

Springer

1st
edition1st ed. 2015, X, 310 p. 46
illus., 26 illus. in color.**Printed book**

Hardcover

Printed book

Hardcover

ISBN 978-3-662-47274-3

\$ 109,00

Available

Discount group

Professional Books (2)

Product category

Monograph

Series

Nonlinear Physical Science

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Softcover

ISBN 978-3-662-51709-3

Physics : Applications of Nonlinear Dynamics and Chaos Theory

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Discretization and Implicit Mapping Dynamics

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This unique book presents the discretization of continuous systems and implicit mapping dynamics of periodic motions to chaos in continuous nonlinear systems. The stability and bifurcation theory of fixed points in discrete nonlinear dynamical systems is reviewed, and the explicit and implicit maps of continuous dynamical systems are developed through the single-step and multi-step discretizations. The implicit dynamics of period- m solutions in discrete nonlinear systems are discussed. The book also offers a generalized approach to finding analytical and numerical solutions of stable and unstable periodic flows to chaos in nonlinear systems with/without time-delay. The bifurcation trees of periodic motions to chaos in the Duffing oscillator are shown as a sample problem, while the discrete Fourier series of periodic motions and chaos are also presented. The book offers a valuable resource for university students, professors, researchers and engineers in the fields of applied mathematics, physics, mechanics, control systems, and engineering.

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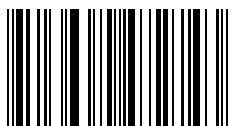
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