

Effect of Coriolis force and magnetic field on thermal convection in an anisotropic porous medium

ABSTRACT

Effect of Coriolis force and magnetic field on thermal convection in an anisotropic porous medium has been studied numerically. Linear stability analysis has been implemented to verify the presence of Coriolis force and magnetic field on the thermal convection in a horizontal anisotropic porous medium heated from below. The Darcy model is used for the momentum equation and Boussinesq approximation is considered for the density variation in the porous medium. The eigenvalue problems of the perturbed state were obtained from a normal mode analysis and solved using Chebyshev Tau method numerically with respect to upper free conducting and lower free conducting boundary condition. By using Fortran software, it is found that the thermal anisotropy parameter destabilized the system while the effect of Coriolis force and magnetic field help to stabilize the system and can delay the onset of convection and mechanical anisotropic parameter advanced the onset of convection in the system.

Keyword: Anisotropic porous medium; Coriolis force; Magnetic field; Chebyshev Tau method

