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View On Neutrosophic Over Topologized Domination Graphs

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Abstract: Neutrosophic over set can deal with the uncertainties related to the information of any decision making problem in real life scenaries, where fuzzy set may fail to handle those uncertainties properly. The study on presented in this "Neutrosophic Over topologized domination graphs" and also classification in different frame are discussed.The idea of $NOver\ Top$-dom set, $NOver\ Top$-minimum dom set, $NOver\ Top$-minimal dom set and $NOver\ Top$-dom number are introduced and necessary examples are established. In any neutrosophic over decision-making problem, the decision maker use the comparision of neutrosophic over number to choose alternative solutions.

Keywords: $NOver\ Top$-dom set, $NOver\ Top$-minimum dom set, $NOver\ Top$-minimal dom set, $NOver\ Top$-dom number.

1 Introduction

The uncertainty theory plays an influential role in handling various real-life models in the field of science and engineering, In the current era, the multi-criteria decision making (MCDM) process has gained much attention by several researchers as it can nicely handle many real-life challenging problems in many front line areas like a financial investment,recruitment polices, clinical diagnosis of disease, design of the complex circuit etc., It is not an overstated fact that the fuzzy set theory plays a very crucial role in decision-making problems, especially when decision-makers work in an uncertain environment. The theories of uncertainty have geared up dramatically after the introduction of the fuzzy set by zadeh[20] and intuitionstic fuzzy set where he introduced the concept of membership function of belongingness. Smarandache[19] manifests the idea of a neutrosophic set. Neutrosophic set considers the truth membership,the indeterminacy membership function, and the falsity membership function simultaneously. Invention of neutrosophic set plays an important impact in science and engineering research domain. In this current epoch, it is generally used in decision making (DM) problem and mathematical modelling. As researchers developed single valued neutrosophic set[18],some types of neutrosophic sets like Over, Under/Off sets etc.,[11], Narmada Devi[14,15] worked on new type of neutrosophic off graph and minimal domination via neutrosophic over graph. Recently chakraborty[5]constructed the theory of pentagonal neutrosophic set.Few otherr research work[6,7,10,11,12,13,17] also published in this field. The concept of topologized graph was introduced by Antoine Vella in 2005 [1]. Antoine Vella extended topology to the topologized graph by the S_1 space and the boundary of every vertex and edges of a graph G. The space is called S_1 space if every singleton in the topological space either open or closed.Chang [8] introduced the concept of the notion of fuzzy topology. Ore [16] introduced the concept of theory of domination of graph. Heynes et. al [9] published the book regarding the concept of fundamental domination on graphs and they worked more concepts on domination on graphs. Annadurai and Bhuvaneswari et. al [3,4] handled the concept of topologized domination in graph and explained some of its properties. In this article, the novel of topologized domination on NOver top graphs are developed and some of its interesting properties are established.

2 Preliminiaries

Definition 2.1. [4] A set $\mathscr{D}$ of vertices of $\mathscr{G}$ is said to be a *topologized domination set* $\mathscr{D}$ if $\mathscr{G}$ is a *topologized graph* and every vertex in $\mathscr{V} - \mathscr{D}$ is adjacent to atleast one vertex of in $\mathscr{D}$.

Definition 2.2. [8] A single values *neutrosophic over set* P is defined as $P = (f, \langle \alpha(\text{f}),\beta(\text{f}),\gamma(\text{f})\rangle, f \in F$ such that there exist some element in P that have atleast one neutrosophic component that is > 1 and no element has Neutrosophic component that are < 0 and $\alpha(\text{f}),\beta(\text{f}),\gamma(\text{f}) \in [0, \Omega]$ where Ω is called *overlimit* such that $0 < 1 < \Omega$.

Definition 2.3. [8] A *NOver graph* $\mathscr{G} = (P, Q)$ is a *Ngraph* on a crisp graph G^* where P is an *neutrosophic vertex over set* on $\mathscr{V}$ and Q is a *neutrosophic edge over set* on $\mathscr{E}$ respectively such that

(i) $\alpha_Q(mn) \leq [\alpha_P(m) \wedge \alpha_P(n)]$

(ii) $\beta_Q(mn) \leq [\beta_P(m) \wedge \beta_P(n)]$

(iii) $\gamma_Q(mn) \geq [\gamma_P(m) \vee \gamma_P(n)]$ for every $mn \in \mathscr{E} \subseteq \mathscr{V} \times \mathscr{V}$.

3 Neutrosophic Over Topologized Domination Graphs

Definition 3.1. A *Nover graph* $\mathscr{G} = (P, Q)$ is called *NOver Top graph* if $\mathscr{G}^*$ satisfy the following condition

(i) every singleton is open or closed in $\mathscr{V}$.

(ii) $\forall f \in \mathscr{F}$, $|\partial(f)| \leq 2$ where $\partial(f)$ is denoted by the boundary of a point x

Definition 3.2. A set $\mathscr{D}$ of nodes of $\mathscr{G}$ is said to be a *NOver Top dom set* in $\mathscr{G}$ if $\mathscr{G}$ is a *NOver Top* graph and every vertex $\mathscr{V} - \mathscr{D}$ is adjacent to atleast one vertex in $\mathscr{D}$ at the degree of truth membership , indeterminacy membership and falsity membership respectively which is belongs to $[0, \Omega]$.

