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ENTIRE LITACT DOMINATION IN GRAPHS

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Abstract

Present palimpsest is aimed to put before a diverse domination variant namely entire domination number on the litact graph. we calculated some particular values of the defined variables for the graph families like Wheel, Cycle, Path, Complete, Bi partite graphs etc., Further a set of theorems were proved which includes some relations of the defined parameters in terms of the graph variables like order, size, the extreme values of edge and vertex degree, covering number of vertex and edge, vertex and edge independence number, domination/total/ connected domination number etc. Further the Nordhaus- Gaddum kinds of upshots are too established.

Keywords: Litact Dominating Set, Litact Domination Number, Entire Litact Dominating Set, Entire Litact Domination Number.

1. INTRODUCTION

In this paper palimpsest we used finite nontrivial simple undirected connected graphs. The elucidations adopted in this paper are those used by F. Harary [1] and corresponding definitions can be found in V. R. Kulli [8].

2. PRELIMINARIES

Definition 2.1: Cut vertex: Removing a vertex along with incident edges results in a graph with more components than the original graph then that vertex is said to be a cut vertex

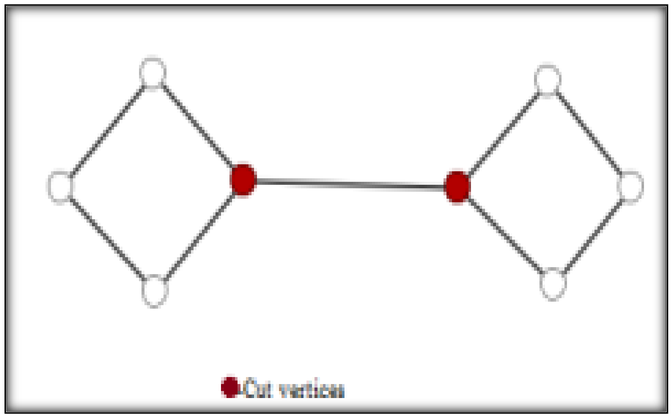

Figure1

Definition 2.2: End vertex: A vertex is said to be an end vertex if vertex of a graph has exactly one edge incident to it.

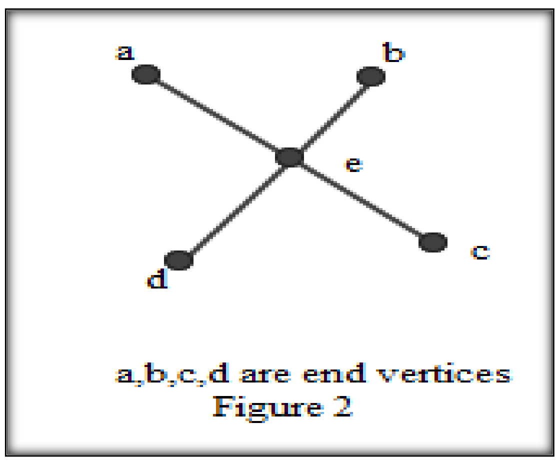

Figure 2

Definition 2.3: Complement: The complement of a graph *G* is a graph *H* on the same vertices such that two different vertices of *H* are connected with an edge if and only if they are not connected with an edge in *G*.

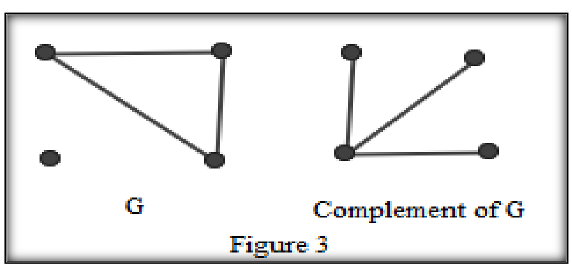

Figure 3

Definition 2.4:Entire litact domination number: A set W of elements in a$litact\ graph$ is said to be an entire dominating set if every element not in W is either adjacent or incident to at least one element in W. Entire litact domination number of G, is denoted by $\gamma_{em}(G)$ and is defined as $\gamma_{em}(G) = min|W|$.

