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Nota di contenuto	Preface -- A Tutorial Introduction to MATLAB® -- Linear Discrete Dynamical Systems -- Nonlinear Discrete Dynamical Systems -- Complex Iterative Maps -- Electromagnetic Waves and Optical Resonators -- Fractals and Multifractals -- The Image Processing Toolbox -- 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 -- Neural Networks -- Chaos Control and Synchronization -- Binary Oscillator Computing -- SIMULINK® -- Examination-Type Questions -- Solutions to Exercises -- Index. .

Sommario/riassunto

This textbook, now in its second edition, provides a broad introduction to both continuous and discrete dynamical systems, the theory of which is motivated by examples from a wide range of disciplines. It emphasizes applications and simulation utilizing MATLAB®, Simulink®, the Image Processing Toolbox™, and the Symbolic Math Toolbox™, including MuPAD. Features new to the second edition include · sections on series solutions of ordinary differential equations, perturbation methods, normal forms, Gröbner bases, and chaos synchronization; · chapters on image processing and binary oscillator computing; · hundreds of new illustrations, examples, and exercises with solutions; and · over eighty up-to-date MATLAB® program files and Simulink model files available online. These files were voted MATLAB® Central Pick of the Week in July 2013. The hands-on approach of Dynamical Systems with Applications using MATLAB®, Second Edition, has minimal prerequisites, only requiring familiarity with ordinary differential equations. It will appeal to advanced undergraduate and graduate students, applied mathematicians, engineers, and researchers in a broad range of disciplines such as population dynamics, biology, chemistry, computing, economics, nonlinear optics, neural networks, and physics. Praise for the first edition Summing up, it can be said that this text allows the reader to have an easy and quick start to the huge field of dynamical systems theory. MATLAB/SIMULINK facilitate this approach under the aspect of learning by doing. —OR News/Operations Research Spectrum The MATLAB programs are kept as simple as possible and the author's experience has shown that this method of teaching using MATLAB works well with computer laboratory classes of small sizes…. I recommend ‘Dynamical Systems with Applications using MATLAB’ as a good handbook for a diverse readership: graduates and professionals in mathematics, physics, science and engineering. —Mathematica.