



A NEW FIVE-MODES TRUNCATION OF THE PLANE INCOMPRESSIBLE NAVIER-STOKES EQUATIONS

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Abstract

A new five-modes truncation of Navier-Stokes equations for a two-dimensional incompressible fluid on a torus is studied. And its stationary solutions, the existence of attractor and the global stability of the equations are firmly proved. At the same time, several issues such as some basic dynamical behaviors and routes to chaos are shown numerically by changing Reynolds number. And the system exhibits a stochastic behavior approached through an involved sequence of bifurcations.

Keywords and phrases: Navier-Stokes equations, strange attractor, Lyapunov function, bifurcation, chaos.

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