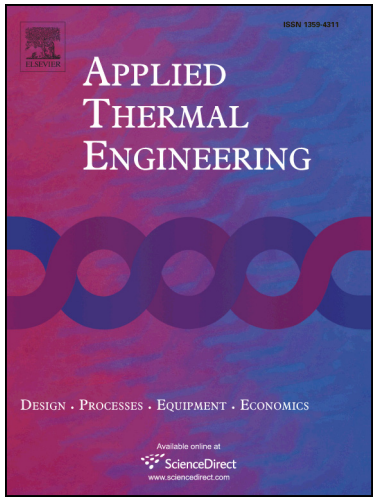

Research Paper

Analysis of wall jet flow for Soret, Dufour and chemical reaction effects in the presence of MHD with uniform suction/injection

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`Analysis of wall jet flow for Soret, Dufour and chemical reaction effects in the presence of MHD with uniform suction/injection

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Abstract

Recently, advancement in the field of medical, industrial, aerospace and automobile has opened new doors for researchers. Scientists and technologists are getting keen interest to examine the influence of physical quantities like Nusselt number and Sherwood number in the subject area of heat and mass transport. Present study deals with the investigation of steady incompressible two dimensional flow of electrically conducting fluid through the wall jet in the presence of uniform suction/blowing. The fluid flow is also exposed to varying magnetic field applied transversely. The study also explored the influence of chemical reaction and combined effects of Soret and Dufour numbers on velocity, temperature and concentration profiles. The governing equations and boundary conditions are reduced to ordinary differential equations by using boundary layer approximation and similarity transformations. Results are obtained by using Fourth-fifth order Runge-Kutta-Fehlberg numerical method coupled with shooting method. The survey indicates that uniform suction can play an important role for the constancy of the wall jet laminar flow. Also, it is recorded that productive chemical reaction, Soret and Dufour numbers strengthen the phenomena of heat and mass transfer rate. Graphical representations are drawn to demonstrate the influence of the non-dimensional numbers and flow parameters. Analysis of Nusselt and Sherwood number is recorded in table 1& 2.

Keywords: Boundary layer; Chemical reaction; Dufour effect; Numerical solution; Magnetohydrodynamic; Porous; Soret effect; Wall jet.

Introduction: