FUZZY DOMINATION OF FUZZY SOFT GRAPH

C.MAHENDRAN[1],R.PREMKUMAR[2],Dr.M.MAHARIN[3],P.MALLIGA[4]

Department of Mathematics
Dhanalakshmi Srinivasan College of
Arts and Science for Women (Autonomous)
Perambalur

ABSTRACT

Fuzzy soft set are presented by creator Molodtsov, which is tackle uncertain issues in the field of differentcultural, environment, economic and Medicinal studies. Graph theory fills in as a numerical framework to speak to double connection and Fuzzy set began with fundamental Article introduced by Zadeh in 1965. Theory of Fuzzy Graphs was presented by AzrielRosenfied in 1975. In spite of the fact that it is youthful it has been becoming quick and has humevous applications in fluctuates fields. The idea of domination in fuzzy graphs are presented by A. Somasundaram. The domination theoryhas been the core of research movement in graph theory as of late. The quickest developing zone inside graph theory is an investigation of domination and related subset issues such covering, independence, decomposition, marking and matching. This research Study gives the idea of Fuzzy graphs domination is presented in an alternate methodology.

Keywords: Fuzzy Graphs, Domination, Fuzzy Soft Graphs, Applications etc.

I. INTRODUCTION

Fuzzy set theory gives important and incredible portrayal of estimation of vulnerabilities, just as dubious ideas communicated in regular dialects. Each crisp set is fuzzy set however every fuzzy set isn't crisp set. The numerical installing of ordinary set theory into fuzzy sets is as normal as implanting the genuine numbers into complex plane. Along these lines the possibility of fluffiness is one of improvement.

Graph theory has enormous applications in numerous genuine issues and numerous regions of science, for example, PC networks, computational neuro - science and science, consolidated issue material science and so forth. By utilizing the standards of graph theory numerous issues in the field of linguistics, economics, pattern recognition, artificial intelligence, network topologies and so on can be displayed and broke down. One of the most intriguing issues with regards to graph theory is that of Domination Theory. These days domination theory positions top among the most conspicuous territories of research in graph theory and combinatorics. The most punctual thoughts of commanding sets are found in the traditional issues of covering chess board with least number of chess pieces. In this Research study, we presented the idea of domination in fuzzy graph. The idea of domination and decides the domination number for a few fuzzy graphs are examined.

II. RELATED SURVEY

Kosko (1993) in his book calls this as Mismatch issue: The world is dim yet science is high contrast. Actually, the fuzzy standard is that "Everything involves degree". In this manner, the membership in a fuzzy set doesn't involve certification or refusal, yet rather a matter of degree. Subsequently, the fundamental logic is the fuzzy logic: A and Not A.

In **Muhammad Akram (2012)** presented the idea of Anti fuzzy structures on graphs and described some fundamental idea of associated anti-fuzzy graph.

Chandrasekaran&NagoorGani(2006) examined domination in fuzzy graph utilizing solid arcs. **Somasundram and Somasundram (1998)** examined domination in fuzzy graphs. They characterized domination utilizing viable edges in fuzzy graphs. **Prasanna Devi &NagoorGani(2013)** examined edge domination and edge independence in fuzzy graphs . **NagoorGani and Vadivel (2011)** examined domination independent domination and irredundance in fuzzy graphs utilizing solid arcs.

Gorai et al. (2015) demonstrated that each item m-polar fuzzy graphs is a m-polar fuzzy graphs They likewise broke down specific tasks like Cartesian item, organization, association, participate in m-polar fuzzy graphs .

R. Muthuraj and A. Sasireka (2017) characterized a few kinds of anti-fuzzy graph. Likewise clarified the idea of domination on anti- fuzzy graphs and anti-cartesian result of anti-fuzzy graph. Domination assumes a fundamental job in graph theory. The domination ideas additionally show up in issues including discovering sets of delegates, in observing correspondence or electrical networks and in land reviewing. Metal and Berge started the investigation of domination set in graphs.

III. PRELIMINARIES

Definition 1: Let Ebe the set of parameters and U be an underlying universe set. Let P(U) means the force set of U . A couple (F, E) is known as a soft set over U where F is a mapping given by$F: E \rightarrow P(U)$.

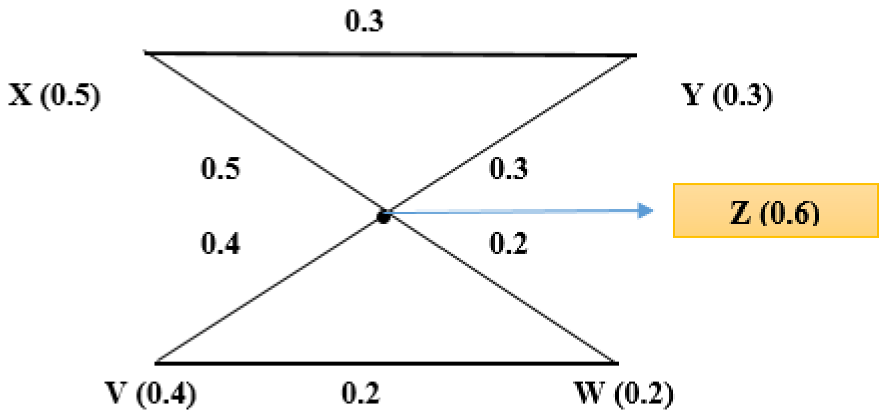
Definition 2: For any $u, v \in V$,on the off chance that u dominates v need not suggest v dominates u. For any $u, v \in V$, if ⍰$(u, v) = \sigma(u)^{A}\, \sigma(v) = \sigma(u) = \sigma(v)$ at that point u dominates v and additionally v dominates u.

Definition 3: Let $G = (\sigma,$ ⍰$)$be a fuzzy graphs A subset D of V is said to be an dominating set of G if for each$v\, V - D$, there exists a u D with the end goal that u dominates v.

Definition 4: Leave G alone a fuzzy graphs without disengaged edges. A subset D of E is said to be an absolute edge dominating set, if each edge in E is dominated by an edge in D. The base fuzzy cardinality of an all-out edge dominating set is known as the all-out edge domination number of G and it is indicated byγ`1 (G)

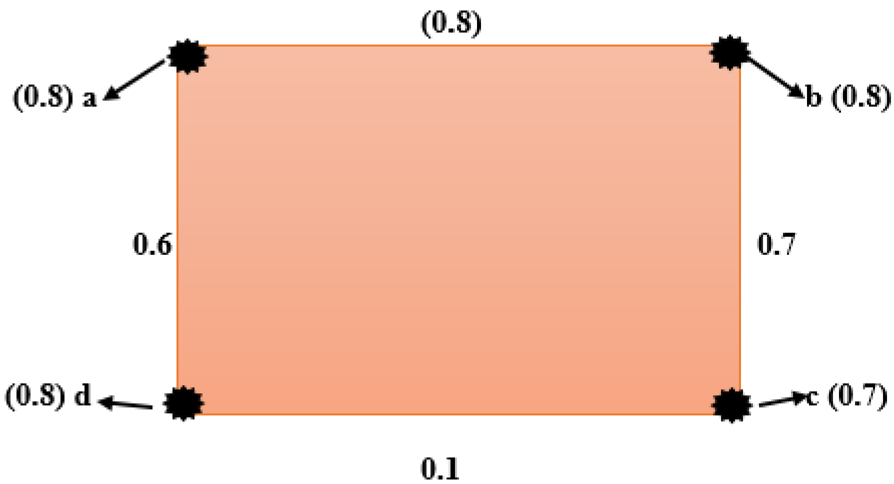
Definition 5: Let $G = (\sigma,$ ⍰$)$be a fuzzy graphs on D and D subseteq E then the fuzzy edge cardinality of D is characterized to be Σ μ (e) where e ∈ D.

Definition 6: An edge dominating set X of a fuzzy graph G is said to be an ideal edge dominating set if each edge of E-X is neighboring precisely one edge in X. The ideal edge dominating set X of a fuzzy graph G is said to be an insignificant impeccable edge dominating set if for each edge $uv \in X, X - (u,v)$is certifiably not an ideal edge dominating set. The cardinality of a base impeccable edge domination set is known as immaculate edge domination number and is signified by



Edge dominating set is given by$\{VW, YZ\}.\gamma\, 0\, (G) = 0.5$.in any case, it's anything but an ideal edge dominating set. The ideal edge dominating set is given by$\{XY, VW\}, \gamma\, (G)$ 0.5.

Definition 7:A D subset of V is known as a 2-dominating set of G if for each hub$v \in V - D$there exist in any event two in number neighbors in D.



(G)

$\{a, c, d\}, \{b, c, d\} and\ \{a, b, c, d,\}$Are 2-dominating sets of the fuzzy graph G.

IV. DOMINATION IN FUZZY AND FUZZY SOFT GRAPHS

Theorem 1: A dominating set D of $FSG, G_{A,V} = ((A, p), (A, \mu)$is a negligible dominating set if and just if for each$d \in D$one of the accompanying conditions holds.