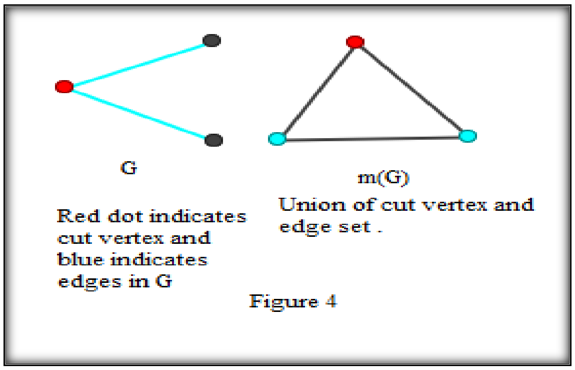

Figure 4

$$\gamma_{\epsilon m}(G) = 1$$

3. RESULTS

For many out of the way consequences we need the following propositions.

Theorem A[8]: For every graph $G, \gamma(G) \leq p - \Delta(G)$.

Theorem B[8]: For every graph G, $\left\lceil \frac{p}{1+\Delta(G)} \right\rceil \leq \gamma(G)$.

Theorem C[8]: For every graph G,$\gamma(G) \leq \beta_0(G)$.

Theorem D[8]: For every graph G, $\alpha_0(G) + \beta_0(G) = p$ and if G has no unhooked vertices, then $\alpha_1(G) + \beta_1(G) = p$.

Theorem E[8]:No isolated vertices in G has$p$ vertices then $\gamma_t(G) \leq p - \Delta(G) + 1$.

Theorem F[2]:For each connected graph G of order p, $\gamma(G) \geq \frac{p}{\Delta(G)+1}$.

Additionally the bound is attained if there will be a minimum dominating set D such that

(1) independent

(2) for any vertex v in $V(G) - D$ there will be a unique vertex w in D such that $N(v) \cap D = \{w\}$

(3) $\deg v = \Delta(G)$for every vertex v in D.

Theorem G[8]:For a connected graph$G$, $\left\lceil \frac{diam(G)+1}{3} \right\rceil \leq \gamma(G)$.

Theorem H[8]: For a connected graph G, $\gamma_c(G) \leq p - \Delta(G)$.

4. THEOREMS

For some standard graphs the following premises are given

Premise4.1: If Cp of order $p \geq 3$then $\gamma_{em}(C_p) = \left\lfloor \frac{p}{3} \right\rfloor + 1$.

Premise4.2: If Pp of order $p \geq 3$ then $\gamma_{em}(P_p) = \begin{cases} p-1, if\ p\ is\ a\ multiple\ of\ 3 \\ p-2, otherwise \end{cases}$

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Premise4.3: If Wp of order $p \geq 4$ then $\gamma_{em}(W_p) = \begin{cases} 7, p \equiv 0(mod7) \\ p-1, otherwise \end{cases}$

Premise4.4: If Kp of order $p \geq 3$ then $\gamma_{em}(K_p) = \begin{cases} 5, p \equiv 0(mod5) \\ p-1, otherwise \end{cases}$

Premise4.5: If $K_{m,n}$ with $p = m + n$then $\gamma_{em}(K_{m,n}) = \left\lfloor \frac{p}{3} \right\rfloor + 1$.

Premise4.6: If $K_{1,p}$ order $p \geq 3$then $\gamma_{em}(K_{1,p}) = \left\lfloor \frac{p}{3} \right\rfloor + 1$.

Succeeding theorem relates the parameters$\gamma(G), \gamma'(G) \& \gamma_{em}(G)$

Theorem 4.1: For each graph G with $p \geq 3$ vertices

(i) $\gamma(G) \leq \gamma_{em}(G)$
(ii) $\gamma'(G) \leq \gamma_{em}(G)$
(iii) $\gamma(G) + \gamma'(G) \leq 2\gamma_{em}(G)$.

