

**CHRIST**(DEEMED TO BE UNIVERSITY)
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Notice for the PhD Viva-Voce Examination

Ms S Madhumitha, Registration Number: 2270151, 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 Friday, 07 November 2025 at 2.00 pm in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru – 560029, Karnataka, India.

Title of the Thesis : **Discrete Structures Emerging from the Algebraic Invariants 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: 31 October 2025

ABSTRACT

This study conflates the two prominent aspects of study in algebraic graph theory, by proposing the notion algebraic derived graphs and algebraic derived hypergraphs. A class of algebraic derived graphs—*invariant intersection graphs*—is constructed based on the automorphism groups of graphs, and their structural properties are investigated. A prominent family of these graphs were identified as the *n*-inordinate invariant intersection graphs, and a comprehensive examination of the properties of these graphs, and their complements *n*-inordinate invariant non-intersection graphs that are built on symmetric groups is done, in this study. Various properties of these graphs, including matchings, convexity, resolvability, and colorings have been investigated, along with which the vulnerability and sensitivity of these graphs are also analysed. Furthermore, a coalitions in these and some of their significant subgraphs are also studied. Following this, hypergraphs based on the algebraic invariants of graphs have been introduced and their properties are discussed. Also, an algebraic derived graph, called the *non-invariant intersection graph*, is proposed and an investigation on the same is initiated.

Keywords: *Automorphism group, invariant intersection graphs, n-inordinate invariant intersection graphs, n-inordinate invariant non-intersection graphs, invariant hypergraphs.*

Publications:

1. **S. Madhumitha** and S. Naduvath, Graphs defined on rings: A review, *Mathematics*, 11(17):3643, 2023.
2. **S. Madhumitha** and S. Naduvath, Graphs on groups in terms of the order of elements: A review, *Discrete Math. Algorithms Appl.*, 16(3), 2024.
3. **S. Madhumitha** and S. Naduvath, Coloring of *n*-inordinate invariant intersection graphs, *J. Combin. Math. Combin. Comput.*, 123(4):369–381, 2024.
4. **S. Madhumitha** and S. Naduvath, Dominator colorings of *n*-inordinate invariant intersection graphs, *Utilitas Math.*, 122(1):81–92, 2025.
5. **S. Madhumitha** and S. Naduvath, Invariant intersection graph of a graph, *J. Discrete Math. Sci. Cryptogr.*, Published Online, 2025.
6. **S. Madhumitha** and S. Naduvath, Coalition partitions of *n*-inordinate invariant intersection graphs, *Discrete Math. Algorithms Appl.*, Published Online, 2025.
7. **S. Madhumitha** and S. Naduvath, Geodetic sets in *n*-inordinate invariant intersection graphs, *Commun. Fac. Sci. Univ. Ank. Math. Stat.*, In Press, 2025.
8. **S. Madhumitha** and S. Naduvath, Certain variants of domatic partitions of *n*-inordinate invariant intersection graphs, *Asian-European J. Math.*, Published Online, 2025.
9. **S. Madhumitha** and S. Naduvath, Centrality-based graph entropy and sensitivity analysis of *n*-inordinate invariant intersection graphs, *Discrete Math. Algorithms Appl.*, Published Online, 2025.
10. **S. Madhumitha** and S. Naduvath, Domination-related colorings of *n*-inordinate invariant intersection graphs, *Discrete Math. Algorithms Appl.*, Published Online, 2025.