

عنوان مقاله:

Effects of Thermophoresis, Viscous Dissipation and Joule Heating on Steady MHD Flow over an Inclined Radiative Isothermal Permeable Surface with Variable Thermal Conductivity

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 7، شماره 1 (سال: 1393)

تعداد صفحات اصل مقاله: 11

نویسنده:

M. G. Reddy - Department of Mathematics, Acharya Nagarjuna University Campus, Ongole, A.P- 523 001, India

خلاصه مقاله:

A two-dimensional mathematical model is presented for the laminar heat and mass transfer of an electrically-conducting, viscous and Joule (Ohmic) heating fluid over an inclined radiate isothermal permeable surface in the presence of the variable thermal conductivity, thermophoresis and heat generation. The Talbot- Cheng-Scheffer-Willis formulation (1980) is used to introduce a thermophoretic coefficient into the concentration boundary layer equation. The governing partial differential equations are non-dimensionalized and transformed into a system of nonlinear ordinary differential similarity equations, in a single independent variable. The resulting coupled nonlinear equations are solved under appropriate transformed boundary conditions using the Runge-Kutta fourth order along with shooting method. Comparisons with previously published work are performed and the results are found to be in very good agreement. Computations are performed for a wide range of the governing flow parameters, viz., magnetic field parameter, thermophoretic coefficient (a function of Knudsen number), Eckert number (viscous heating effect), angle of inclination, thermal conductivity parameter, heat generation parameter and Schmidt number. The present problem finds applications in optical fiber fabrication, aerosol filter precipitators, particle deposition on hydronautical blades, semiconductor wafer design, thermo-electronics and magnetohydrodynamic energy generators.

کلمات کلیدی:

Joule heating, Thermophoresis, Magnetohydrodynamics, Heat and mass transfer, Thermal radiation, Viscous dissipation, Heat generation, Inclined plate

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1385148>