Example 3.1.

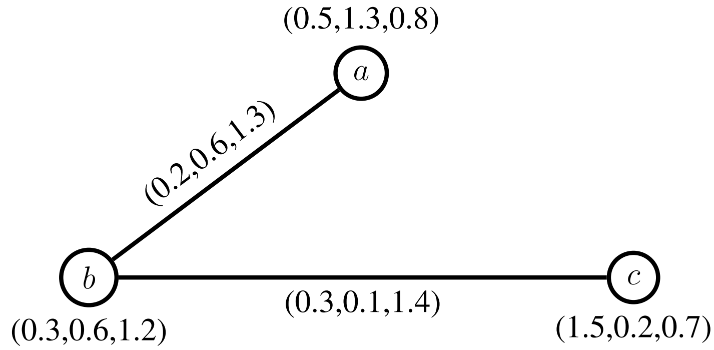


Figure 1: S_3-star graph

Let $\mathscr{F} = \{a, b, c, (0.2, 0.6, 1.3), (0.3, 0.1, 1.4)\}$ be a topological space on $V \cup E$ defined by the topology $\tau = \{\mathscr{F}, \emptyset, \{a\}, \{b, c\}\}$. Here for every $\{f\} \in \mathscr{F}$ is open or closed and $|\partial(v)| \leq 2$.
By the definition of 3.1, $\mathscr{G} = (P, Q)$ is NOver Top graph. Also NOver top dom sets by $\mathscr{D}_1 = \{b\}$ and $\mathscr{D}_2 = \{a, c\}$.

Theorem 3.1. Let $\mathscr{G}$ be a *NOver Top* graph with atmost degree two. If $\mathscr{D}$ is a top dominating set of $\mathscr{G}$, then it is a *NOver Top dominating set* of $\mathscr{G}$.

Proof:

Let $(\mathscr{F}, \tau)$ be a topology on $\mathscr{F} = V \cup E$. Then every singleton set is open or closed and G is a *NOver graph* with atmost degree two. Hence $|\partial(v)| \leq 2$. This implies that $\mathscr{G}$ is *NOver Top graph*. Let $\mathscr{D}$ be top dom set. Then every node in $\mathscr{V} - \mathscr{D}$ is adjacent to atleast one node of $\mathscr{D}$ thus implies that $\mathscr{D}$ is a *NOver Top dom set* of $\mathscr{G}$.

Definition 3.3. A dominating set $\mathscr{D}$ of the *NOver Top graph* $\mathscr{G}$ is said to be a *NOver Top minimal dom set* if for every node in $\mathscr{D}$, $\mathscr{D} - \{v\}$ is not a *NOver Top dom set*. i.e., no proper subset of $\mathscr{D}$ is a *NOver Top dom set*.

Example 3.2. From Example 1, $\{a, c\}$ is *NOver Top minimal dom set* but which is not a *NOver Top dom set*.

Theorem 3.2. Let $\mathscr{G}$ be a *NOver Top graph* with atmost degree two. If $\mathscr{D}$ is a *Top minimum dom set*, then $\mathscr{D}$ is a *Top minimal dom set*.

Proof:

Let $(\mathscr{F}, \tau)$ be a topology on $\mathscr{F} = V \cup E$. Then every singleton set *open or closed* and $\mathscr{G}$ is *NOver graph* with atmost degree two. Hence $|\partial(v)| \leq 2$. Thus implies that $\mathscr{G}$ is *NOver Top graph*. Let $\mathscr{D}$ be a *topologized minimum dom set*. Then every $v \in \mathscr{D}$, $\mathscr{D} - \{v\}$ is not a top dom set which implies that $\mathscr{D}$ is a *NOver Top dom set* of $\mathscr{G}$.

Remark 3.1. The converse of the above theorem need not be true. Every graph need not be a *NOver Top graph*.

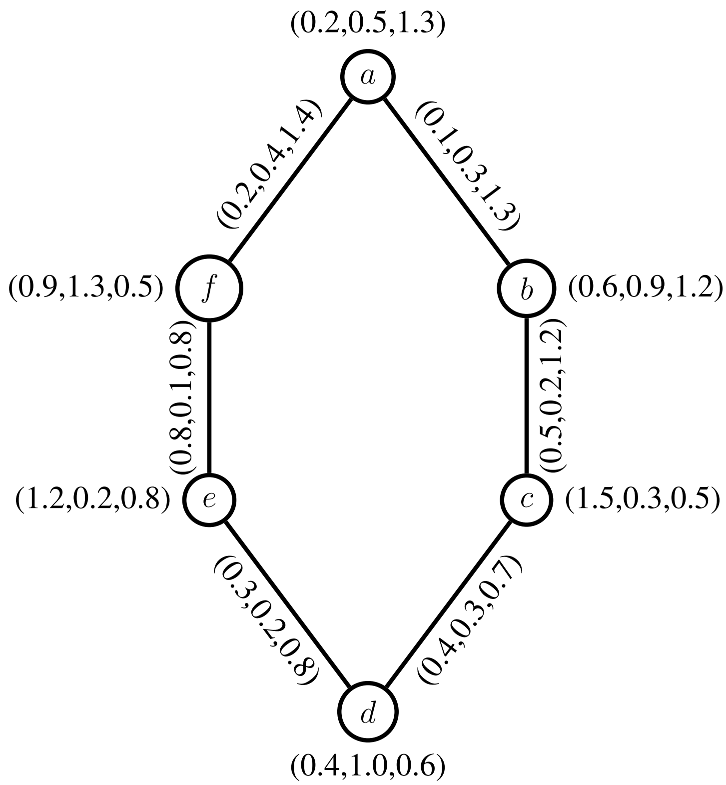
Lemma .1. Let $\mathscr{P}_n$ be a *NOver path* with n nodes which is a *NOver Top graph*. Then the *NOver Top dom number* is $\tau_\gamma(\mathscr{P}_n) \geq \lceil n/3 \rceil$.