Proof: Let X be a minimum entire litact dominating set of $m(G)$. Then $D = \{u \in V, \text{for each } uv \in X\} \cup \{X \cap V\}$forms a dominating set of G. Then by the dominating set definition,

We have$|D| \leq |X|$

Thus $\gamma(G) \leq \gamma_{em}(G)$-------------------(1)

A dominating set $F = \{uv \in E, \text{for each } u \in X\} \cup (X \cap E)inG$. Then by the edge dominating set definition,

we have$|F| \leq |X|$

Thus $\gamma'(G) \leq \gamma_{em}(G)$-------------------(2)

From (1) and (2) we get $\gamma(G) + \gamma'(G) \leq 2\gamma_{em}(G)$.

Next theorem we relates p, deg(v) and entire litact domination number.

Theorem 4.2: For every graph G, $\gamma_{\epsilon m}(G) < p + \left\lfloor \frac{\Delta(G)}{2} \right\rfloor$.

Proof: Let $A = \{v_1, v_2, v_3, \dots \dots \dots v_n\}$ be the set of vertices in$G$ with $\deg(v_i) \geq 2$ that is $|A| = p$. Let v be a vertex of degree $\Delta(G)$.Let X be a minimal entire litact dominating set and $y \in X$. Then y is either a beside vertex or edge to at least one vertexin $(V \cup E) - X$, otherwise y is either a beside vertex or edge to an vertex in X itself. The minimal cardinality of an entire litact dominating set of $m(G)$ is $\gamma_{em}(G)$ that is $|X| = \gamma_{em}(G)$. Clearly$|X| < |A| + \left\lfloor \frac{\Delta(G)}{2} \right\rfloor$.Thus $\gamma_{em}(G) < p + \left\lfloor \frac{\Delta(G)}{2} \right\rfloor$.

Next succeeding theorem relates about$p, q$and $\gamma_{em}(G)$.

Theorem 4.3: For any connected graph G of order $p \geq 3, \gamma_{em}(G) > \left\lfloor \frac{p+q}{3} \right\rfloor$.

Proof: Let vertex set be $A = \{v_1, v_2, v_3, \dots \dots \dots v_n\}andB = \{e_1, e_2 \dots \dots . . e_n\}$ be edge set in G. Let X be the set of elements in $m(G)$ is said to be an entire litact dominating set if every

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element not in X is either a beside vertex or edge to at least one vertex in X. The minimal cardinality of entire litact dominating set of $m(G)$ is $\gamma_{em}(G)$ that is $|X| = \gamma_{em}(G)$. Clearly$|X| > \left\lfloor\frac{A+B}{3}\right\rfloor$ .Thus $\gamma_{em}(G) > \left\lfloor\frac{p+q}{3}\right\rfloor$.

In the succeeding corollary we get bounds for entire litact domination number.

Corollary 4.1: For any graph G, $\left\lfloor\frac{p+q}{3}\right\rfloor < \gamma_{em}(G) < p + \left\lfloor\frac{\Delta(G)}{2}\right\rfloor$.

Proof: We can obtain the result by using theorem 4.2 and theorem 4.3

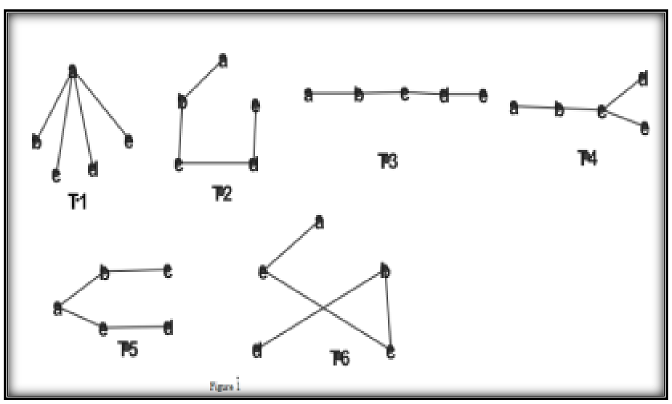
In the next theorem we relates $\gamma_{em}(G)$& p

Theorem 4.4: For any graph G with $p \geq 3$ vertices,$\gamma_{em}(G) < \left\lfloor\frac{4p}{3}\right\rfloor + 2$.

