Mathematical modeling of unsteady radiative magnetohydromagnetic flow of Maxwell Nano-fluid in a porous medium with buoyancy and Arrhenius chemical kinetic

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Abstract

Parametric sensitivity of mathematical modeling of unsteady Maxwell magnetohydromagnetic nanofluid and second thermodynamic law analysis under Arrhenius kinetic with buoyancy is investigated in the presence of viscous heating and radiation. The porous flow channel is subjected to tension with material properties that vary with time without deformation. In the absence of fluid charge polarization, the conducting liquid is influenced by the sheet stretching velocity [1]. The flow coupled derivatives model is transformed to dimensionless form by relevant similarity variables. These are numerically solved by shooting numerical technique together with Fehlberg Runge-Kutta procedures [2]. The essential characteristics of the flow and thermodynamic irreversibility are determined. The results are quantitatively and qualitatively compared with other studies and are established to agree well. The graphical results revealed that Lewis number increases the molecular species concentration and the thermodynamic stability for reversibility can be enhanced by the augmentation of magnetic field, thermophoresis, and radiation. Therefore, for thermal and chemical reaction systems, increasing heat propagation should be managed to keep the system from blowing up. The buoyancy has a greater effects on the flow generally

***K*eywords** Buoyancy · mathematical modeling · Arrhenius chemical kinetics · porois medium · internal heat generation

References

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