutrosophic nano $g^{\#}\psi$-closed set respectively. But not $N_{N-\alpha g^{\#}\psi}$-closed set because $N\alpha cl(D_3) \nsubseteq (D_5)^c$, $N\alpha cl(D_4) \nsubseteq (D_5)^c$ and $N\alpha cl(D_5) \nsubseteq (D_5)^c$.

Theorem 3.10. *Intersection of two $N_{N-\alpha g^{\#}\psi}$-closed sets in (X, τ) is again $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let A and B be the subsets of $N_{N-\alpha g^{\#}\psi}$-closed sets, $A \subseteq \mathcal{U}$ and $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$, $B \subseteq \mathcal{U}$ and $\mathcal{N}_N\alpha cl(B) \subseteq \mathcal{U}$, $\mathcal{U}$ is a neutrosophic nano $g^{\#}\psi$-open. Therefore, $A \cap B \subseteq A$ and $\alpha cl(A \cap B) \subseteq \alpha cl(A)$, $A \cap B \subseteq B$ and $\alpha cl(A \cap B) \subseteq \mathcal{N}_N\alpha cl(B)$. Hence $\mathcal{N}_N\alpha cl(A \cap B) \subseteq \mathcal{U}$ and $\mathcal{U}$ is a neutrosophic nano $g^{\#}\psi$-open. Thus $A \cap B$ is $N_{N-\alpha g^{\#}\psi}$-closed set.

Theorem 3.11. *Union of two $N_{N-\alpha g^{\#}\psi}$-closed sets in (X, τ) is again $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let A and B be the subsets of $N_{N-\alpha g^{\#}\psi}$-closed sets, $A \subseteq \mathcal{U}$ and $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$, $B \subseteq \mathcal{U}$ and $\mathcal{N}_N\alpha cl(B) \subseteq \mathcal{U}$, $\mathcal{U}$is a neutrosophic nano $g^{\#}\psi$-open. Therefore, $A \cup B \subseteq \mathcal{U}$ and $\mathcal{N}_N\alpha cl(A \cup B) = \mathcal{N}_N\alpha cl(A) \cup \mathcal{N}_N\alpha cl(B) \subseteq \mathcal{U}$. That is $\mathcal{N}_N\alpha cl(A \cup B) \subseteq \mathcal{U}$. Therefore, $A \cup B$ is $N_{N-\alpha g^{\#}\psi}$-closed set.

Theorem 3.12. *If a set A is $N_{N-\alpha g^{\#}\psi}$-closed in (X, τ) iff $\mathcal{N}_N\alpha cl(A) - A$ contains no non-empty neutrosophic nano $g^{\#}\psi$-closed set.*

Proof: Necessity: Let $\mathcal{F}$ be a neutrosophic nano $g^{\#}\psi$-closed in (X, τ) such that $\mathcal{F} \subseteq \mathcal{N}_N\alpha cl(A) - A$. Then $\mathcal{F} \subseteq X - A$. This implies $A \subseteq X - \mathcal{F}$. Now $X - \mathcal{F}$ is neutrosophic nano $g^{\#}\psi$-open set of (X, τ) such that $A \subseteq X - \mathcal{F}$. Since A is $N_{N-\alpha g^{\#}\psi}$-closed set then $\mathcal{N}_N\alpha cl(A) \subseteq X - \mathcal{F}$. Thus $\mathcal{F} \subseteq X - \mathcal{N}_N\alpha cl(A)$. Now $\mathcal{F} \subseteq \mathcal{N}_N\alpha cl(A) \cap (X - \mathcal{N}_N\alpha cl(A)) = 0_N$.
Sufficiency: Assume that $\mathcal{N}_N\alpha cl(A) - A$ contains no non-empty neutrosophic nano $g^{\#}\psi$-closed set. Let $A \subseteq \mathcal{U}, \mathcal{U}$ is $N_{g^{\#}\psi}$-open set. Suppose that $\mathcal{N}_N\alpha cl(A)$ is not contained in $\mathcal{U}$ then $\mathcal{N}_N\alpha cl(A) \cap \mathcal{U}^c$ is a non-empty neutrosophic nano $g^{\#}\psi$-closed set of $\mathcal{N}_N\alpha cl(A) - A$, which is a contradiction. Therefore, $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$ and hence A is $N_{N-\alpha g^{\#}\psi}$-closed.

Theorem 3.13. *If a subset A is $N_{N-\alpha g^{\#}\psi}$-closed and $A \subseteq B \subseteq N_{N\alpha cl(A)}$, then B is $N_{N-\alpha g^{\#}\psi}$-closed set.*

Proof: Let $B \subseteq \mathcal{U}, \mathcal{U}$ is a neutrosophic nano $g^{\#}\psi$-open, then $A \subseteq B$ and $A \subseteq \mathcal{U}$. Since A is $N_{N-\alpha g^{\#}\psi}$-closed, $\mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$ but $B \subseteq \mathcal{N}_N\alpha cl(A)$ this implies that $\mathcal{N}_N\alpha cl(B) \subseteq \mathcal{N}_N\alpha cl(A)$. Therefore, $\mathcal{N}_N\alpha cl(B) \subseteq \mathcal{N}_N\alpha cl(A) \subseteq \mathcal{U}$. Thus $\mathcal{N}_N\alpha cl(B) \subseteq \mathcal{U}$ and $\mathcal{U}$ is neutrosophic nano $g^{\#}\psi$-open. Hence B is $N_{N-\alpha g^{\#}\psi}$-closed.

Conclusion

In this article the new concept of $N_{N-\alpha g^{\#}\psi}$-closed sets is introduced in neutrosophic nano topological spaces. Furthermore, the work was extended as its basic properties.

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