Proof: By using mathematical induction on p we can prove our outcome. We divide the natural numbers p into 3 classes. (i) $p \equiv 0(mod3)$ (ii) $p \equiv 1(mod3)$ (iii) $p \equiv 2(mod3)$.

Suppose $p = 3,4,5$. Then inequality holds.

Assume the outcome is true for all connected graphs with $p \geq 3$ vertices in $m(G)$. Let $m(G_1)$ be any connected graph with $p + 4$ vertices so that order of $m(G)$ and $m(G_1)$ belong to the same class and the order $m(G_1)$is the next natural number in the class. Let a, b, c, d and e be five vertices of $m(G)$, such that$\langle\{a, b, c, d, e\}\rangle$ is connected. Then $a,\ b,\ c,\ d$ and e are in the spanning tree T of $m(G_1)$ and T has one of the following as a subgraph.



Case 1: Suppose T contains T_1 as a subgraph. Then $X \cup \{a, ad\}$ is an entire litact dominating set in G.

Case 2: Suppose T contains T_2 as a subgraph. Then $X \cup \{e, c\}$ is an entire litact dominating set in G.

Case 3: Suppose T contains T_3 as a subgraph. Then $X \cup \{b, d\}$ is an entire litact dominating set in G.

Case 4: Suppose T contains T_4 as a subgraph. Then $X \cup \{b, c\}$ is an entire litact dominating set in G.

Case 5: Suppose T contains T_5 as a subgraph. Then $X \cup \{b, e\}$ is an entire litact dominating set in G.

Case 6: Suppose T contains T_6 as a subgraph. Then $X \cup \{b, e\}$ is an entire litact dominating set in G.

From all these cases,

we have $\gamma_{em}(G_1) < |X| + 2 < \left\lfloor \frac{4p}{3} \right\rfloor + 2$

It is clear that $\gamma_{em}(G) < \left\lfloor \frac{4p}{3} \right\rfloor + 2$

This completes the proof.

In the following corollary we get bounds for entire litact domination number.

Corollary 4.2: For any graph G, $\left\lfloor \frac{p+q}{3} \right\rfloor < \gamma_{em}(G) < \left\lfloor \frac{4p}{3} \right\rfloor + 2$.

Proof: We can get the result $\left\lfloor \frac{p+q}{3} \right\rfloor < \gamma_{em}(G) < \left\lfloor \frac{4p}{3} \right\rfloor$ + 2 by using theorems 4.3 & 4.4

In the succeeding theorem we relates entire litact domination number for trees ,p, end vertices, cut vertices.

Theorem 4.5: If T is a tree of order $p \geq 3$, then $(i)\gamma_{em}(T) \leq 2(s+1)(ii)\gamma_{em}(T) \leq p - e + 5$

Proof: Suppose T is a tree of order $p \geq 3$. Then T has not less than one cut vertex .Let the cut vertex set be Cin$T$ that is $|C| = s$&e be the end vertices of T. Then for every end vertex $u, S \cup \{u\}$ is a entire dominating set in$m(T)$.

Thus $\gamma_{\epsilon m}(G) \leq 2|C \cup \{u\}| \leq 2(|C| + 1)$.Hence $\gamma_{\epsilon m}(T) \leq 2(s+1)$

If e is the number of end vertices in Tthen $s = p - e$.

Thus from the above inequality, we have $\gamma_{em}(T) \leq p - e + 5$

For all standard graphs with $p \geq 3$ vertices achieve this upper bound.

In the next theorem we relates $\gamma_{em}(T), p$ & $\Delta(T)$

Theorem 4.6: If T is a tree of order $p \geq 3$, then $\gamma_{em}(T) \leq p - \Delta(T) + 5$.

