

Effect of nonlinear temperature profile on thermal convection in a binary fluid saturated an anisotropic porous medium

ABSTRACT

The thermal convection in a horizontal binary fluid layer saturated an anisotropic porous medium with the effect of non-uniform temperature profile is studied analytically by linear stability analysis. The generalized eigenvalues problem subjected to various boundaries conditions are solved numerically using Galerkin method. The effects of solute Rayleigh number, Lewis number, mechanical anisotropy and thermal anisotropy parameters corresponding to the six basic temperature profiles on the stationary thermal convection are shown graphically. It is found that the effects of thermal anisotropic parameter, Lewis number and solute Rayleigh number are to reinforce the stability of the system while the effect of mechanical anisotropic parameter is to advance the onset of convection.

Keyword: Anisotropic; Binary; Galerkin method; Nonlinear temperature profile; Thermal convection