

Abstract

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Double Diffusive Natural Convection in a Square Cavity with Segmental Heat Sources”

double-diffusive convective flow in a square enclosure with segmental heat sources is solved numerically. constant temperature and concentration are imposed along the right wall of the enclosure at low temperature and concentration which is assumed as a heat and mass sink. the heaters are at constant temperature and concentration assumed as source of heat and mass at the left wall while the rest of this wall is adiabatic. the other two sides of the cavity are assumed adiabatic walls. the flow is laminar under steady state condition and is considered. the transport equations for continuity, momentum, energy and mass transfer are solved. the numerical procedure adopted in this analysis yields consistent performance over a wide range of parameters, rayleigh number ($10^3 \leq Ra \leq 10^6$), dimensionless heater lengths ($0.2 \leq l/h \leq 1$), buoyancy ratio ($-10 \leq N \leq 10$), prandtl number, ($0.01 < Pr < 100$). this study was done for constant lewis number $Le = 2$. the results show the average nusselt number and average sherwood number are increased with the increasing of the rayleigh number, the dimensionless heater length and prandtl number. on the other hand, the prandtl number has significant effect on the nusselt number and average sherwood number to the value of $Pr = 0.7$. the results for the average nusselt number are correlated as a function of dimensionless heater length, buoyancy ratio, rayleigh number and prandtl number. the results were compared with previous results and good agreement was found.