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Free convection flow of an electrically-conducting micropolar fluid between parallel porous vertical plates using differential transform
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Abstract

In the present study, the effect of temperature-dependent heat sources on the fully developed free convection flow of an electrically conducting micropolar fluid between two parallel porous vertical plates in the presence of a strong cross magnetic field is analyzed. The micropolar fluid fills the space inside the porous plates when the rate of suction at one boundary is equal to the rate of injection at the other boundary. The coupled nonlinear governing differential equations are solved using the differential transform method (DTM). Moreover, the Runge-Kutta shooting method (RKSM), which is a numerical method, is used for the validity of DTM method and an excellent agreement is observed between the solutions of DTM and RKSM. Trusting this validity, the effects of Hartmann number, Reynolds number, micropolar parameter, and applied electric field load parameter are discussed on the velocity, microrotation velocity, and temperature. The skin friction, the couple stress, and Nusselt numbers at the plates are shown in graphs. It is observed that the Hartmann number and the micropolar parameter decreases the skin friction and the couple stress at both plates for suction and injection. © 2018 Shahid Chamran University of Ahvaz.

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