

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Excellent Domination in WhatsApp Group Chat Network

M.Raji

Assistant Professor, Department of Mathematics, Vels Institute of Science, Technolgy and Advanced Studies, Pallavaram, Chennai-600117, India.

ABSTRACT:

Social network analysis examines social structures through the application of graph theory and networks. Graph theory is vital for social network analysis, which explores the dynamics and structure of social networks to comprehend information flow, community building and social interactions. This Paper describes Excellent Domination in WhatsApp group chat network by complete graph.

Keywords: Complete graph, Excellent Domination, Social Network.

1. Introduction

Graph theory depicts associated and activities as graphs, establishing an essential structure for the study of complex networks across a selection of domains. A graph is a type of mathematical structure that connects a collection of vertices to show relationships between objects. Generating a pairwise connection between all the individuals in certain types is what it does. A graph **G** is represented as $\mathbf{G} = (\mathbf{V}, \mathbf{E})$. A graph is regarded to be *complete* when every pair of vertices is connected by an edge. A *network* is a set of vertices connected by the relationships(edges). A set **D** of vertices in a graph $\mathbf{G} = (\mathbf{V}, \mathbf{E})$ is called a *dominating set* of **G** if every vertex in $\mathbf{V} - \mathbf{D}$ is adjacent to some vertex in **D**. A dominating set **D** is said to be *Minimum dominating set* if **D** consist of minimum number of vertices among the all-dominating sets [1,2,3]. A vertex of a graph **G** is good if it is contained in some $\gamma(\mathbf{G}) - \mathbf{set}$, and *bad* if it is not. A graph **G** is said to be *excellent* if every vertex of **G** is good [4,5,6]. Social Network analysis is the process of investigating and evaluating system of society. It is employed to determine and assess the network's organizational features. Measuring the connections and flows of groups, organizations, and other interrelated units is essential [7,8,9,10].

Excellent Domination in WhatsApp Group Chat Network

This section gives Excellent Domination in WhatsApp group chat network. Individuals or organizations(vertices) connected by one or more kind of relationships(edges) form a social network. A *complete graph*, as used in social networks, would indicate that every individual person is directly connected to every other one: that is, everyone knows, communicates with or watches everyone in it. Each member is a vertex in the WhatsApp group chat network model, which can be described as a finite graph with connections between members (discussions or messages) being as edges. Graph theory can be applied to WhatsApp group chat model in the following ways:

- Each member is a vertex.
- An edge exists between two members if they are both in a group chat.
- Undirected graph where each member in a WhatsApp group can communicate with every other member, forming a complete subgraph within in the group.
- No isolated vertices.

So, A WhatsApp group with its member might form a complete graph, where each member is connected to every other member in that group. Small networks can be visualized directly, but larger networks are harder to visualize and describe. To investigate how information circulates among users, a network analysis might be employed. For example, how fast a message goes viral in a group.Let us take a real-life scenario. There are three friends in a hostel room. Their names are Arjun, Babu and Charan. They belong to different departments in the college but staying same room in the hostel. They form a WhatsApp group for sharing their communication.

For graph model, Arjun(A), Babu(B) and Charan(C) are vertices.

Here every vertex is connected by every other vertex.

So, this graph is complete.



For domination concept, Arjun is a roommate of both Babu and Charan.

Vertex A is adjacent with vertices B and C.

Vertex A dominates the whole graph.

Similarly, Babu is a roommate of both Charan and Arjun.

Vertex B is adjacent with vertices C and A.

Vertex B dominates the whole graph and then

Charan is a roommate of both Arjun and Babu.

Vertex C is adjacent with vertices A and B.

Vertex C dominates the whole graph.

Therefore, in complete graph K_3 , every vertex is a dominating vertex.

Proposition

Let $G_{whatsapp}$ be an undirected finite connected graph with WhatsApp group chat Network, then this graph $G_{whatsapp}$ is Excellent. Proof.

Let $G_{whatsapp}$ be an undirected finite connected graph.

Without loss of generality, Assume that each member as a vertex and communication between members as an edge.

Let V be a vertex set with v_i vertices and E be an edge set with e_i edges in the graph $G_{whatsapp}$.

Since the graph $G_{whatsapp}$ has no isolated vertices, Each and every vertex in the graph $G_{whatsapp}$ has an adjacency by interactions.

Therefore, every vertex in the graph $G_{whatsapp}$ is a dominating vertex.

From this, every vertex is good. (By definition)

Hence, it can be concluded that the graph $G_{whatsapp}$ is Excellent.

Conclusion

Social networks provide significant information into how individuals connect, shape, and organize themselves when represented as graphs. Graph theory is a necessity in modern social science, business, health, and technology, and it has been used to model global communication while comprehending connections with others. This Paper obtains Excellent Domination in WhatsApp group chat network by complete graph.

REFERENCES

- 1. S. Arumugam (2014), Invitation to Graph Theory, Scitech Publications (India) Pvt Ltd, ISBN:139788187328469.
- 2. Frank Harary (1971), Graph Theory, Addison-Wilsey.
- 3. J.A.Bondy and U.S.R.Murty(1976), Graph Theory with Applications, Elsevier Science Publishing Co., Inc., ISBN:044194517.
- 4. S.Suganthi, V.Swaminathan, A.P.Pushpalatha and G.Jothilakshmi(2014), Just nr-Excellent Graphs, International J.Math. Combin. Vol.2, 96-115.
- 5. C. V. R. Harinarayanan, C. Y. Ponnappan, S. P. Subbiah, R. Sundareswaran and V. Swaminathan (2007), Just excellence and very excellence in graphs with respect to strong domination, Tamkang Journal of Mathematics, Volume 38, Number 2, 167-175.
- 6. N. Sridharan & M. Yamuna (2007), Very Excellent Graphs and Rigid Very Excellent Graphs, AKCE International Journal of Graphs and Combinatorics, 4:2, 211-221.
- Tsok Samuel Hwere, Rwat Solomon Isa & Hosea Yakubu (2020), Graph Models Of Social Media Network As Related To Whatsapp Groups, International Journal of Innovative Mathematics, Statistics & Energy Policies 8(1):.24-31.
- Anwesha Chakraborty, Trina Dutta, Sushmita Mondal, Asoke Nath(2018), Application of Graph Theory in Social Media, International Journal of Computer Sciences and Engineering Vol.-6, Issue-10, E-ISSN: 2347-2693.

- 9. Ade Tuti Turistiati (2020), The Use of WhatsApp Group to Maintain Intercultural Friendship, Komunika: Jurnal Dakwah dan Komunikasi Vol. 14, No. 2, 297-307 ISSN 1978-1261 (print); 2548-9496 (online).
- P Pranitha, Bokka Anil Kumar, Mysore Sai Divya, Kalisetty Lokesh Varma, Thiruveedula Rajendra (2025), Sentiment Analysis on social media, International Journal for Modern Trends in Science and Technology Volume 11, Issue 04, 329-340. ISSN: 2455-3778 online.