

Mixed convection in porous media

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Many studies have been done in convection of porous media since the introduction of Horton-Rogers-Lapwood convection. Applying horizontal throughflow to porous medium heated from below, the mixed convection sets in. Also, the flow transition from the time-dependent oscillating transverse rolls to the longitudinal ones occurs, as the velocity increases. There are two kinds of driving forces, one is a horizontal pressure gradient and other is a buoyancy force. However, it is usually difficult to observe this phenomena due to its structural complexity. Therefore, in order to reproduce this physical phenomenon, the direct three-dimensional numerical simulation is applied. In addition, the related stability condition, i.e., the absolute and convective instabilities, is examined by using the amplitude equation known as Ginzburg-Landau equation