Lemma .2. Let $\mathscr{G}$ be a *NOver cycle* with $n-$nodes which is a *NOver Top graph*. Then the *NOver Top dom number* $\tau_\gamma(\mathscr{C}_n) \geq \lceil n/3 \rceil$.

Lemma .3. Let $(\mathscr{K}_n)$ be a *NOver complete graph* with $n-$nodes $(n = 2, 3)$ which is a *NOver Top graph*. Then the *NOver Top dom number* $\tau_\gamma(\mathscr{K}_n) = 1$

4 Some Example For Neutrosophic Over Topologized Domination Graphs

Example 4.1.



Let a, b, c, d, e and f denote the nodes and $(0.1, 0.3, 1.3)$, $(0.5, 0.2, 1.2)$, $(0.4, 0.3, 0.7)$, $(0.3, 0.2, 0.8)$, $(0.8, 0.1, 0.8)$, $(0.2, 0.4, 1.4)$ denote the edges which are labelled $h(0.1, 0.3, 1.3) = \{a, b\}$, $h(0.5, 0.2, 1.2) = \{b, c\}$, $h(0.4, 0.3, 0.7) = \{c, d\}$, $h(0.3, 0.2, 0.8) = \{d, e\}$, $h(0.8, 0.1, 0.8) = \{e, f\}$, $h(0.2, 0.4, 1.4) = \{f, a\}$,

Let $\mathscr{F} = \{a, b, c, d, e, f, (0.1, 0.3, 1.3), (0.5, 0.2, 1.2), (0.4, 0.3, 0.7), (0.3, 0.2, 0.8), (0.8, 0.1, 0.8), (0.2, 0.4, 1.4)\}$ be a topological space defined by the topology

$$\tau = \Big\{\mathscr{F}, \emptyset, \{a\}, \{b, c\}, \{d\}, \{e, f\}, \{a, b, c\}, \{a, d\}, \{a, e, f\}, \{b, c, d\}, \{b, c, e, f\}, \{d, e, f\}, \{a, b, c, d\}, \{a, b, c, e, f\}, \{a, d, e, f\}, \{b, c, d, e, f\}\Big\}$$

Here for every $\{f\} \in \mathscr{F}$ is *open or closed*.

We have $\partial(a) = \{b, f\}$, $\partial(b) = \{a, c\}$, $\partial(c) = \{b, d\}$, $\partial(d) = \{c, e\}$, $\partial(e) = \{f, d\}$ and $\partial(f) = \{a, e\}$ with $|\partial(v_i)| = 2$ where $i = 1, 2, 3, 4, 5, 6$. By the definition of 3.1, $|\partial(v)| \leq 2$.

Hence this graph is a *NOver Top graph*.

Moreover, the *NOver topologized dominating sets* are given by $\mathscr{D} = \{a, d\}$ and the corresponding *NOver sets* for maximum and minimum are given by

	a	b	c	d	e	f
T_A	0.2	0.6	1.5	0.4	1.2	0.9
I_A	0.5	0.9	0.3	1.0	0.2	1.3
F_A	1.3	1.2	0.5	0.6	0.8	0.5

$\cup$	ab	bc	cd	de	ef	fa
T_B	0.6	1.5	1.5	1.2	1.2	0.9
I_B	0.9	0.9	1.0	1.0	1.3	1.3
F_B	1.2	0.5	0.5	0.6	0.5	0.5

$\cap$	ab	bc	cd	de	ef	fa
T_B	0.2	0.6	0.4	0.4	0.9	0.2
I_B	0.5	0.3	0.3	0.2	0.2	0.5
F_B	1.2	1.2	0.6	0.8	0.8	1.3

Therefore this graph is *NOver Top* domination graph.

Example 4.2.

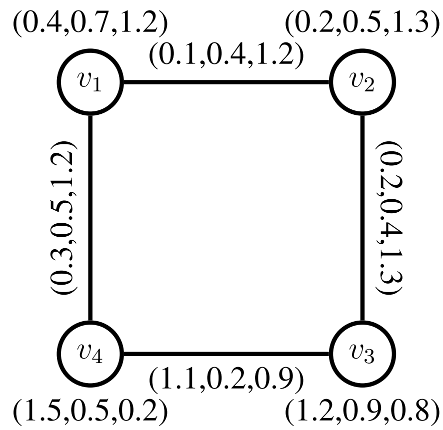


Figure 2: S_3-star graph

Let v_1, v_2, v_3 and v_4 denote the vertices and $(0.1, 0.4, 1.2)$, $(0.2, 0.4, 1.3)$, $(1.1, 0.2, 0.9)$, $(0.3, 0.5, 1.2)$ denote the edges.

