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# Notice for the PhD Viva Voce Examination

Ms Ancy K Joseph (Registration Number: 2071512), PhD Scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore Central Campus will defend her PhD thesis at the public viva-voce examination on Saturday, 05 April 2025 at 9.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

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| **Title of the Thesis** | : | **Antimagic Labeling of Graphs** |
| **Discipline** | : | **Mathematics** |
| **External Examiner - I** | : | **Dr Kala Murugan**<br>Professor and Dean of Science<br>Department of Mathematics<br>Manonmaniam Sundaranar University<br>Abishekapatti, Tirunelveli, Tamil Nadu - 627 012 |
| **External Examiner - II** | : | **Dr Chandru Hegde**<br>Associate Professor<br>Department of Mathematics<br>Mangalore University<br>Mangalagangothri, Karnataka - 574199 |
| **Supervisor** | : | **Dr Joseph Varghese**<br>Professor<br>Department of Mathematics<br>School of Sciences<br>CHRIST (Deemed to be University)<br>Bengaluru, Karnataka - 560029 |

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:** 02 April 2025

# ABSTRACT

Graph labeling has drawn much attention due to its inherent mathematical complexity and diverse applications. The antimagicness of a graph is determined by the pairwise distinct labels of its vertices. If m is the number of edges of a graph, then each edge is distinctly labeled by a single number from 1 to m. Each vertex is then labeled with the sum of the labels of the edges incident to it.

Hartsfield and Ringel introduced antimagic labeling of graphs. They also put forth the conjecture that every connected graph different from $K_2$ is antimagic. This conjecture remains open. Although efforts have been made to prove certain graph classes to be antimagic, numerous other classes remain unexplored in this context. Through this thesis, this gap was aimed to be bridged to some extent. In this direction, antimagicness of a specific family of general class of graphs, viz. Cactus chain graph, with and without pendant vertices and Halin graph with embedded k-regular caterpillar were proved. Regarding the trees, antimagic labeling of same sized stars, connected by rule, and antimagic labeling of the concatenation of stars of different star sizes were explored. We proved the firecracker graph, banana tree, homogeneous lobsters, and a class of lobsters are antimagic. With regard to graph products, we proved that Cartesian product of wheel graph and path graph is antimagic and the tensor product of cycle and path graph is antimagic.

A key methodological contribution of this thesis is the fresh approach in partitioning labels into equivalence classes. This approach not only facilitated the proofs of antimagicness for some graph families but also yielded new results in equivalence classes.

*Keywords: Antimagic labeling, Cactus graph, Lobsters, Cartesian product, Tensor product, Equivalence class.*

**Publications:**

1. **Ancy Kandathil Joseph**, Joseph Varghese Kureethara, "The Cartesian product of wheel graph and path graph is antimagic", Communications in Combinatorics and Optimization Vol. 8, No. 4 (2023), pp. 639-647.
2. **Ancy Kandathil Joseph**, Joseph Varghese Kureethara, "Antimagic labeling of n-uniform Cactus Chain Graphs", Discrete Mathematics, Algorithms and Applications, https://doi.org/10.1142/S1793830925500156.
3. **Ancy Kandathil Joseph**, Joseph Varghese Kureethara, "The Tensor product of Wheel and Path graph is antimagic", Palestine Journal of Mathematics, accepted on January 16, 2025