

Heat and Mass Transfer of Triple Diffusive Convection in a Rotating Couple Stress Liquid Using Ginzburg-Landau Model

Authors : Sameena Tarannum, S. Pranesh

Abstract : A nonlinear study of triple diffusive convection in a rotating couple stress liquid has been analysed. It is performed to study the effect of heat and mass transfer by deriving Ginzburg-Landau equation. Heat and mass transfer are quantified in terms of Nusselt number and Sherwood numbers, which are obtained as a function of thermal and solute Rayleigh numbers. The obtained Ginzburg-Landau equation is Bernoulli equation, and it has been elucidated numerically by using Mathematica. The effects of couple stress parameter, solute Rayleigh numbers, and Taylor number on the onset of convection and heat and mass transfer have been examined. It is found that the effects of couple stress parameter and Taylor number are to stabilize the system and to increase the heat and mass transfer.

Keywords : couple stress liquid, Ginzburg-Landau model, rotation, triple diffusive convection

Conference Title : ICFMHTT 2017 : International Conference on Fluid Mechanics, Heat Transfer and Thermodynamics

Conference Location : London, United Kingdom

Conference Dates : March 14-15, 2017