Proof: Let tree$T$ is of order $p \geq 3$ then by Theorem 4.5 we possess$\gamma_{em}(T) \leq p - e + 5$.

Since $e \leq \Delta(T)$, $\gamma_{em}(T) \leq p - \Delta(T) + 5$.

Succeeding theorem relates with $\gamma_{em}(T), p$

Theorem 4.7: For every graph G,$\gamma_{em}(G) < 2p - 1$.

Proof: Let edge set be$E = \{e_1, e_2, \dots \dots .. e_n\}$& cut vertex set be $C = \{c_1, c_2, \dots \dots \dots c_n\}$ in G such that $E \cup C \subseteq V(m(G))$. Let minimal entire dominating set be X_1 in $m(G), X_2 \subseteq (V \cup E) - X_1$ in $m(G)$ and $X_2 \in N(X_1)$ then $|X_1 \cup X_2| = |V \cup E| < 2p$

Hence$|X_1 \cup X_2| < 2p$.......................... (1)

Since $1 \leq |X_2|$

$\Longrightarrow$ 1+$|X_1| < |X_2| + |X_1|$

$\Longrightarrow$ $|X_1| < |X_1 \cup X_2| - 1$

$\Longrightarrow$ $|X_1| < 2p - 1$

$\therefore \gamma_{em}(G) < 2p - 1$.

Next corollary relates with $\gamma(G), \gamma_{\epsilon m}(G), p, \Delta(G)$

Corollary 4.3: For a graph $G, \gamma(G) + \gamma_{em}(G) < 3p - \Delta(G) - 1$

Proof: We can get the result $\gamma(G) + \gamma_{em}(G) < 3p - \Delta(G) - 1$ by the addition of theorems A &4.7

Next corollary relates with $\gamma_c, \gamma_{em}(G), p, \Delta(G)$

Corollary 4.4: For each graph $G, \gamma_c(G) + \gamma_{em}(G) < 3p - \Delta(G) - 1$

Proof: We can get the result $\gamma_c(G) + \gamma_{em}(G) < 3p - \Delta(G) - 1$ by adding theorems H &4.7.

In the following theorem we relates $\gamma_{em}(G), \alpha_0(G) \& \beta_0(G)$

Theorem 4.8: For a graph $G, \gamma_{em}(G) < \alpha_0(G) + \beta_0(G) + 1$

Proof: Let minimum set of vertices be$A = \{v_1, v_2, v_3, \dots \dots \dots v_i\}$that enfolds every single one of the edges in G such that $|A| = \alpha_0(G)$ and maximal vertex set be $B = \{v_1, v_2, v_3, \dots \dots \dots v_j\}$ which are not adjacent to each other such that $|B| = \beta_0(G)$. In (G) , let minimal dominating set be X in $m(G)$ and $y \in X$. Then y is either beside vertex or edge at least one element in $(V \cup E) - X$, otherwise y is either beside vertex or edge to an element in X itself. Then X itself forms a $\gamma_{em}(G) - set$. Clearly $|D| < |A| + |B| + 1$.Thus $\gamma_{em}(G) < \alpha_0(G) + \beta_0(G) + 1$.

Next corollary relates with $\gamma_{em}(T), p$

Corollary 4.5: For any graph G,$\gamma_{em}(G) < p + 1$.

Proof: By using theorems D &4.8 we can get $\gamma_{em}(G) < p + 1$ and also it satisfies $\gamma_{em}(G) < \alpha_1(G) + \beta_1(G) + 1$

Next theorem relates with $\gamma_{em}(G), \alpha_0(G) \& \gamma(G)$

Corollary 4.6: In a graph G,$\gamma_{em}(G) < \alpha_0(G) + \gamma(G) + 1$.

Proof: We can get the outcome $\gamma_{em}(G) < \alpha_0(G) + \gamma(G) + 1$ by subtracting Theorem 4.8 from Theorem C.

Ensuing theorem relates with $q, \Delta'(G) \& \gamma_{em}(G)$.

