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Neutrosophic Bipolar Semi α Interior And Bipolar Neutrosophic Semi α Closure

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In this study, we examined the fundamental features of neutrosophic bipolar semi α interior and closure in open and closed sets, a new concept of neutrosophic bipolar semi α open and closure and its interior is defined on neutrosophic bipolar topological spaces. Additionally, we introduce and examine some of the basic features of neutrosophic bipolar semi α interior and neutrosophic bipolar semi α closure.

Keywords: BipolarNeutrosophic semi α open sets (BNSOα), Bip-olar neutrosophic semi α closed sets, bi-polar neutrosophic semi α interior and neu-trosophic bipolar semi α closure.

1. Introduction

The term "neutrophic" refers to a set that consists of three elements the probability that mens truth will occur in the first place, the numerical value with indeterminacy in the second place, and the probability that the numerical value will not occur in the third place. Bipolar represents six numerical values, three of which are positive and the remaining three of which are negative. Any value's total always falls between -3 and +3. Now let's talk about toplogical space. It is a set made up of a collection of opensets that satisfies the requirements of orbitrary union and finite intesection, both of which require that the set be non empty. In the topological space, a neutrosophic closed bipolar set (abbreviated NCBS) is known as a neutrosophic complenent bipolar open set (abbreviated NCBOS).

Neutrosophic probability developed by many research schlors for defining, Neutrosophic set, and neutrosophy open Set and closed sets theory together with basic probability in neutrosophic theory given by [14, 16, 18, 19]. Set of all topological spaces in neutrosophic topological space has been studied by many authors [5, 9, 10, 12] given different theorems from basic defination to new developments. The logical part of this theory given and explained in real time applications in different fields like Philosophical Neutrosophic Logic intraduced by [6, 8, 11]. Neutrosophy basic definition in general topology with different collection of certain different concepts and its roles in neutrosophic topological and bipolar spaces that are neutrosophic in nature intraduced by [7, 13, 15, 17].

Different approaches to explaine Generalized closed sets and open sets with different propositions and example given a brief information of locally compact and locally bouded through a main impact of more features of neutrosophic theoryin generalise cases studied by [31, 32, 33, 34,35].The term Topological space in Neutrosophic Pre open and Pre closed sets to gether with this Neutrosophic αgs into different sets and properties like connected and compacteness Irresolute with in Maps of glory in nature and Neutrosophic αgs with the conditions Continuity of collection of sets and topological Neutrosophic space and Neutrosophic sets was intraduced by several authors in the field of may applications in real world given by [25, 26, 27, 28, 29, 30]. The Systems and indeterminency Sets of bipolar Neutrosophics theory with this regards some new type of neutrosophic semi closed and semi open sets in topological spaces with different properties and some propositions has been given by [20, 21, 22, 23, 24].

The idea of neutrosophic topological space, or NTS for short was introduced by A.A. Salamanand S.A. Alblowi [1]. G.B. Navalagi [4] introduced the concept of semi open sets in topological spaces in 2000. F.Smarandache introduced the idea of "neutrosophicset" [2, 3]. This paper aims to introduce the notion of neutrosophic semi α open sets and investigate their basic characteristics in neutrosophic topological spaces. Additionally, we introduce and derive some of the features of neutrosophic semi α interior and semi α closure.

For a neutro sophic set bipolar $\Im$ in a neutrosophic topological bipolar space($\Im$, $\perp$),$N\mathrm{B}cl(\Im)$, $\mathrm{B}N\mathrm{in}t(\Im)$ and $\Im^{c}$ denote the neutrosophic closure bipolar of $\Im$, the neutrosophic bipolar interior of $\Im$ and the neutros-ophic complement bipolar of $\Im$ respectively.

2. Preliminaries

Definition2.1:

A neutrosophic bipolar topological space ($\aleph, \ni$) is said to have a bipolar neutrosophic subset Υ as follows:

(i) If $\Upsilon \subseteq \mathrm{B}N\mathrm{in}t(\mathrm{B}Ncl(\mathcal{A}))$, a BN pre-openset (abbreviated NBPOS) [7].In ($\aleph, \ni$), the complement of an NBPOS is referred to as a BN pre closed set (abbreviated NBPCS). NBPO ($\aleph, \ni$) (resp.NBPC ($\aleph, \ni$)) represents the collection of all NBPOS(resp.NBPCS).

(ii) If $\mathrm{B}Ncl(N\mathrm{in}t(\mathcal{A})) \approx$ NBSOS, a NBS open set (abbreviated NBSOS)[6]. NB semi closed set (abbreviated NBSCS) is the complement of an NBSOS in (Σ, T).NBSO (resp. NBSC) represents the collection of all NBSOS (resp. NBSCS)

(iii) If $\kappa \subseteq \mathrm{B}N\mathrm{in}t(\mathrm{B}Ncl(\mathrm{B}N\mathrm{in}t(\kappa))$ then a NB α open set (abbreviated NBαOS)[5]. A BN α closed set, or short NBαCS, is the complement of an NBαOS in (Σ, T). NBαO (resp. NBα C (Σ)) represents the family of all NBαOS (resp. NBαCS) of Σ.

Definition2.2:
(i) The $\cup$ of all NBPOS included in κ is the NB pre-interior of a BSN set $\aleph$ of a BTSN & it is represented byPNBin$t$(κ)[7].
(ii) The$\cup$of all NBSOS included in $\mathcal{A}$ is the BN semi interior of a NBS κ of a SNBT ($\aleph, \ni$), and it is representedas$S$BNin$t$(κ)[6].
(iii) The $\cup$ of all NBαOS included in ρ is the BN α interior of a NB set $\mathcal{A}$ of a SN ($\aleph, \ni$), and it is represented as αBNin$t$(κ)[5].

