Convective Stability of CO2 Sequestration in a Porous Medium

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Abstract

We considered an incompressible fluid-saturated porous layer bounded by two infinite parallel plates. Boussinesq approximation and Darcy's law are applied. The permeability is assumed to be a linear function of the depth z. The linear stability is investigated. The long wavelength expansion method is applied to conduct the weakly nonlinear stability analysis. The evolution equation is derived and analyzed. A uniformly valid periodic solution of the evolution equation is obtained by the application of Poincar\'e-Lindstedt method. Some numerical simulations is presented.

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