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Soret and dufour effects on mhd heat and mass transfer flow of a micropolar fluid with thermophoresis particle deposition
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Abstract
The effect of thermophoresis on heat and mass transfer flow of a micropolar fluid in the presence of Soret and Dufour effects over a stretching sheet is investigated in the present analysis. The transformed conservation equations are solved numerically using an optimized, extensively validated, variational Finite element method. The influence of key non-dimensional parameters, namely, suction parameter V0 (0.1-0.5), magnetic parameter M (0.1-1.5), Soret parameter Sr (0.5-1.8), Dufour parameter Du (0.5-0.1) and thermophoretic parameter τ (0.1-1.5) on velocity, angular velocity (micro-rotation), temperature and concentration fields as well as skin-friction coefficient, Nusselt number and Sherwood number are examined in detail and the results are shown in graphically and in tabular form to know the physical importance of the problem. It is found that the imposition of wall fluid suction (V 0 >0) in the present problem of flow has the effect of depreciating the velocity, micro-rotation, temperature and concentration boundary layer thicknesses at every finite value of η. The thermal boundary layer thickness decelerates whereas solutal boundary layer thickness is improved with the combined influence of Sr and Du.

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