Abstract

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"Numerical Simulation of Double-Diffusive Natural Convective Flow in an Inclined Rectangular Enclosure in the Presences of Magnetic Field and Heat Source, Part A: Effect of Rayleigh Number and Inclination Angle"

Double-diffusive convective flow in an inclined rectangular enclosure with the shortest sides being insulated and impermeable is investigated numerically. Constant temperatures and concentration are imposed along the longest sides of the enclosure. In addition, a uniform magnetic field is applied in a horizontal direction. Laminar regime is considered under steady state condition. The transport equations for continuity, momentum, energy and species transfer are solved using the finite volume technique. The validity of the numerical code used is ascertained and good agreement was found with published results. The numerical results are reported for the effect of thermal Rayleigh number on the contours of streamline, temperature, and concentration. In addition, results for the average Nusselt and Sherwood numbers are presented and discussed for various parametric conditions. This study was done for constant Prandtl number, Pr= 0.7, aspect ratio, A = 2, Lewis number, Le= 2, the buoyancy ratio, N = 1, Hartmann number, Ha =10 and the dimensionless