Theorem 4.9: For each graph $G, \left\lfloor \frac{q}{\Delta'(G)+1} \right\rfloor < \gamma_{em}(G)$.

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Proof: Suppose edge set be $E = \{e_i/1 \leq i \leq n\}$ such that $|E(G)| = q$ and $\Delta'(G)$ be the maximum degree of an edge in G. Suppose minimal dominating set be $X \subseteq (V \cup E)$ in $m(G)$ then X itself forms a $\gamma_{em}(G) - set$.

Then $|X|\Delta'(G) < \left|E\big(m(G)\big)\right| - |X|$

$$|X|\Delta'(G) + |X| < |E(m(G))|$$

$|X|(\Delta'(G) + 1) < |E(m(G))|$------------ (1)

By definition of litact graph $E(G) \cup C(G) = V(m(G))$

We get $|X|(\Delta'(G) + 1) > E(G) = q$------------- (2)

From (1) and (2)

$$|E(m(G))| > |X|(\Delta'(G) + 1) > E(G) = |X|(\Delta'(G) + 1) > q$$

$$|X| > \left\lfloor \frac{q}{\Delta'(G) + 1} \right\rfloor$$

Thus $\left\lfloor \frac{q}{\Delta'(G)+1} \right\rfloor < \gamma_{em}(G)$.

Succeeding theorem interrelates with the parameters$diam(G), \gamma(G), \alpha_0(G), \gamma_c(G)$&$\gamma_{em}(G)$

Theorem 4.10**:** In a connected graph G,$\left\lfloor \frac{\gamma_{em}(G)+\gamma_c(G)}{2} \right\rfloor < diam(G) + \gamma(G) + \alpha_0(G)$.

Proof: Let minimal vertex set be $A \subseteq V(G)$that enfolds every single one of the edges in G such that $|A| = \alpha_0(G)$. Further there will be an edge set $E \subseteq E'$ where $E'$is the edge setthat are incident with the vertices of V establishing the lengthy path in Gin such a way that $|E| = diam(G)$. Let minimal dominating set be$S = \{v_1, v_2, v_3, \dots \dots \dots v_n\} \subseteq V(G)$in G. Let$\langle S' \rangle$be connected subgraph, then S itself is a $\gamma_c - set$.Or else there will be at least a vertex $x \in V(G) - S'$ and S''=$S' \cup \{x\}$ forms a connected minimal dominating set in G. Now in $m(G)$, let X be a minimal dominating set in $m(G)$ and $y \in X$.Then$y$ is either adjacent or incident to at least one element in $(V \cup E) - X$, otherwise y is either adjacent or incident to an element in X itself. Then X itself forms a $\gamma_{em}(G) - set$.Clearly $\frac{|X| \cup |S''|}{2} < |E| \cup |A| \cup |S'|$. Thus $\left\lfloor \frac{\gamma_{em}(G)+\gamma_c(G)}{2} \right\rfloor < diam(G) + \gamma(G) + \alpha_0(G)$.

Next corollary we interrelates $diam(G), \gamma_c(G)$&$\gamma_{em}(G)$

Corollary 4.7: For every graph, $\left\lfloor \frac{\gamma_c(G)-\gamma_{em}(G)}{2} \right\rfloor < diam(G) + 1$.

Proof: we can get the result by subtracting corollary 4.6 from Theorem 4.9.

