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Homogeneous-heterogeneous reactions and viscous dissipation effect on the MHD convective boundary layer flow past a curved stretching sheet

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Abstract:

In this study, we investigate the interplay of homogeneous-heterogeneous reactions and the impact of viscous dissipation on the magnetohydrodynamics (MHD) convective boundary layer flow past a curved stretching sheet. The governing partial differential equations are transformed into a system of ordinary differential equations using appropriate similarity transformations. The resulting equations are then numerically solved and the detailed profiles of velocity, temperature, and concentration fields are obtained. The outcomes provide insights into the intricate interplay between magnetic forces, convective effects, and chemical reactions. The suggested physical parameter characteristics are investigated, and their corresponding behaviors are depicted graphically. Additional physical attributes, such as surface drag force, Nusselt numbers, and Sherwood numbers, are computed and presented in tabular form. In comparison to previous findings, the current results exhibit a strong agreement.

Keywords: Magnetohydrodynamic; curved surface; convective boundary condition; homogenous and heterogeneous reactions; viscous dissipation;

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