

TITLE

HALL CURRENT EFFECTS ON UNSTEADY MHD FLOW THROUGH A COMPOSITE MEDIUM IN A ROTATING PARALLEL PLATE CHANNEL

Professor J. Prakash

Department of Mathematics, Faculty of Science
University of Botswana, Private Bag 0022, Gaborone, BOTSWANA
Email: prakashj@mopipi.ub.bw

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Dr. M. Veera Krishna

Department of Mathematics, Rayalaseema University, KURNOOL, Andhra Pradesh, INDIA

ABSTRACT

The unsteady flow of an incompressible viscous fluid in a rotating parallel plate channel bounded on one side by a porous bed under the influence of a uniform transverse magnetic field taking hall current into account is presented. The perturbations are created by a constant pressure gradient along the plates in addition to the non-torsional oscillations of the upper plate. The flow in the clean fluid region is governed by Navier-Stoke's equations while in the porous bed the equations are based on Darcy-Lapwood model. The exact solutions of the velocity in the clean fluid and the porous medium consist of steady state and transient state. The time required for the transient state to decay is evaluated in detail and ultimate quasi-steady state solution has been derived analytically, its behaviour is computationally discussed with reference to the various governing parameters. The shear stresses on the boundaries and the mass flux are also obtained analytically and their behaviour is computationally discussed.