Definition2.3:
(i) The orbitrary $\cap$ of NBPCS that involves Υ is the NB pre closure of a BSN $\aleph$ of a NBTS, & it is denoted as SBNcl(Υ)[7].
(ii) The $\cap$of all NBSCS that contain X is the NBS closure of a SBN of a SBN, and it is represented by SBNcl($\aleph$)[6].
(iii) The $\cap$of all NBαCS that contain $\aleph$ is the BNα closure of a BSN X of a STBN ($\wedge, \kappa$), and it is represented by αBNcl(X)[5].

Proposition2.4:
The following propositions are valid in a neutrosophic bipolar topological space (α,T), and theirequivalenceisfalse:
(i) an NBαOS (resp.NBαCS) is each and $\forall$ NBOS (resp.NBCS).
(ii) a NBSOS is a resp.NBSCS, for $\forall$ NBαOS (resp.NBαCS).
(iii) a NBPOS (resp.NBPCS) is formed by $\forall$ NBαOS (resp.NBαCS).

Proposition2.5: In a BTSN($\wedge, \kappa$), a BN sub set $\mathcal{A}$ is an NBαOS.
if both $\hbar$ and NBPOS are NBSOS.

Lemma2.6: (i) Considering that $\aleph$ is an NB O S, SBNcl(Υ)=BNin$t$(BNcl((X))).
(ii) BNin$t$(BNcl(X))= BNcl(BNin$t$(BNcl((X))) if (X) is a SBN of a NBTS($\wedge, \kappa$).
Proof: This is evident from both the proposition (2.4) and definition (2.1).

3. Neutrosophic bipolar Semi α Interior and bipolar Neutrosophic Semi α Closure
Now we will discuss about the interior bipolar neutrosophic semi bip-olar α closure and its properties

Definition3.1: The $\bigcup$ NTBSα BOS in a neutrosophic bipolar topological space(α , X) involves$\Im$is said to be bipolar neutrosophic semi α interior of $\Im$and is denoted by B$S\alpha$ BNin$t$($\Im$), B$S\alpha$ NGBin$t$(X)=∪{ $\Lambda : \Lambda \subseteq$ X , $\mathscr{B}$ is a BNSα OBS}.

Definition3.2: The $\bigcap$BNBSα BCnS in a neutrosophic bipolar topological space (α, X) associated with a new $\Im$ is called bipolar neutrosophic bipolar semi α closure of $\aleph$ and is given by $S\alpha$BNcl(X), SBα Ncl($\Im$)=$\bigcap$ { X : X $\subseteq \alpha$, X is a BNSBα CBS}.

Proposition.3.3: Assume α be any BNS in a TNBS (α, X), the following properties are trivial,

a) $S\alpha N$Bint(Λ) = X iff $\in$ is a BNNS $O\ \alpha$ S.
b) SNBcl ($\in$) = Λ iff $\in$ is a NBNSCα S.
c) BSNint($\in$) is the supet set BNBSα OS which embeded in SBGα NYcl($\mathcal{A}$) is the subset wit less elements NSBSα CRS enclosing X.

Proof: The testimony is straightforward.

Proposition3.4: Assume α be any BNS in a TNBS (α , X), the following properties are trivial:

A. B$S\alpha$ SB$Nint$(N, X) =Bα N($S\alpha$ BNcl(X)),
B. SBα BSNcl(BNX)=$N\alpha$ B(B$S\alpha$ Nint(X)).

Proof:(A) By description, SBVα Ncl($\mathcal{A}$)=$\bigcap$ {α : X $\subseteq \in$, $\in$ is a BNBSα CBS}
N($S\Xi$ BVNcl($\mathcal{A}$))=BS$N\bigcap${α : X $\subseteq \alpha$,$\mathscr{B}$ is a NBNSα BCS}=$\bigcup${SvNB: X $\subseteq \alpha$, X is a BNS α CS}
=$\bigcup${α : X $\subseteq \alpha$ BNX, $\propto$ is a BSα OBS}=NSBα Nint(NB X).
The substantiation of B is analogous like (A).

Theorem3.5: Choose κ & ρ be any two TNBS (X , $\in$).Then below Statements are true:

(i) SNB-Nint(N)= BN, SGBNint(BN)=$\approx$BN.
(ii) BNint(α)$\subseteq \alpha$.
(iii) $\alpha \subseteq$A$\Longrightarrow S$GBNint(α)$\subseteq S \approx N$Bint($\in$).
(iv) $S\propto$BNi nt($\alpha \cap \in$)$\subseteq S$KNBint(α)$\cap S$MBNint($\in$).
(v) SVNBint(K)$\cup S\approx$BNint($\in$)$\subseteq S$PNBint($\alpha \cup \in$).
(vi) SBNint(SVNBint(P))=SBNint($\in$).

Proof: first, second, third, fourth are evident.

Conclusion

In this study, the authors es-tablish a n-ew cla-ss of sets termed n-eutrosophic semi-α -open bi-polar sets, which involve neutrosophic open bipolarα - sets. We provide examples and a brief explanation of the theory behind these sets' fundamental properties in ne-utrosophic bipolar theoretical spaces. Ne-utrosophic bipolar semi-α -open sets are extremely important for the decomposition of compact sets with orbitrary unions and finite intersections of sets in topological spaces possessing bipolar properties such as n-eutrosophic bipolar compactness and connectedness, which are both involved in numerous applications, and bipol-ar neutrosophic connectedness.

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