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A Prospective Evaluation of Thermal Radiation Effects on Magneto-Hydrodynamic Transport of a Nanofluid Traversing a Spongy Medium

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Abstract : This article reports a fundamental numerical investigation to analyze the impact of thermal radiations on MHD flow of differential type nanofluid past a porous plate. Here, viscosity is taken as function of temperature. Energy equation is deliberated in the existence of viscous dissipation. The mathematical terminologies of nano concentration, velocity and temperature are first cast into dimensionless expressions via suitable conversions and then solved by using Shooting technique to obtain the numerical solutions. Graphs has been plotted to check the convergence of constructed solutions. At the end, the influence of effective parameters on nanoparticle concentration, velocity and temperature fields are also deliberated in a comprehensive way. Moreover, the physical measures of engineering importance such as the Sherwood number, Skin friction and Nusselt number are also calculated. It is perceived that the thermal radiation enhances the temperature for both Vogel's and Reynolds' models but the normal stress parameter causes a reduction in temperature profile.

Keywords : MHD flow, differential type nanofluid, Porous medium, variable viscosity, thermal radiation
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