Double-diffusive buoyancy induced flow in a triangular cavity with corrugated bottom wall: effects of geometrical parameters

ABSTRACT

A numerical study has been carried out to present flow field, temperature and concentration distribution in a triangular enclosed space with corrugated base surface using finite element method. The cavity consists of an absorber plate and two inclined glass covers. At the base corrugated wall high concentrations and temperature are considered. The study was done for various wave lengths $(0.1, \leq, \lambda, \leq, 1.0)$, thermal Rayleigh number $(103 \leq Ra \leq 105)$ and Prandtl number $(0.071, \leq, Pr, \leq, 7)$. Isotherms, iso-concentration, streamlines, overall Nusselt and Sherwood numbers are obtained for the aforesaid parameters. It is found that wave length plays a dominant role on flow strength for any Rayleigh numbers. Variation of Prandtl number becomes significant for greater values of Rayleigh numbers and multiple cells are formed at the lowest value of Prandtl number.