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FREE CONVECTIVE MHD FLOW OF RIVLIN-ERICKSEN FLUID IN A VERTICAL WAVY CHANNEL

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Abstract

The steady two-dimensional free convective MHD flow of an electrically conducting visco-elastic Rivlin-Ericksen fluid confined in a vertical wavy channel has been investigated analytically. The equations governing the fluid flow and heat transfer have been solved subject to the relevant boundary condition by assuming that the solution consists of a mean part and a perturbed part as the walls are pure sinusoidal wavy perturbations to the planes $y = \pm 1$. It is also assumed that one of the walls is isothermal and the other is adiabatic. The analytical expressions for dimensionless velocity and temperature fields have been obtained and these results have been numerically worked out for different values of parameters involved in the solution. The first-order velocity components have been presented graphically for various visco-elastic parameters. The important characteristics of the problem, the skinfriction coefficient and the rate of heat transfer at both walls have been discussed in details.

Key Words: Free Convective, Rivlin-Ericksen fluid, Skin-friction, Nusselt number, Wavy Channel, Eckert number.

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