

Effect of cubic temperature gradient and internal heat generation on the onset of Marangoni electro convection with feedback control in a micropolar fluid

ABSTRACT

The linear stability analysis is carried out to investigate the influence of non-uniform basic temperature gradients in the presence of internal heat generation, electric field and feedback control on the onset of Marangoni convection in a micropolar fluid. For an upper free adiabatic and lower rigid isothermal boundaries, the eigenvalue are obtained. Then, Galerkin method is applied to solve the eigen value. The effect of internal heat generation, Q , electric number, L and feedback control on the onset of Marangoni convection has been figured out. Three non-uniform basic profiles of the temperature are studied and several general conclusions about their destabilizing effects are revealed. Different values of internal heat generation, Q , electric number and feedback control are added together to investigate their existence either it will delay or enhance the onset of electro convection.

Keyword: Cubic temperature gradient; Internal heat generation; Marangoni electro convection; Micropolar fluid

