

Numerical schemes for stochastic 2D Benard-Boussinesq equations

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We implement a semi-implicit time Euler scheme for the two-dimensional Benard-Boussinesq model on the torus. We prove a rate of convergence in probability of order $(1/2)^-$ for a multiplicative noise; this relies on moment estimates in various norms for the processes and the scheme. In case of an additive noise, due to the coupling of the equations, provided that the difference on temperature between the top and bottom parts of the torus is not too big compared to the viscosity and thermal diffusivity, a strong polynomial rate of convergence (almost $1/2$) is proven for both the velocity and the temperature. These rates in both cases are like that obtained for the 2d stochastic Navier-Stokes equation.

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