

Chaos and Nonlinear Dynamics

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Chaos and Nonlinear Dynamics introduces students, scientists, and engineers to the full range of activity in the rapidly growing field of nonlinear dynamics. Using a step-by-step introduction to dynamics and geometry in state space as the central focus of understanding nonlinear dynamics, this book includes a thorough treatment of both differential equation models and iterated map models (including a derivation of the famous Feigenbaum numbers). It is the only book at this level to include the increasingly important field of pattern formation and a survey of the controversial questions of quantum chaos. Important tools such as Lyapunov exponents and fractal dimensions are treated in detail. With over 200 figures and diagrams, and analytic and computer exercises for every chapter, the book can be used as a course-text or for self-instruction. This second edition has been restructured to make the book even more useful as a course text: many of the more complex examples and derivations have been moved to appendices. The extensive collection of annotated references has been updated through January 2000 and now includes listings of World Wide Web sites at many of the major nonlinear dynamics research centers. From reviews on the 1/e: 'What has been lacking is a single book that takes the reader with nothing but a knowledge of elementary calculus and physics all the way to the frontiers of research in chaos and nonlinear dynamics in all its facets. [...] a serious student, teacher, or researcher would be delighted to have this book on the shelf as a reference and as a window to the literature in this exciting and rapidly growing new field of chaos.' J.C. Sprott, American Journal of Physics, September 1994 'I congratulate the author on having managed to write an extremely thorough, comprehensive, and entertaining introduction to the fascinating field of nonlinear dynamics. His book is highly self-explanatory and ideally suited for self-instruction. There is hardly any question that the author does not address in an exceptionally readable manner. [...] I strongly recommend it to those looking for a comprehensive, practical, and not highly mathematical approach to the subject.' E.A. Hunt, IEEE Spectrum, December 1994

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