Ensuing theorem relates with the parameters$p, q, \delta(G)$&$\gamma_{em}(G)$

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Theorem 4.11: For any graph $G, \gamma_{em}(G) < p + \left\lfloor \frac{2q}{\delta(G)} \right\rfloor$

Proof: Let the vertex set and edge set be$p$ and $q$in$G$separately, $\delta(G)$ be the minimum degree in$G$. Let X be an entire dominating set in $m(G)$ and $y \in X$. Then y is either adjacent or incident to at least one element in $(V \cup E) - X$, otherwise y is either adjacent or incident to an element in X itself. That is $\gamma_{em}(G) = |X|$. Each element $V - X$ is neighbouring with at least $\delta(G)$in X. This implies that $2q > |V - X|\delta(G)$

$$\left\lfloor \frac{2q}{\delta(G)} \right\rfloor > |V - X|$$

$$p + |V - X| < p + \left\lfloor \frac{2q}{\delta(G)} \right\rfloor \text{--------(1)}$$

Clearly $|X| < p + |V - X|$-------(2)

From (1) and (2) $|X| < p + |V - X| < p + \left\lfloor \frac{2q}{\delta(G)} \right\rfloor$

$$|X| < p + \left\lfloor \frac{2q}{\delta(G)} \right\rfloor$$

$$\gamma_{em}(G) < p + \left\lfloor \frac{2q}{\delta(G)} \right\rfloor$$

Ensuing theorem relates with $p, q, \Delta(G) \& \gamma_{em}(G)$

Theorem 4.12: For any graph $G, \gamma_{em}(G) \geq \left\lfloor \frac{p+q}{2\Delta(G)+1} \right\rfloor$.

Proof: Proof follows from Theorem F. If there will be a minimum entire dominating set X satisfies entire independent set,then for every element x in $(V \cup E) - X$ there is an element y in X such that $n(x) \cap X = \{y\} \& |n(x)| = 2\Delta(G)$ the bound is attained. This can be verified in figure.

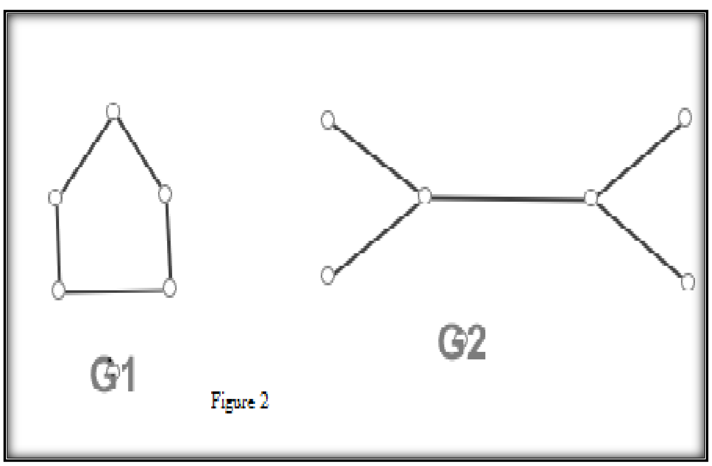

Figure 2

The following result involving the diameter of G gives a lower bound for $\gamma_{em}(G)$

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Theorem 4.13: In a graph $G,\left\lceil\frac{diam(G)+1}{3}\right\rceil \leq \gamma_{em}(G)$.

Proof: Let X be a $\gamma_{em}(G)-$ set in$G$. Consider an arbitrary path of length $diam(G)$. This diameteral path induces utmost two edges from the $\langle N[x]\rangle$ for each $x \in X$. Furthermore, X is a $\gamma_{em}(G)-set$ thediameteral path involves utmost$\gamma_{\epsilon m}(G)-1$ edges unite the vicinity of vertices in X. Hence $diam(G) \leq 2\gamma_{em}(G)+\gamma_{em}(G)-1$. Thus$\left\lceil\frac{diam(G)+1}{3}\right\rceil \leq \gamma_{em}(G)$.

Succeeding corollary relates with$\gamma(G)$&$\gamma_{em}(G)$

Corollary 4.8: In a graph$G$, $\gamma(G) \leq \gamma_{em}(G)$.

Proof: by subtracting Theorem H from Theorem 4.13 we get $\gamma(G) \leq \gamma_{em}(G)$.

In the succeeding corollary we obtain a relation for $diam(G), \gamma(G)$&$\gamma_{em}(G)$

Corollary 4.9: For any Graph $G, diam(G) \leq \left\lceil\frac{3\left(\gamma(G)+\gamma_{em}(G)\right)}{2}\right\rceil - 1$

Proof: We can get the result by adding theorems H &4.13.

