

Abstract

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the objective of the present investigation is to study the laminar natural heatmass transfer in a symmetrical trapezoidal enclosure. the base and ceiling are isothermal concentration surfaces, while the lateral walls are considered adiabatic impermeable. a mathematical model is derived and solved numerically. both aiding and opposing buoyancy forces have been studied. the investigation is made for wide range of buoyancy ratio n , $-1 < n < 1$ and Lewis number Le , $1 < Le < 10$ and thermal grashof number Gr_t , $2 \times 10^3 < Gr_t < 5 \times 10^6$ with fixed aspect ratio a , $a = 3$, prandtl number Pr , at $Pr = 0.7$. the effect of Lewis number, buoyancy ratio, thermal grashof number on both average nusselt and average sherwood numbers are studied as well as the average nusselt and sherwood numbers were correlated in terms of buoyancy ratio and Lewis number. a comparison is made with the previous experimental and numerical results. the comparison shows a maximum deviation from -5% to $+12.8\%$.