Let $\mathscr{F} = \{v_1, v_2, v_3, v_4, (.1, .4, .2), (.3, .5, .4), (.1, .4, .8), (.2, .4, .9)\}$ be a topological space defined by the topology

$$\tau = \Big\{\mathscr{F}, \emptyset, \{v_1\}, \{v_2\}, \{v_3\}, \{v_4\}, \{v_1, v_2\}, \{v_1, v_3\}, \{v_1, v_4\}, \{v_2, v_3\}, \{v_2, v_4\}, \{v_3, v_4\}, \{v_1, v_2, v_3\}, \{v_1, v_2, v_4\}, \{v_2, v_3, v_4\}, \{v_1, v_3, v_4\}\Big\}$$

Here for every$\{f\} \in \mathscr{F}$ is open.

By the definition of Nover Top graph $|\partial(v)| \leq 2$.

We have $\partial(v_1) = \{v_2, v_4\}$, $\partial(v_2) = \{v_1, v_3\}$, $\partial(v_3) = \{v_2, v_4\}$ and $\partial(v_4) = \{v_1, v_3\}$ with $|\partial(v_i)| = 2$ where $i = 1, 2, 3, 4$.

Hence this graph is a Nover Top graph.

Moreover, the Nover topologized dominating sets are given by $D = \{v_1, v_3\}$ and $\{v_2, v_4\}$ and the corresponding neutrosophic over sets for maximum and minimum are given by

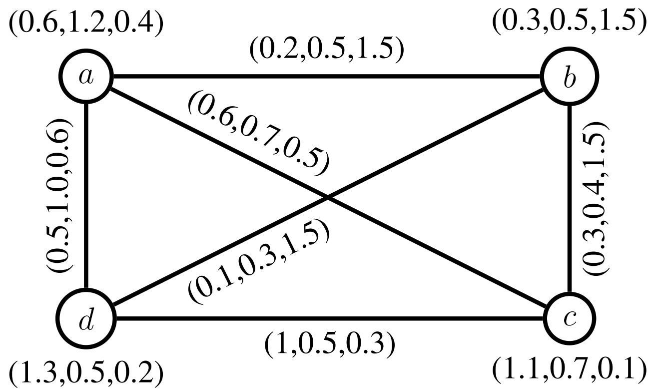
	T_A	I_A	F_A
v_1	0.4	0.7	1.2
v_2	0.2	0.5	1.3
v_3	1.2	0.9	0.8
v_4	1.5	0.5	.2

	v_1v_2	v_2v_3	3 4	4 1	
$T_{v_i \cup v_j} = \max \langle v_i, v_j \rangle$	0.4	1.2	1.5	1.5	$\forall x \in X$
$I_{v_i \cup v_j} = \max \langle v_i, v_j \rangle$	0.7	0.9	0.9	0.7	
$F_{v_i \cup v_j} = \min \langle v_i, v_j \rangle$	1.2	0.8	0.2	0.2	

	v_1v_2	v_2v_3	v_3v_4	v_4v_1	
$T_{v_i \cap v_j} = \min \langle v_i, v_j \rangle$	0.2	0.2	1.2	0.4	$\forall x \in X$
$I_{v_i \cap v_j} = \min \langle v_i, v_j \rangle$	0.5	0.5	0.5	0.5	
$F_{v_i \cap v_j} = \max \langle v_i, v_j \rangle$	1.3	1.3	0.8	1.2	

Hence it is clear that this graph is Nover Top domination graph.

Example 4.3.



Here every singleton sets are minimum dom sets. Clearly the complete graph $\mathscr{K}_4$ is not a *NOver Top graph*. Since $n \geq 4$. Then the dom set need not be a *NOver Top dom set*.

Example 4.4. Let G be a N complete graph K_4 with 4 vertices.

