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The analysis of periodic and strange attractors during density-wave oscillations in boiling flows. (English) [Zbl 0732.76090](#)

Chaos Solitons Fractals 1, No. 2, 167-178 (1991).

Summary: The occurrence of periodic and strange attractors for a boiling flow is considered. A nonlinear homogeneous one-dimensional two-phase flow model of the conservation equations is analyzed using a nodal averaging method to obtain a system of nonlinear ordinary differential equations. It was found that, for constant pressure drop boundary conditions, the flow undergoes a supercritical bifurcation evolving to a stable limit cycle due to density-wave instability. A cascade of bifurcations leading to chaos was found at low flow rate conditions in a system comprised of a boiling channel coupled with an adiabatic riser.

MSC:

76T99 Multiphase and multicomponent flows

Cited in 1 Document

37C70 Attractors and repellers of smooth dynamical systems and their topological structure

37D45 Strange attractors, chaotic dynamics of systems with hyperbolic behavior

37G15 Bifurcations of limit cycles and periodic orbits in dynamical systems

Keywords:

strange attractors; boiling flow; nonlinear homogeneous one-dimensional two-phase flow; nodal averaging method; supercritical bifurcation; stable limit cycle; density-wave instability; chaos

Full Text: [DOI](#)

References:

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