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Soggetti	Dynamics Mathematics Differential equations System theory Engineering mathematics Engineering - Data processing Computer software Dynamical Systems Applications of Mathematics Differential Equations Complex Systems Mathematical and Computational Engineering Applications Mathematical Software
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	A Tutorial Introduction to Mathematica -- Differential Equations -- Planar Systems -- Interacting Species -- Limit Cycles -- Hamiltonian Systems, Lyapunov Functions, and Stability -- Bifurcation Theory -- Three-Dimensional Autonomous Systems and Chaos -- Poincaré Maps and Nonautonomous Systems in the Plane -- Local and Global Bifurcations -- The Second Part of Hilbert's Sixteenth Problem -- Linear Discrete Dynamical Systems -- Nonlinear Discrete Dynamical Systems -- Complex Iterative Maps -- Electromagnetic Waves and Optical Resonators -- Fractals and Multifractals -- Chaos Control and

This textbook, now in its second edition, provides a broad introduction to the theory and practice of both continuous and discrete dynamical systems with the aid of the Mathematica software suite. Taking a hands-on approach, the reader is guided from basic concepts to modern research topics. Emphasized throughout are numerous applications to biology, chemical kinetics, economics, electronics, epidemiology, nonlinear optics, mechanics, population dynamics, and neural networks. The book begins with an efficient tutorial introduction to Mathematica, enabling new users to become familiar with the program, while providing a good reference source for experts. Working Mathematica notebooks will be available at: <http://library.wolfram.com/infocenter/Books/9563/> The author has focused on breadth of coverage rather than fine detail, with theorems and proofs being kept to a minimum, though references are included for the inquisitive reader. The book is intended for senior undergraduate and graduate students as well as working scientists in applied mathematics, the natural sciences, and engineering. Many of the chapters are especially useful as reference material for senior undergraduate independent project work. New to the second edition: Since the first printing of this book in 2007, Mathematica has evolved from version 6.0 to version 11.2 in 2017. Accordingly, the second edition has been thoroughly updated and new material has been added. There are many more applications, examples and exercises, all with solutions, and new sections on series solutions of ordinary differential equations and Newton fractals, have been added. There are also new chapters on delay differential equations, image processing, binary oscillator computing, and simulation with Wolfram SystemModeler. Praise for the first edition: “[This book’s] content and presentation style convey the excitement that has drawn many students and researchers to dynamical systems in the firstplace.” —Dynamical Systems Magazine “This book presents an original, cheap and powerful solution to the problem of analysis of large data sets.” —Studia Universitatis Babes’-Bolyai Mathematica “The one-liner programs come to life when typed in, and the growing programming skill lends itself to inventing [one’s] own extensions to the supplied problems.” —Datafile, The Journal of the HPCC.