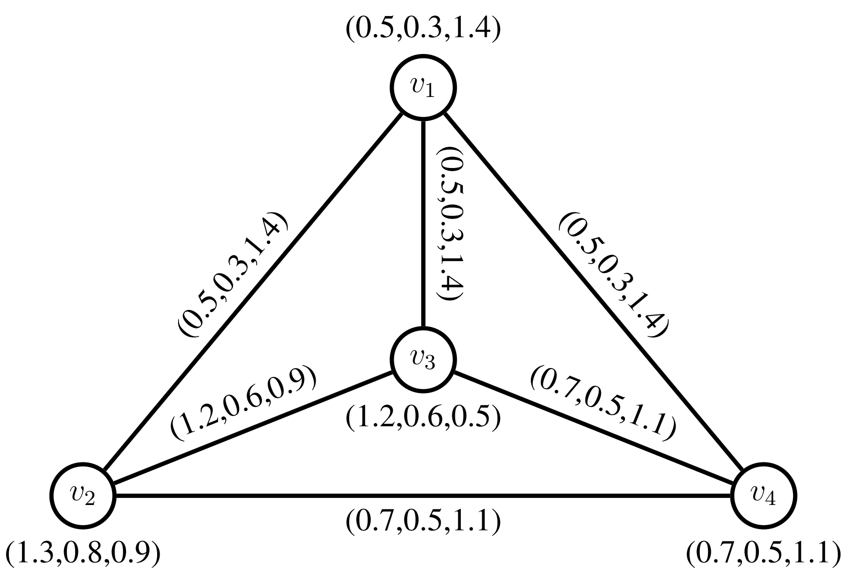


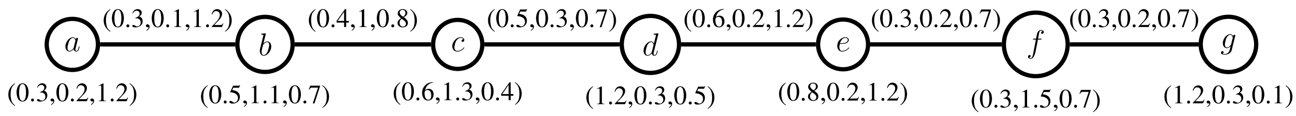
Figure 3: K_4 complete graph

Here every singleton sets are minimum dominating sets. Clearly the complete graph K_4 is not a Nover Top graph, since $n \geq 4$.

Then the a Nover Top dominating set does exits.

Then the dominating sets need not be a Nover Top dominating set.

Example 4.5.



Let a, b, c, d, e, f and g denote the nodes and $(0.3, 0.1, 1.2), (0.4, 1.0, 0.8), (0.5, 0.3, 0.7), (0.6, 0.2, 1.2),$ $, (0.3, 0.2, 0.7)$ denote the edges which are labelled $h(0.3, 0.1, 1.2) = \{a, b\}$, $h(0.4, 1.0, 0.8) = \{b, c\}$, $h(0.5, 0.3, 0.7) = \{c, d\}$, $h(0.6, 0.2, 1.2) = \{d, e\}$, $h(0.3, 0.2, 0.7) = \{e, f\}$, $h(0.3, 0.2, 0.7) = \{f, g\}$,

Let $\mathscr{F} = \{a, b, c, d, e, f, g, (0.3, 0.1, 1.2), (0.4, 1.0, 0.8), (0.5, 0.3, 0.7)(0.6, 0.2, 1.2),(0.3, 0.2, 0.7),$ $(0.3, 0.2, 0.7)\}$ be a topological space defined by the topology

$\tau = \Big\{\mathscr{F}, \emptyset, \{a\}, \{b, c\}, \{d\}, \{e, f\}, \{g\}, \{a, b, c\}, \{a, d\}, \{a, e, f\}, \{a, g\}, \{b, c, d\}, \{b, c, e, f\}, \{b, c, g\},$ $\{d, e, f\}, \{d, g\}, \{e, f, g\}, \{a, b, c, d\}, \{a, b, c, e, f\}, \{a, b, c, g\}, \{a, b, c, e, f\}, \{a, b, c, d, e, f\}, \{a, b, c, d, f\},$ $\{a, b, c, e, f, g\}, \{a, d, e, f\}, \{a, d, f\}, \{a, d, e, f, g\}, \{a, b, c, d, e, f\}, \{a, b, c, d, g\}, \{b, c, d, e, f, g\},$ $\{b, c, d, g\}, \{a, b, c, e, f, g\}, \{d, e, f, g\}, \{b, c, e, f, g\}, \{b, c, d, g\}, \{b, c, d, e, f\}, \{a, e, f, g\},$ $\{a, d, g\}, \{a, d, e, f\}\Big\}$

Here for every $\{f\} \in \mathscr{F}$ is *open or closed* and $|\partial(v)| \leq 2$. So it is a *NOver Top graph.*

	a	b	c	d	e	f	g
T_A	0.3	0.5	0.6	1.2	0.8	0.3	1.2
I_A	0.2	1.1	1.3	0.3	0.2	1.5	0.3
F_A	1.2	0.7	0.4	0.5	1.2	0.7	0.1

Moreover *NOver Top dom sets* are given by $\mathscr{D} = \{a, d, f\}$ and and the corresponding *Nover sets* for maximum and minimum is given by

$\cup$	ab	bc	cd	de	ef	fg
T_B	0.5	0.6	1.2	1.2	0.8	1.2
I_B	1.1	1.3	1.3	0.3	1.5	1.5
F_B	0.7	0.4	0.4	0.5	0.7	0.1

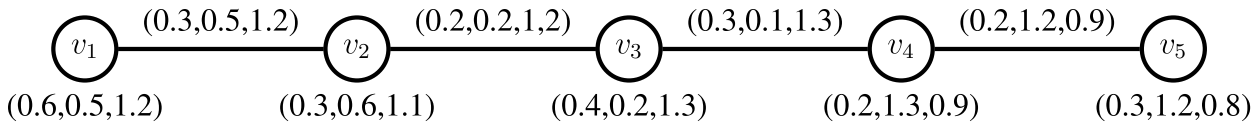
$\cap$	ab	bc	cd	de	ef	fg
T_B	0.3	0.5	0.6	0.8	0.3	0.3
I_B	0.2	1.1	0.3	0.2	0.2	0.3
F_B	1.2	0.7	0.5	1.2	1.2	0.7

The *NOver Top* dom set is $\mathscr{D} = \{a, d, f\}$.

$$\tau_\gamma(\mathscr{P}_7) = \lceil 7/3 \rceil = \lceil 2.333 \rceil > 2.$$

Therefore this graph is *NOver Top dom graph.*

Example 4.6.



