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Notice for the PhD Viva Voce Examination

Ms Suman Babu, Registration Number: 1942080, 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 Wednesday, 13 May 2026 at 02.30 pm in Room No. 628, 6th Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	**:**	**Convective Instability of Chemically Reacting Couple Stress Ferromagnetic Fluids Saturating a Brinkman Porous Medium**
Discipline	**:**	**Mathematics**
External Examiner - I	**:**	**Dr C V Vinay** Professor Department of Mathematics J S S Academy of Technical Education Dr Vishnuvardhana road Bengaluru - 560060 Karnataka
External Examiner - II	**:**	**Dr R Sivaraj** Associate Professor Department of Mathematics and Computing Dr B R Ambedkar National Institute of Technology Jalandhar, Amritsar Bypass Road Jalandhar - 144008 Punjab
Supervisor	**:**	**Dr Nisha Mary Thomas** Associate Professor Department of Sciences and Humanity Engineering 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: 09 May 2026

ABSTRACT

The problem of thermodynamic stability originates in the differentiation of the stable from the unstable patterns of permissible flows. In recent years the class of such problems of stability has been enlarged by the interest in convective flows of fluids in presence of magnetic fields. The investigation of ferroconvective instability of the Bénard-Brinkman type induced by the interplay of magnetic and convective forces, influenced by a non- autocatalytic exothermic reaction and couple stresses, is conducted through the stability analysis involving infinitesimally small disturbances utilizing normal modes, subsequent to the application of the higher-order Galerkin method. The small perturbation method is used to investigate how a chemical reaction and coupling stress affect the beginning of convection of a magnetic fluid which is heated from below in a horizontal porous layer. It is assumed that the solid and fluid phases are in a local thermal equilibrium and that the fluid undergoes a zero-order exothermic chemical process. Initially, in the basic quiescent state a closed form solution is observed. Oscillatory instability is excluded, and the principle of exchange of stabilities is considered. The eigenvalues are found using the Galerkin method. The effect of Frank-Kamenetskii number, magnetic, porous, chemical reaction, anisotropy and couple stress parameters on the stability of the system is discussed.

Keywords: *Ferroconvection, Couple Stress, Chemical Reaction, Porous Media, Galerkin Method, Linear Stability Analysis, Normal Mode Technique, Anisotropic Brinkman Porous Medium*

Publications:

1. **Suman Babu**, Dr Nisha Mary Thomas, “Couple Stress Effect on Ferro-Convection Triggered by Chemical Reaction in a Porous Layer with Sparse Distribution”, Journal of Chemistry and Technologies.,2024,32(2), 480-488, ISSN 2663-2942.

2. **Suman Babu**, Dr Nisha Mary Thomas, “Thermal Instability of Chemically Reactive Couple-Stress Ferro-Fluids in an Anisotropic Brinkman Porous Medium”, Letters in High Energy Physics.,2024,194-204, ISSN 2632-2714.

3. **Suman Babu**, Dr Nisha Mary Thomas, “Convective Instability In Porous Media: Impact of Chemical Reaction on Maxwell-Cattaneo Couple-Stress Ferromagnetic Fluids”, Journal of Chemistry and Technologies, 2024, *32*(3), 826-836. ISSN 2663-2942.