EFFECTS OF SUCTION/INJECTION AND VELOCITY SLIP ON ENTROPY GENERATION OVER STRETCHING/SHRINKING SURFACE IN MHD FLOW

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ABSTRACT

The present study concerns the first and second law analyses of an electrically conducting fluid past a porous stretching/shrinking surface in the presence of second order slip flow conditions. A semi numerical-analytical technique, homotopy analysis method (HAM) is employed to solve system of ordinary differential equations that is converted form of the partial differential equations governing the heat and flow motion. Entropy generation equation is derived as a function of velocity and temperature gradients and non-dimensionalized using geometrical and flow physical field-dependent parameters. The velocity and temperature profiles and averaged entropy generation number are obtained and discussed in details. The effects of physical flow parameters such as magnetic interaction parameter, first and second order velocity slip parameter, Prandtl number, suction/injection parameter, and Brinkman number on the fluid velocity, temperature distribution, and averaged entropy generation number are checked and discussed and the path for minimizing the entropy is also proposed.