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Notice for the PhD Viva Voce Examination

Ms Annie Clare Antony, Registration Number: 2270147, PhD Scholar at the Department of Mathematics, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Wednesday, 24 June 2026 at 10.30 am in Room No. 05, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis : **A Study on Domination Integrity of Graphs**

Discipline : **Mathematics**

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The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva–voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 16 June 2026

ABSTRACT

In the modern world, almost everything around us is connected through some form of network. Networks are fundamental structures that represent a wide range of real-world systems from social interactions and communication systems to biological, technological and transportation infras-tructures. Studying these interconnected systems gives us an idea of how individual components influence one another and how collective behaviour result from complex interactions. Further, it shows us how one component can affect the performance of the entire network and how all the elements come together to create an efficient and resilient system. Graph theory acts as a framework to model these networks to capture them mathematically and analyze the systems. The networks are modeled into a graph by taking their components as vertices of the graph and the relationship between the components as edges. Through this representation and with the help of graph theoret-ical parameters one can understand how the structure of the network affects its overall behaviour. The study mainly centers on assessing the vulnerability of a given network using graph theoret-ical parameters. To achieve this, two significant concepts, namely graph domination and graph integrity are considered. While domination in graphs focuses on identifying a small set of vertices that can control or monitor the entire network, integrity is used to evaluate the vulnerability of any graph when certain vertices are removed. The combination of these two concepts led to the introduction of a parameter called domination integrity that captures not only the control within a network but also its stability after the removal of dominating vertices. Domination integrity has been studied throughout the years due to its significance in network analysis and has been further extended to introduce new measures of graph vulnerability. The domination integrity (DI(G)) of a graph G is defined as $DI(G) = \min\{|S| + m(G - S) : S \text{ is a dominating set of } G\}$, where $m(G - S)$ is the order of the largest component in the graph induced by $G - S$. This work ex- tends the concept of domination integrity by proposing two new variations of domination integrity, namely paired domination integrity and strong hotspot domination integrity. A detailed analysis is presented, focusing on establishing bounds, values for specific graph families and exploration of their characteristics and behaviour across real-life networks.

Keywords: Graph vulnerability, domination integrity, paired domination integrity, strong hotspot domination number, strong hotspot domination integrity.

Publications:

1. **A. C. Antony** and V. Sangeetha, Paired Domination Integrity of Graphs, Int. J. Found. Comput. Sci., 36 (02):161-181, 2025.

2. **A. C. Antony** and V. Sangeetha, Paired Domination Integrity of Derived Graphs of Cycles, TWMS J. App. Eng., Math. 15 (10):2453-2464, 2025.

3. **A. C. Antony** and V. Sangeetha, Vulnerability Analysis of Comb product of graphs and related applications in chemical structures, J. Combin. Math. Combin. Comput., 128: 365-377, 2025.