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Notice for the PhD Viva Voce Examination

Ms Achu Aniyan (Registration Number: 1942065), 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 Saturday, 22 July, 2023 at 11.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Topologies Emanating from Graphs**
Discipline	:	**Mathematics**
External Examiner (Outside Karnataka, Maharashtra)	:	**Dr Udayan Prajapati** Associate Professor Department of Mathematics St Xavier's College P B No. 4168, Navarangpura Ahmedabad, Gujarat - 380009
External Examiner (Within Karnataka)	:	**Dr A Satyanarayana Reddy** Associate Professor Department of Mathematics Shiv Nadar University A111E, Block-A Gautam Buddha Nagar, Dadri Uttar Pradesh - 201314
Supervisor	:	**Dr Sudev N K** Associate 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

Place: Bengaluru

Date: 15 July 2023

ABSTRACT

A topology on a set is a collection of its subsets, including the set itself and the empty set, which is closed under union and intersection. This dissertation introduces the notions such as graph topology, spanning graph topology, generalised graph topology, and generalised spanning graph by considering subgraphs and spanning subgraphs of a graph. Analogous to the set-theoretic notion, a graph topology is a collection of subgraphs of a given graph, including the null graph K0 and the graph itself, that is closed under union and intersection. At the same time, a spanning graph topology of a graph is a collection of spanning subgraphs, including the spanning empty graph Nn and the graph G, which is closed under union and intersection. The topological concepts such as open sets, closed sets, base, subbase, neighbourhood, interior, subspace, and connectedness of spaces are extended to graph topology and spanning graph topology. In order to study the closed graphs in the above-mentioned graph topologies, two new graph complements are introduced in these graph topologies, such as decomposition and neighbourhood complements, to define decomposition closed and neighbourhood closed graphs. The decomposition complement is defined with respect to the edge set and the neighbourhood complement with respect to the vertex set. Since all the members of a spanning graph topology have the same vertex set, the neighbourhood closed graphs are described in terms of the edge set. The notion and characteristics of subspaces of both these graph topologies are defined, and the properties of closed graphs in these subspaces are also studied. Connectedness in topology holds a prominent role and applications in various fields of mathematics. The idea of connectedness is extended to these graph topologies, and the same is characterised in the context of graph topology.

Apart from these two types of graph topologies, a more generalised concept, called a generalised graph topology, is also introduced and discussed in the dissertation. This generalisation is made by relaxing some of the axioms of graph topologies. The conditions, such as the graphs being open and closed under the intersection, are relaxed to obtain a collection of subgraphs. Most of the graph topological notions are extended to generalised graph topological spaces and generalised spanning graph topological spaces. Keywords: Graph topology, subspace graph topology, spanning graph topology, subspace spanning graph topology, generalised graph topology, generalised spanning graph topology, generalised subspace graph topology, generalised subspace spanning graph topology.

Publications

1. **A. Aniyan** and S. Naduvath, "A study on graph topology", Commun. Combin. Opt., Vol. 8, No. 2 (2023), pp. 39-409.
2. **A. Aniyan** and S. Naduvath, "Spanning graph topological spaces of graphs", Asian Europe. J. Math., p. 2350119, 2023.
3. **A. Aniyan** and S. Naduvath, "Subspace graph topological spaces of graphs", Proyecciones, Vol. 42, No. 2(2023), pp. 521-532.
4. **A. Aniyan** and S. Naduvath, "Subspace spanning graph topological space of graphs", Proyecciones, Vol. 42, No. 2(2023), pp. 479-488.