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Thermodiffusion and diffusion – Thermo effects on MHD heat and mass transfer of micropolar fluid over a stretching sheet
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Abstract

The influence of Soret and Dufour effects on unsteady magnetohydrodynamic (MHD) boundary layer flow, and heat and mass transfer analysis over a stretching sheet embedded in porous media filled with viscous micropolar fluid is numerically investigated. Suitable similarity variables are introduced to transform the governing conservation equations into the set of ordinary differential equations and are solved numerically by using the finite-element method. The influences of key nondimensional parameters, namely, the suction parameter $V_0(0.1-1.5)$, magnetic parameter $M(0.1-1.5)$, unsteadiness parameter $\tau(0.1-1.0)$ Eckert number $Ec(0.1-2.2)$ Soret parameter $Sr(0.1-2.0)$, Dufour parameter $Du(0.1-1.0)$ and microrotation parameter $A_1(0.1-1.0)$ on velocity, microrotation, temperature, and concentration profiles are portrayed graphically. Furthermore, the skin-friction coefficient, couple stress coefficient, and rates of heat and mass transfer for various values of the governing parameters are calculated, with the results summarized in tabular form. It is found that the velocity, angular velocity, temperature, and concentration distributions of the fluid deteriorate with rising values of the suction parameter ($V_0 > 0$). © 2017 by Begell House, Inc.

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