

BIDISPERSIVE THERMAL CONVECTION WITH RELATIVELY LARGE MACRO PORES

ABSTRACT. We derive linear instability and nonlinear stability thresholds for a problem of thermal convection in a bidispersive porous medium with a single temperature when Darcy theory is employed in the micro pores whereas Brinkman theory is utilized in the macro pores. It is important to note that we show that the linear instability threshold is the same as the nonlinear stability one. This means that the linear theory is capturing completely the physics of the onset of thermal convection. The coincidence of the linear and nonlinear stability boundaries is established under general thermal boundary conditions.

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