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Notice for the PhD Viva Voce Examination

Ms Chithra K P (Registration Number: 1881501), 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 Tuesday, 25 February 2025 at 12.00 pm in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**On Coloring Problems with Respect to Domination in Graphs**
Discipline	:	**Mathematics**
External Examiner (Outside Karnataka)	:	**Dr Udayan Prajapati** Associate Professor Department of Mathematics St Xavier's College Navrangpura Ahmedabad - 380009 Gujarat
External Examiner (Within Karnataka)	:	**Dr Veena Mathad** Associate Professor Department of Studies in Mathematics University of Mysore Manasagangotri, Mysuru – 570006 Karnataka
Supervisor	:	**Dr Mayamma Joseph** 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.

Registrar (Academics)

Place: Bengaluru
Date: 18 February 2025

ABSTRACT

This thesis deals with proper coloring of graphs subject to certain constraints based on the concepts of domination. Extending the concepts of dominator coloring and global dominator coloring the present study introduces and study three domination related colorings are namely: total global dominator coloring, total domination coloring and anti-dom-coloring. A total global dominator coloring (tgd-coloring) of a graph G G is a coloring in which every vertex of G G has a proper dom-color class and an anti-dom-color class. The proper dom-color class of a vertex v v is a color class in which every vertex in it is adjacent to v v while the anti-dom color class of v v is a color class in which none of the vertices in it is dominated by v v. The total global dominator chromatic number of a graph G G denoted by $\chi_{tgd}(G)$ $\chi_{tgd}(G)$, is the minimum number of colors required for a tgd-coloring of G G. A detailed study of the parameter $\chi_{tgd}(G)$ $\chi_{tgd}(G)$ has been carried out, and the results include bounds of $\chi_{tgd}(G)$ $\chi_{tgd}(G)$ and its relationship with the other graph parameters of G G such as $o(G)$ $o(G)$, $\chi(G)$ $\chi(G)$, $\gamma(G)$ $\gamma(G)$, $\chi_d^t(G$ $\chi_d^t(G)$, $\gamma_g(G)$ $\gamma_g(G)$, $\chi_{gd}(G)$ $\chi_{gd}(G)$ etc. The total global dominator chromatic number of several graph classes and graphs obtained by some graph operations such as the union of graphs, the corona of graphs, and the join of graphs were determined.

A total domination coloring of a graph G G is a coloring in which every vertex has a proper dom-color class, and each of the color classes is dominated by some vertex of G G. The minimum number of colors required for the total domination coloring of G G is said to be the total domination chromatic number of G G, denoted by $\chi_{td}(G)$ $\chi_{td}(G)$. The relation of $\chi_{td}(G)$ $\chi_{td}(G)$ with $\chi(G), \gamma(G), \gamma_t(G), \chi_d^t(G)$ $\chi(G), \gamma(G), \gamma_t(G), \chi_d^t(G)$ etc., are determined. The total domination chromatic number of several graph classes and graphs obtained by some graph operations such as the union of graphs, the corona of graphs, and the join of graphs were determined. An anti-dom-coloring of a graph G G is a coloring in which every vertex has an anti-dom-color class, and the minimum number of colors required for such a coloring of G G is called the anti-dom-chromatic number of G G, and is denoted by $\chi_{ad}(G)$ $\chi_{ad}(G)$. The anti-dom-chromatic number of different graph classes, union of graphs, and join of graphs are determined. A detailed study on the anti-dom-coloring of the corona of graphs is also done.

Keywords: Dominator Coloring, Total Dominator Coloring, Global Dominator Coloring, Total Global Dominator Coloring, Domination Coloring, Total Domination Coloring, Anti-dom-coloring.

Publications:

1. **K P Chithra** and M Joseph, "Total global dominator coloring of graphs", In *Recent Advancements in Graph Theory*, CRC Press, pp. 315-327, 2020.
2. **K P Chithra** and M Joseph, "Total domination coloring of graphs", *J. Math. Comput. Sci.*, vol. 11, no. 1, pp. 442-458, 2020.
3. **K P Chithra** and M Joseph, "Total global dominator coloring of trees and unicyclic graphs", *Baghdad Sci.J.*, vol. 20, no. 4, pp. 1380-1386, 2023