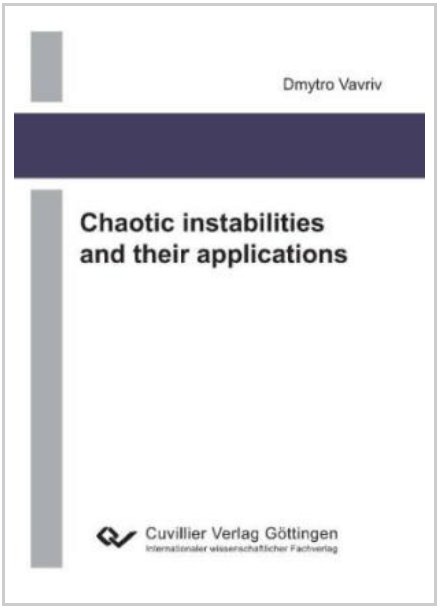

Chaotic instabilities and their applications

By Dmytro Vavriv

Cuvillier Verlag Nov 2009, 2009. Taschenbuch. Condition: Neu. Neuware - The phenomenon of chaos, which is arising as noise-like oscillations in deterministic low-dimensional nonlinear system-s, should be treated from two different points of view. First, this effect can create a threat to stability of many practical systems, and it is needed to know conditions for the chaos to arise. Second, chaotic oscillations can be used for the development of various advanced devices, like noise oscillators, random number generators, noise radars, and so on. Both mentioned directions of the chaos study are addressed in this thesis. In this thesis, we present a first attempt to study chaotic instabilities which arise during the transition of pulses via nonlinear circuits. The mathematical model used is a generalized Duffing equation, which is an adequate model to describe stability in a number of electronic, microwave, and optical devices. The simplest physical oscillator which is described by such equation is a RLC-circuit with nonlinear capacitor, or a cavity with nonlinear element or media. Analytical, numerical, and experimental methods have been used in order to determine conditions for chaotic instabilities arising. For example, the application of secondary averaging has enabled us to find resonances which can give...

Reviews

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