- There is a vertex $v \in V - \{D\} such\ that\ N(u) \cap D = d$
- d is not a solid neighbor of any vertex in D .

Proof: Let's suppose that D is a negligible dominating set of $G_{A,V}$. at that point for each vertex $d \epsilon D, D - \{d\}$is not a dominating set and consequently there exists $v \epsilon V - (D - \{d\})$which isn't overwhelmed by any vertex in $D - \{d\}$.

If $v = d$, weget v is certifiably not a solid neighbor of any vertex in D. On the off chance that $v \neq d, v$is not dominated by $D - \{v\}$, be that as it may, is dominated by D, at that point the vertex v is solid neighbor just to d in D. That is, $N\ (v) \cap D = d$.

Theorem 2: For any fuzzy graph G. $\gamma + \bar{\gamma} = 2p$if and only if $0 < \mu(u,v) < \sigma(u)^A \sigma(v) for\ all\ u, v \in V\ where\ \bar{\gamma}$ is the domination number of $\bar{G}$.

Proof: From the meaning of secluded vertex, $\gamma = p \Leftrightarrow \mu(u,v) < \sigma(u)^A \sigma(v) for\ all\ u, v\ \epsilon\ V\ and\ \bar{\gamma} = p \Leftrightarrow$ ▯ $(u,v) - \sigma(u)^A \sigma\ (v) < \sigma\ (u)^A \sigma\ (v)\ for\ all\ u, v\ V.$

Hence $\gamma + \bar{\gamma} = 2p$if and only if $0 < \mu(u,v) < \sigma(u)^A \sigma(v) for\ all\ u, v\ \in V.$

Remark: For any fuzzy graph, $\gamma + \bar{\gamma} \leq 2p$.

Theorem 3: Each total fuzzy graph G is an ideal dominating set.

Proof: G is a finished fuzzy graph. Along these lines each circular segment in G is solid bend (ie) every vertex V-D is nearby precisely one vertex of the dominating set D in G. Consequently D is an ideal dominating set. In this way, every total fuzzy graph G is an ideal dominating set.

Theorem 4: Assume G be associated fuzzy graph and have n vertices m edges if $n \geq 4, m \geq n\ and\ G$ is not a circuit then $\gamma_c(G) \leq n - 3$

Proof: If G isn't a circuit then T is a crossing fuzzy tree of G. G must have at any rate one vertex V with degree in any event3.

Theorem 5: Let $\widetilde{G_d}$be a d-fuzzy star then the fuzzy edge domination number is given by $\grave{\gamma_f}(\tilde{G}_d) = \frac{1}{n}$.

Proof: Any edge of d-fuzzy star is incident with the vertex v_1 so any edge $(v_1, v_i) for\ i = 2, 3, \ldots. n$is the fuzzy edge dominating set S. i.e., $S = \{(v_1, v_i)\} for\ any\ i = 2, 3, \ldots. n$.

Theorem 6: Let $G_{A,v} = ((A,p), (A,\mu)$be an FSG without detached vertices, and D is a negligible dominating set. At that point $V - D$ is a dominating set of $G_{A,v}$.

Proof: D be an insignificant dominating set. Let v be a any vertex of D. Since $G_{A,v}$has no segregated vertices, there is a vertex $d \in N(v). v$must be dominated by in any event one vertex in D − v that is D − v is a dominating set. By above hypothesis, it follows that $d \in V - D$. in this way every vertex in D is dominated by at least one vertex in $V - D, and\ V - D$ is a dominating set.

Theorem 7: A independent set is a maximal independent set in fuzzy graph and the membership evaluations of all vertices are equivalent if and just on the off chance that it is an independent dominating set.

Proof: Each maximal independent set is an independent dominating set since all the vertices having the membership grades are equivalent. On the other hand, let S be a independent dominating set. Presently we need to show that it is maximal independent set. Assume S is anything but a maximal independent set then there exists a vertex $u \in V - S$ $such\ that$ $S \cup \{u\}$ is an independent set. But if $S \cup \{u\}$ is an independent set, at that point no vertex is nearby u. In this manner S is anything but a dominating set. Its logical inconsistency. Henceforth S is anindependent maximal set.

V. CONCLUSION

The domination idea in graph is extremely rich both in hypothetical turns of events and applications. Hypotheses identified with this idea are inferred and the connection between associated dominating quantities of fuzzy graphs are expressed. Regarding fuzzy graphs standard, we have stated the specific estimation of the 2-domination number.. In this paper, a few outcomes on fuzzy graphs have been alluded and this will be an abridgment for the scientists to evaluate field of fuzzy graph theory.

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