Abstract

Mohamed Abd El Fatah Mohamed Teamah

Hydro-Magnetic Mixed Convection Double Diffusive in a Lid Driven Square Cavity

The hydro-magnet double diffusive mixed convection in a square lid-driven cavity is studied numerically. Constant temperatures and concentration are imposed along the vertical sides of the square enclosure. Both upper and lower surfaces are being insulated and impermeable. The lid is assumed to be moving in two directions that aids opposes the free convection. In addition, a uniform magnetic field is applied in a horizontal direction. Results are presented for different values of Hartmann number (0 ? Ha ? 50), Richardson number (0.01? Ri ? 10) and buoyancy ratio, -10 ? N ? 10.This study is done for constant Prandtl number, Pr = 0.7, Lewis number, Le =2 and the Grashof number,Gr=104.The numerical results studied the effect of Richardson number, Hartmann number and buoyancy ratio on the local values (iso-contours of stream line, temperature, concentration as well as both local Nusselt and Sherwood numbers). In addition, the predicted results for both average Nusselt and Sherwood numbers are presented and discussed for various parametric conditions. It is found that direction of lid is more effective on heat and mass transfer and fluid flow with increasing of magnetic field for all studied parameters