International J. of Engg. Research & Indu. Appls. (IJERIA).
ISSN 0974-1518, Vol.6, No. II (May 2013), pp 97-117

HALL EFFECT ON MHD FLOW OF A DISSIPATIVE AND CHEMICALLY REACTING FLUID ALONG SEMI-INFINITE VERTICAL PLATE IN THE PRESENCE OF RADIATION

M. N. RAJA SHEKAR
Department of Mathematics, JNTUH College of Engineering,
Nachupally, Karimnagar, India.

Abstract

The paper deals with the effect of Hall current on unsteady laminar boundary layer flow of a chemically reacting incompressible viscous fluid along a semi-infinite vertical plate in the presence of thermal radiation, taking the terms viscous dissipation, heat source/sink in to account. A Magnetic field of uniform strength is applied normal to the flow. The governing boundary layer equations are solved numerically, using Crank-Nicholson method. The Rossel and approximation is used to describe the radiative heat flux in the energy equation. Computations are performed for wide range of the governing flow parameters, viz. the thermal Grash of number, Solutal Grash of number, Magnetic parameter, Soret number, Prandtl number and thermal radiation parameter. The variations of these different flow parameters on velocity, temperature and concentration fields are discussed graphically. Also, the results of skin friction coefficient, Nusselt number and Shear wood number for various flow parameters are discussed. From this study, it is found that, an increase in the soret number leads to an increase in the velocity, concentration of the fluid.

Keywords : Hall current, magnetic field, radiative heat flux, chemical reaction, Crank-Nicholson method,