JMA-783

Heat Transfer in Micropolar Fluids: Noninear Stability Analysis of Rayleigh–Bénard Convection with Porous Medium, and Internal Heat Generation

Riya Baby

Department of Computational Science, Assistant Professor, CHRIST (Deemed to be University), Delhi NCR, India

Corresponding author's e-mail: riya.baby@christuniversity.in

ABSTRACT

Many real-world applications, like the heating and cooling of molten glass, electric current flowing through a conducting fluid, and solar collector, depend heavily on internal heat generation. This phenomenon is also significant for several other fields, including geophysics, storing radioactive materials, creating metal waste forms, reactor safety evaluations, and studying fire and combustion. The effect of heat generation on convective instability in a micropolar fluid and porous layer that is heated from below is studied in this paper. The Nusselt number formulation was obtained by doing a weak non-linear stability study using Lorenz equations. The Lorenz equations were determined to solve this problem mathematically. We use the regular perturbation method to obtain the Rayleigh number and correct the Rayleigh number in the problems. The truncated representation of the Fourier series is used to study the non-linear theory. Heat transfer has been studied concerning several factors, including internal Rayleigh and Prandtl numbers. It has been discovered that micropolar fluids and internal heating regulate heat and mass transfer and control the commencement of convection.

Keywords: Micropolar fluid, Porous Medium, Rayleigh Number

How to Cite

R. Baby, "Heat Transfer in Micropolar Fluids: Noninear Stability Analysis of Rayleigh–Bénard Convection with Porous Medium, and Internal Heat Generation", *AIJR Abstracts*, pp. 58–58, Feb. 2024.

DOI: 10.21467/abstracts.165 ISBN: 978-81-965621-7-5 (eBook), 978-81-965621-4-4 (Paperback)