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Numerical Investigation of Convective Regimes in a Planar Filtrational Convection Problem

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One-parameter families of steady-state convection regimes developing in the Darcy plane convection problem in a rectangular vessel are investigated numerically with increase of filtrational Rayleigh number and various aspect ratios of the container. The reason of the existence of these families is the cosymmetry. We consider Galerkin systems of various dimensions (up to 1000) for PDE approximation. The qualitative repetition of the bifurcations and consistency of the bifurcation parameter values was established by investigation of Galerkin's models of increasing dimensions for each set of the physical parameters. The loss of stability on a primary family, bifurcations of equilibrium families, periodic and chaotic regimes are studied. The fluid motion and heat transfer by convective regimes are also investigated.

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