Let $\mathscr{F} = \{v_1, v_2, v_3, v_4, v_5, (0.3, 0.5, 1.2), (0.2, 0.2, 1, 2), (0.3, 0.1, 1.3), (0.2, 1.2, 0.9)\}$ be a topological space defined by the topology

$$\tau = \Big\{\mathscr{F}, \emptyset, \{v_1\}, \{v_2\}, \{v_3\}, \{v_4\}, \{v_5\}, \{v_1, v_2\}, \{v_1, v_3\}, \{v_1, v_4\}, \{v_1, v_5\}, \{v_2, v_3\}, \{v_2, v_4\}, \{v_2, v_5\}, \{v_3, v_4\}, \{v_3, v_5\}, \{v_4, v_5\}, \{v_1, v_2, v_3\}, \{v_1, v_2, v_4\}, \{v_1, v_2, v_5\}, \{v_2, v_3, v_4\}, \{v_2, v_3, v_5\}, \{v_3, v_4, v_5\}, \{v_1, v_2, v_3, v_4\}, \{v_1, v_2, v_3, v_5\}\Big\}$$

Here for every $\{f\} \in \mathscr{F}$ is open.

Moreover, the Nover Top dominating sets are given by $D = \{v_2, v_5\}$ and the corresponding neutrosophic over sets for maximum and minimum are given by

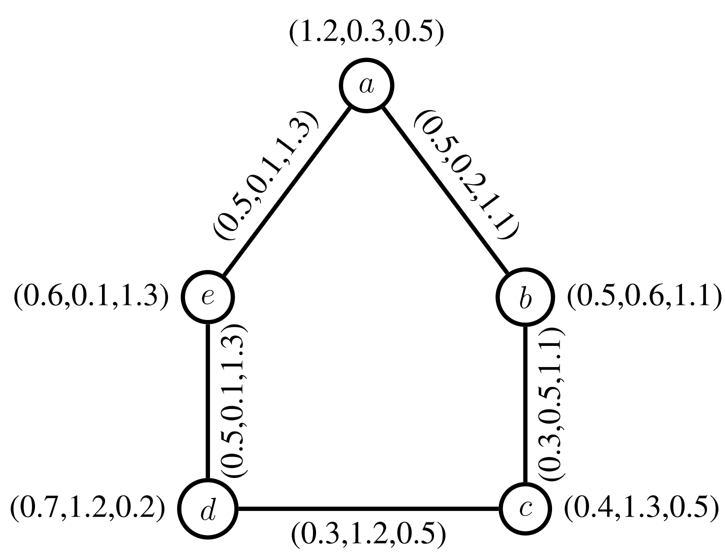
	v_1	v_2	v_3	v_4	v_5
T_A	0.6	0.3	0.4	0.2	0.3
I_A	0.5	0.6	0.2	1.3	1.2
F_A	1.2	1.1	1.3	0.9	0.8

	v_1v_2	v_2v_3	v_3v_4	v_4v_5
T_B(min)	0.3	0.2	0.3	0.2
I_B(min)	0.5	0.2	0.1	1.2
F_B(max)	1.2	1.3	1.3	.9

Hence the dominating set is $D = \{v_2, v_5\}$.

$$\tau_\gamma(P_5) = \lceil 5/3 \rceil = \lceil 1.666 \rceil = 2.$$

Example 4.7.



Let a, b, c, d and e denote the nodes and $(0.5, 0.2, 1.1), (0.3, 0.5, 1.1), (0.3, 1.2, 0.5),$ $(0.5, 0.1, 1.3), (0.5, 0.1, 1.3)$ denote the edges which are labelled $h(0.5, 0.2, 1.1) = \{a, b\}$, $h(0.3, 0.5, 1.1) = \{b, c\}$, $h(0.3, 1.2, 0.5) = \{c, d\}$, $h(0.5, 0.1, 1.3) = \{d, e\}$, $h(0.5, 0.1, 1.3) = \{e, a\}$,

Let $\mathscr{F} = a, b, c, d, e, (0.5, 0.2, 1.1), (0.3, 0.5, 1.1), (0.3, 1.2, 0.5), (0.5, 0.1, 1.3), (0.5, 0.1, 1.3)$ be a topological space defined by the topology

$$\tau = \Big\{\mathscr{F}, \emptyset, \{a\}, \{b\}, \{c\}, \{d\}, \{e\}, \{a, b\}, \{a, c\}, d\}, \{a, e\}, \{b, c\}, \{b, d\}, \{b, e\}, \{c, d\},$$
$$\{c, e\}, \{d, e\}, \{a, b, c\}, \{a, b, d\}, \{a, b, e\}, \{b, c, d\}, \{b, c, e\}, \{c, d, e\}, \{a, b, c, d\}, \{a, b, c, e\}\Big\}$$

Here for every $\{f\} \in \mathscr{F}$ is *open* and $|\partial(v)| \leq 2$. We have $\partial(a) = \{b, e\}$, $\partial(b) = \{a, c\}$, $\partial(c) = \{b, d\}$, $\partial(d) = \{c, e\}$, and $\partial(e) = \{a, d\}$ with $|\partial(v_i)| = 2$ where $i = 1, 2, 3, 4, 5,$.

