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Non-uniform mass transfer in MHD mixed convection flow of water over a sphere with variable viscosity and Prandtl number
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Abstract
Purpose - The purpose of this paper is to consider axisymmetric mixed convection flow of water over a sphere with variable viscosity and Prandtl number and an applied magnetic field. Design/methodology/approach - The non-similar solutions have been obtained from the origin of the streamwise co-ordinate to the point of zero skin friction using quasilinearization technique with an implicit finite-difference scheme. Findings - The effect of M is not notable on the temperature and heat transfer coefficient when λ is large. The skin friction coefficient and velocity profile are enhance with the increase of MHD parameter M when λ is small. Viscous dissipation has no significant on the skin friction coefficient under MHD effect. For M=1, the movement of the slot or slot suction or slot injection do not cause any effect on flow separation. The slot suction and the movement of the slot in downstream direction delay the point of zero skin friction for M=0. Originality/value - The present results are original and new for water boundary-layer flow over sphere in mixed convection flow with MHD effect and non-uniform mass transfer. So this study would be useful in analysing the skin friction and heat transfer coefficient on sphere of mixed convection flow of water boundary layer with MHD effect. © Emerald Group Publishing Limited.

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