Two-dimensional convection in a horizontal fluid layer with spatially periodic boundary temperatures

Joo-Sik Yoo

Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, P.O. Box 150, Cheongryang, Seoul, South Korea

Moon-Uhn Kim

Department of Mathematics, Korea Advanced Institute of Science and Technology, P.O. Box 150, Cheongryang, Seoul, South Korea

Received 20-DEC-90

Two-dimensional thermal convection in a fluid layer confined between two horizontal rigid walls kept at spatially periodic temperatures is investigated by direct numerical simulations. With increasing the Rayleigh number, convection evolves from a steady state to a temporally chaotic flow. It is observed that the transition to the chaos occurs via quasi-periodic states with two or three basic frequencies or via sequences of period-doubling bifurcations, according to the boundary temperature distributions.

Copyright (c) 1998 Elsevier Science B.V. All rights reserved.