In the succeeding theorem we obtain a relation for $\gamma_t(G), \beta_0(G), \beta_1(G)$&$\gamma_{em}(G)$

Theorem 4.14: For each graph G, $\gamma_{em}(G) < \gamma_t(G)+\beta_0(G)+\beta_1(G)$.

Proof: Let the maximum vertex set be $U=\{u_1,u_2,\dots\dots..u_m\} \subseteq V(G)$ such that $dist(u,v) \geq 2$ and $N(u) \cap N(v) = x, \forall u,v \in U$ and $x \in V(G)-U$.Clearly$|U|=\beta_0(G)$. $U'=\{u'_1,u'_2,\dots\dots..u'_m\} \subseteq E(G)$is the maximum edge set in such a way that $dist(u',v') \geq 1$. Implies that $|U'|=\beta_1(G)$.Let the minimal vertex set be $V'=\{v_1,v_2,\dots\dots..v_m\} \subseteq V(G)-U$ that enfolds every single one of the vertices in G. Let$\langle V'\rangle$be the subgraph with no isolated vertices, then V'forms$\gamma_t(G)$-set. Otherwise, there will be at least one vertex $w \in N(V')$ such that $V' \cup \{w\}$ forms a dominating set which is minimal. Let X be a entire dominating set in $m(G)$ and $y \in X$. Then y is either adjacent or incident to at least one element in $(V \cup E)-X$, otherwise y is either adjacent or incident to an element in X itself. That is $\gamma_{em}(G)=|X|$. It follows that $\gamma_{em}(G) < \gamma_t(G)+\beta_0(G)+\beta_1(G)$.

Nordhaus-Gaddumkind outcomes:

Theorem 4.15: For every graph G,

i)$\gamma_{em}(G)+\gamma_{em}(\bar{G}) < 2p$ ii)$\gamma_{em}(G).\gamma_{em}(\bar{G}) < 2p$

CONCLUSION

This article introduces a strange domination parameter on the litact graph for stated graphs. The estimations of standard graphs and several general graphs were acquired. In addition, a range of outcomes were found in the guise of boundaries affixing the contemporary variables to multiple graph variants. Because domination theory occupies many fields of Science and Engineering and its application has been studied by many researchers who have made the domination field as research area, the present work is worthy of study.

References

1) F. Harary, Graph theory, Adison Wesley, Reading mass, 1972.

2) H. B. Walikar, B. D. Acharya and E. Sampath Kumar, Recent Developments in the Theory of Domination in Graphs. MRI Lecture Notes in Math.1(1979).

3) T. W. Haynes, S.T. Hedetniemi and P.J. Slater, Fundamentals of domination in graph, New York, Marcel Dekker, Inc.,1998.

4) T. W. Haynes, S.T. Hedetniemi and P.J. Slater, Domination in graph, Advanced Topics, New York, Marcel Dekker, Inc.,1998.

5) V. R. Kulli, On entire domination number, Second Conf. Ramanujan Math.Soc., Madras (1987)

6) V. R. Kulli, S. C. Sigarkanti and N. D. Soner, Entire domination in graphs. In V. R. Kulli, editor, Advances in Graph Theory, Vishwa International Publications, Gulbarga (1991) 237-243.

7) V. R. Kulli and S. C. Sigarkanti, Connected entire domination in graphs, Technical Report, 9201 Dept. Math. Gulbarga University, Gulbarga, India (1992).

8) V. R. Kulli, Theory of Domination in Graphs, Vishwa Inter. Publ. Gulbarga (2010), India.

9) V. R. Kulli and S. C. Sigarkanti, Total entire domination in graphs. In V. R. Kulli, editor, Advances in Domination Theory I, Vishwa International Publications, Gulbarga (2012) 53-62.

10) V. R. Kulli, Edge entire domination in graphs, International Journal of Mathematical Archive-5(10), 2014.