By the definition of 3.1 this graph is a *NOver Top graph.*

Moreover *NOver Top dom set* is given by $\mathscr{D} = \{b, d\}$ and the corresponding *NOver sets* for maximum and minimum are given by

	a	b	c	d	e
T_A	1.2	0.5	0.4	0.3	0.6
I_A	0.3	0.6	1.3	1.2	0.1
F_A	0.5	1.1	0.5	0.5	1.3

$\cup$	ab	bc	cd	de	ea
T_B	1.2	0.5	0.4	0.6	1.2
I_B	0.6	1.3	1.3	1.2	0.3
F_B	0.5	0.5	0.5	0.5	0.5

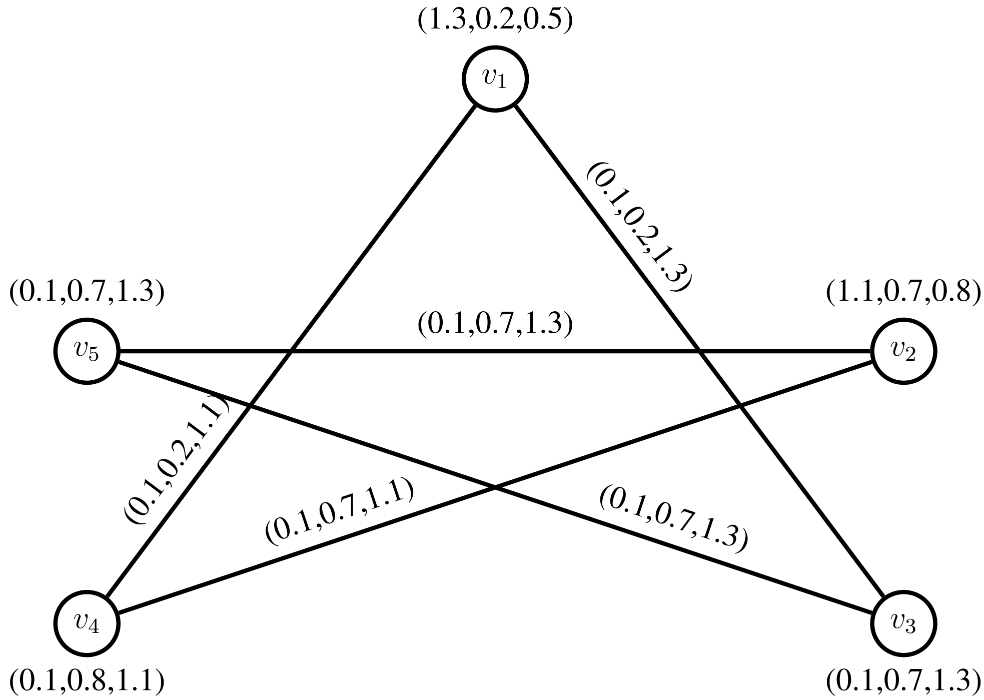
$\cap$	ab	bc	cd	de	ea
T_B	0.5	0.4	0.3	0.3	0.6
I_B	0.3	0.6	1.2	0.1	0.1
F_B	1.1	1.1	0.5	1.3	1.3

The *NOver Top dom set* is $\mathscr{D} = \{b, d\}$.

$$\tau_\gamma(\mathscr{C}_5) = \lceil 5/3 \rceil = \lceil 1.666 \rceil = 2$$

Therefore this graph is *NOver Top dom graph.*

Example 4.8.



Let v_1, v_2, v_3, v_4 and v_5 denote the vertices and $(0.1, 0.2, 0.8)$, $(0.1, 0.7, 1.3)$, $(0.1, 0.7, 1.3)$, $(0.1, 0.7, 1.3)$ and $(0.1, 0.2, 1.3)$ denote the edges which are labelled $h_u(0.1, 0.2, 1.3) = (v_1, v_3)$, $h_u(0.1, 0.7, 1.3) = (v_3, v_5)$, $h_u(0.1, 0.7, 1.3) = (v_5, v_2)$, $h_u(0.1, 0.7, 1.1) = (v_2, v_4)$, $h_u(0.1, 0.2, 1.1) = (v_4, v_1)$.

Let $\mathscr{F} = \{v_1, v_2, v_3, v_4, v_5, (0.1, 0.2, 0.8), (0.1, 0.7, 1.3), (0.1, 0.7, 1.3), (0.1, 0.7, 1.3), (0.1, 0.2, 1.3)\}$ be a topology $\tau = \{\mathscr{F}, \emptyset, \{v_1\}, \{v_2, v_3\}, \{v_1, v_2, v_3\}, \{v_1, v_4, v_5\}, \{v_2, v_3, v_4, v_5\}, \{v_4, v_5\}, \{v_1, v_3, v_4, v_5\}, \{v_3\},$
$\{, v_1, v_4\}, \{v_3, v_4, v_5\}, \{v_4\}, \{v_2\}, \{v_5\}, \{v_2, v_4, v_5\}, \{v_1, v_4\}, \{v_3, v_5\}, \{v_3, v_4, \}, \{v_2, v_3, v_4\},$
$\{v_1, v_2, v_4\}, \{v_1, v_3, v_4\}, \{v_1, v_2, v_4, v_5\}, \{v_2, v_3, v_5\}, \{v_1, v_2, v_3, v_5\}, \{v_2, v_3, v_4, v_1\}, \{v_1, v_5\}$
$, \{v_1, v_3\}, \{v_1, v_2, v_5\}, \{v_2, v_5\}, \}$.

