Notice for the PhD Viva Voce Examination

Ms Raksha M R (Registration Number: 1942072), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend her PhD thesis at the public viva-voce examination on Monday, 8 January 2024 at 11.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Forcing Parameters and Propagation Time of Certain Graph Classes**
Discipline	:	**Mathematics**
External Examiner (Outside Karnataka, Maharashtra and Uttar Pradesh)	:	**Dr Jobish V D** Professor Department of Industrial Engineering Tecnologico de Monterrey Av. Eugenio Garza Sada 2501 Tecnologico C.P. 64849 Monterrey, Mexico
External Examiner (Within Karnataka, Maharashtra and Uttar Pradesh)	:	**Dr Minirani S** Associate Professor Department of Mathematics NMIMS Mumbai Campus Vile Parle West, Mumbai - 400056 Maharashtra
Supervisor	:	**Dr Charles Dominic** Assistant Professor Department of Mathematics School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

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.

Place: Bengaluru

Date: 03 January 2024

Registrar

ABSTRACT

A branch of mathematics that treats vertices and edges is called graph theory. This theory is used to replicate many real-life situations and physical problems. Graph coloring problem is one of the prominent studies in extremal graph theory. Suppose information has to be communicated in a network or some product has to be marketed to all the people in a cluster then there are two types of cost that needs to be encountered, one the cost of selecting the initial set of vertices in a network and the second is, time it takes to propagate the information through the entire network. The sum of these two parameters is known as the total cost. Optimization of the cost is a challenging problem for any graph. Such an interesting and well-studied problem is called the dynamic coloring problem. The forcing problem also known as infecting or spreading problem is one such dynamic coloring problem where two colors- white and black are used. Assume that a fixed set of vertices in a graph G are initially black and that the remaining vertices are considered white vertices.

The aim of the forcing process is to obtain, fully black- colored vertices of the graph G by progressively applying the color change law, making sure that at least one white vertex is forced black in every discrete time interval. The forcing index is the minimum cardinality of the forcing sets. Different types of forcing can be seen based on the color change law. The one forcing is the basic form of forcing. A generalised form of one forcing is known as k-forcing where k < V (G). The time taken by a forcing set to force the entire vertices of the graph G black is the propagation time or iteration index. The subject of study aims to find the one forcing number and k-forcing number of different types of graph classes and derived graph classes. The study then extends to find the propagation time of general graphs and cubic graphs.

Keywords: One forcing number, k-forcing number, Propagation time, Open global shadow graph, Closed global shadow graph, Complementary prism graph, Degree Splitting graph, Cubic graph.

Publications:
1. M. R. Raksha and C. Dominic, "On the k-forcing number of some ds-graphs," in Data Science and Security (S. Shukla, A. Unal, J. V. Kureethara, D. K. Mishra, and D. S. Han, eds.), pp. 394–402, Springer Singapore, 2021.
2. M.R. Raksha and C. Dominic, "Some properties of the closed global shadow graphs and their zero forcing number," Acta Universitatis Sapientiae, Informatica, vol. 14, no. 1, pp. 137–154, 2022.
3. R. Malur and C. Dominic, "Open global shadow graph and it's zero forcing number," Proyecciones (Antofagasta, On line), vol. 42, no. 1, pp. 33–52, 2023.
4. R. Malur and C. Dominic, "On the Zero Forcing Number of Complementary Prism Graphs", (communicated, 2022).
5. R. Malur and C. Dominic, "On the zero forcing propagation of graphs and cubic graphs", (communicated, 2023).