

Influence of internal heat source on double-diffusive Soret induced convection in a binary fluid

ABSTRACT

The neutral convection in a double-diffusive fluid layer subject to the internal heat source (internal heating) and thermodiffusion or also known as Soret effect is studied analytically. The influence of the internal heating is supplied by an internal volumetric source with a uniform distribution. Results show that the presence of internal heating in the binary fluid layer which is fluid layer heated and salted has a significant influence on the neutral convection where increasing the internal heating will destabilize the fluid system. Despite the destabilizing factor, an increase of the Solutal Rayleigh number spikes the critical Rayleigh number and thus ensures greater stability of the system. The instability gets fluctuate depending on values of Soret parameter in the presence of internal heating.

Keyword: Convection; Galerkin method; Internal heating; Soret parameter; Stability analysis