Here for every $\{f\} \in \mathscr{F}$ is open or closed.

By the definition of Nover Top graph, we have $|\partial(V)| \leq 2$ and $\partial(v_1) = (v_3, v_4)$, $\partial(v_2) = (v_5, v_4)$, $\partial(v_3) = (v_1, v_5)$, $\partial(v_4) = (v_1, v_2)$, $\partial(v_5) = (v_2, v_3)$ with $\partial(v_i) = 2$. Hence this graph is Nover Top graph. Moreover *NOver Top dom set* is given by $\mathscr{D} = \{v_1, v_5\}$ and the corresponding *NOver sets* for maximum and minimum are given by

	v_1	v_2	v_3	v_4	v_5
T_A	1.3	1.1	0.1	0.1	0.1
I_A	0.2	0.7	0.7	0.8	0.7
F_A	0.5	0.8	1.3	1.1	1.3

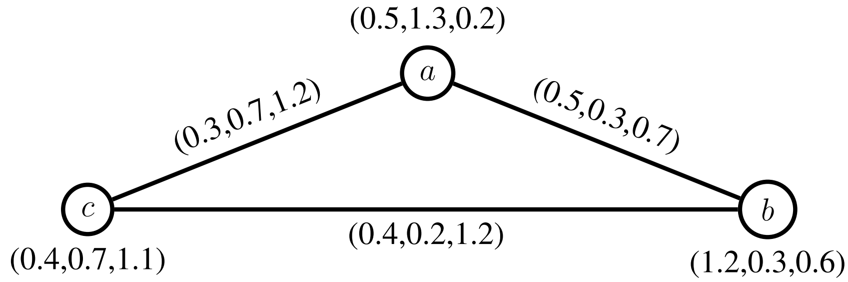
$\cup$	v_1v_3	v_3v_5	v_5v_2	v_2v_4	v_4v_1
T_B	0.1	0.1	0.1	0.1	0.1
I_B	0.2	0.7	0.7	0.7	0.2
F_B	1.3	1.3	1.3	1.3	1.3

The *NOver Top dom set* is $\mathscr{D} = \{v_1, v_5\}$.

$$\tau_\gamma(\mathscr{C}_5) = \lceil 5/3 \rceil = \lceil 1.666 \rceil = 2$$

Therefore this graph is *NOver Top dom graph.*

Example 4.9.

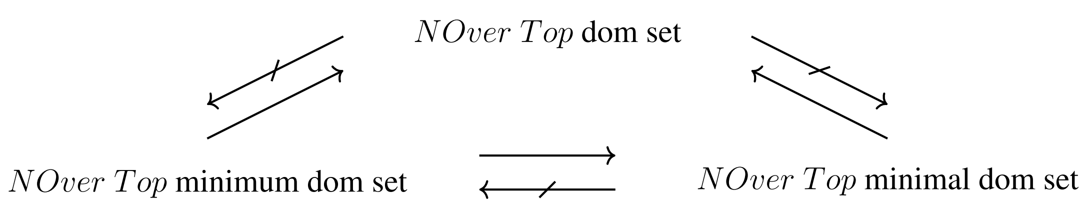


Let a, b and c denote the nodes and $(0.5, 0.3, 0.7), (0.4, 0.2, 1.2), (0.3, 0.7, 1.2)$ denote the edges which are labelled $h(0.5, 0.3, 0.7) = \{a, b\}$, $h(0.4, 0.2, 1.2) = \{b, c\}$, $h(0.3, 0.7, 1.2) = \{c, a\}$,
Let $\mathscr{F} = \{a, b, c, (0.5, 0.3, 0.7), (0.4, 0.2, 1.2), (0.3, 0.7, 1.2)\}$ be a topological space defined by the topology $\tau = \Big\{\mathscr{F}, \emptyset, \{a, b\}, \{c\}\Big\}$. Here for every $\{f\} \in \mathscr{F}$ is *open or closed.*

The definition of *NOver Top graph* $|\partial(v)| \leq 2$. We have $\partial(a) = \{b, c\}$, $\partial(b) = \{c, a\}$, and$\partial(c) = \{a, b\}$, with $|\partial(v_i)| = 2$ where $i = 1, 2, 3$. So this graph is a *NOver Top graph.* The dominating set is $\mathscr{D} = \{b\}$,whose top dom number is given by

$$\tau_\gamma(\mathscr{K}_3) = 1.$$

Remark 4.1. The interrelationship among $NOver\ Top$ dom set as given below



5 Comparision

A neutrosophic set and neutrosophic over set are generalised of Atanassov's intuitionstic fuzzy set which consists of three membership grades: truth membership.indeterminancy membership and false membership. The neutrosophic network is an extension of a vague graph and intuitionstic fuzzy graph which provides more flexibility, more effectively precision, and compatibility to design the real-life problem when compared with the intuitionstic fuzzy graphs. Neutrosophic graph and neutrosophic over graph models are recently using model to many real-life problems in several different areas of engineering and science.

6 Conclusion

This paper has focused on calculating the dominating number of Nover top graph G by using top domination conditions.The top dom condition is introduced in new method to find the domination number.The Nover top domination for some standard Nover graphs such as a path,cycle are specified.The future study can be continued by forming different types of Nover top domination set with various applications.

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