

HOMOTOPY ANALYSIS TO HEAT AND MASS TRANSFER OF MHD FLOW OVER A MOVING VERTICAL POROUS PLATE WITH SUCTION

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Abstract

The objective of this paper is to find the analytical solutions of heat and mass transfer of MHD boundary layer flow over a moving vertical plate in the presence of suction, Soret and Dufour effects. The governing partial differential equations are converted to a set of ordinary differential equations using suitable similarity transformations. The resulting equations are solved analytically using homotopy analysis method (HAM). The convergence of analytical solutions is explicitly discussed. The velocity, temperature and concentration profiles are plotted for various parameters such as magnetic parameter M , suction parameter F_w , buoyancy parameters Gr and Gc , permeability parameter K , Prandtl number Pr , Soret number Sr , Dufour number Du and Schmidt number Sc . Also, the numerical values of skin friction coefficient, Nusselt number and Sherwood number are obtained for various values of these parameters and are presented through tables. The accuracy of our results is shown by giving a comparison between our results and the results already existing in the literature.

Keywords: Suction, Boundary layer flow, Soret and Dufour effects, Homotopy Analysis Method (HAM).