

Double-Diffusive Natural Convection with Various Partially Heated and Salted Sources Arrangements in an Open Cavity

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Abstract : Double-diffusive natural convection in an open top cavity with partial vertical heating and salting sources is investigated numerically. Different temperatures and concentrations are applied at the source location on the right and left walls while the other remains adiabatic except at the open top surface. Various combinations of sources arrangements are imposed at the vertical walls in order to observe the significant impact to the convection. An iterative finite different method is used to solve the dimensionless governing equations. The effects of Marangoni number and sources arrangements on the contours of streamlines, isotherms, and concentrations are visualized as the outcome of the numerical solutions. The average Nusselt and Sherwood number are presented for various sources arrangements. It is clearly observed that the sources arrangements gave major impact on the heat and mass transfer rates. A horizontal-like pattern is found for sources arrangements that near the top-free surface.

Keywords : double-diffusive, Marangoni effect, partial heating, salting

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