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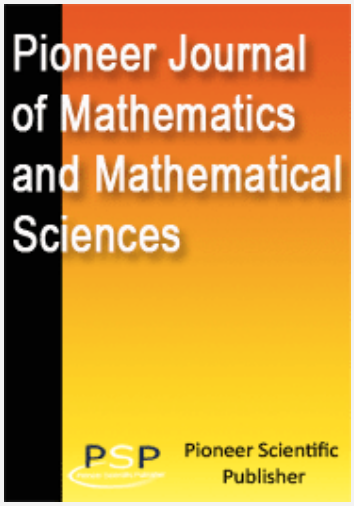

MHD STOKES HEAT AND MASS FLOW PAST AN INFINITE PERMEABLE PLATE SUBJECTED TO CONVECTIVE SURFACE BOUNDARY CONDITIONS

Odero O. Isaiah, Manyonge W. Alfred and Bitok K. Jacob

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Abstract

In this paper, we investigate the hydromagnetic unsteady flow and heat transfer characteristics of a viscous, electrically conducting, incompressible fluid flowing past an infinite porous plate subjected to convective surface boundary conditions in the presence of a strong magnetic field. The coupled non-linear partial differential equations for continuity, momentum and energy balance governing the problem are solved numerically using finite difference explicit scheme. The effects thermo-physical parameters such as Hall currents parameter, ion-slip parameter, magnetic interraction parameter, Grashof number, modified Grashof number, suction velocity and time on the flow fields of the fluid in the presence of cooling and heating of the plate by free convection currents are examined and discussed graphically. The solution of this research is useful to mathematicians, scientists and engineers since it serves as a prototype for practical propulsion type problems, for example generation of increased propulsion force in ship and a very useful source of information for researchers on the subject of hydromagnetic stokes free convection fluid flows in porous media.

Keywords and phrases: magnetohydrodynamics, viscosity, constant heat flux, magnetic field.