

Rotatory Thermosolutal Convection in a Couple-Stress Fluid

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The thermosolutal instability of couple-stress fluid in the presence of uniform vertical rotation is considered. Following the linearized stability theory and normal mode analysis, the dispersion is obtained. For the case of stationary convection, the stable solute gradient and rotation have stabilizing effects on the system, whereas the couple-stress has both stabilizing and destabilizing effects. The dispersion relation is also analyzed numerically. The stable solute gradient and the rotation introduce oscillatory modes in the system, which did not occur in their absence. The sufficient conditions for the non-existence of overstability are also obtained.

Key words: Thermosolutal Convection; Couple-Stress Fluid; Uniform Vertical Rotation.