Piotr Kalita
Jagiellonian University
José A. Langa
Universidad de Sevilla
Grzegorz Łukaszewicz
University of Warsaw

Nonlinear semigroups in hydrodynamics and their perturbations. Micropolar meets Newtonian.

We consider the Rayleigh–Bénard problem for two-dimensional Boussinesq systems, for the micropolar fluid and the Navier–Stokes model, respectively. The former model can be regarded as a perturbation of the latter which can be expressed in terms of the associated semigroups.

Our main goal is to compare three important physical characteristics for the both problems, namely, the values of the critical Rayleigh numbers, estimates of the Nusselt numbers and the fractal dimensions of global attractors.

Our estimates reveal the stabilizing effects of micropolarity in comparison with the homogeneous Navier–Stokes fluid.

References:

P. Kalita, J. A. Langa, G. Łukaszewicz, *Micropolar meets Newtonian. The Rayleigh–Bénard problem*, to appear.