



# Chaos and Fractals: An Elementary Introduction

By David P. Feldman

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## Chaos and Fractals: An Elementary Introduction By David P. Feldman

This book provides the reader with an elementary introduction to chaos and fractals, suitable for students with a background in elementary algebra, without assuming prior coursework in calculus or physics. It introduces the key phenomena of chaos - aperiodicity, sensitive dependence on initial conditions, bifurcations - via simple iterated functions. Fractals are introduced as self-similar geometric objects and analyzed with the self-similarity and box-counting dimensions. After a brief discussion of power laws, subsequent chapters explore Julia Sets and the Mandelbrot Set. The last part of the book examines two-dimensional dynamical systems, strange attractors, cellular automata, and chaotic differential equations.

The book is richly illustrated and includes over 200 end-of-chapter exercises. A flexible format and a clear and succinct writing style make it a good choice for introductory courses in chaos and fractals.

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## **Chaos and Fractals: An Elementary Introduction** By David P. Feldman Bibliography

- Sales Rank: #869330 in Books
- Published on: 2012-10-12
- Released on: 2012-10-12
- Original language: English
- Number of items: 1
- Dimensions: 7.40" h x .90" w x 9.60" l, 2.00 pounds
- Binding: Paperback
- 432 pages

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#### Review

"For the right audience and instructor, this is a wonderful book. With considerable effort on both sides it can take a wide audience with modest mathematics to a reasonable understanding of what is behind much of the complex phenomena seen in modern mathematical models of the physical universe."

-- Thomas B. Ward, Durham University

"There is a great deal to like about this book, starting with the author's writing style, which I found particularly clear and enjoyable. ... All in all, this is a very valuable book. ... This is an excellent book and is highly recommended." --*Mark Hunacek, MAA Reviews*

#### From the Author

A solutions manual is available for instructors. Contact Oxford University Press or the author.

#### About the Author

David Feldman joined the faculty at College of the Atlantic in 1998, having completed a PhD in Physics at the University of California. He served as Associate Dean for Academic Affairs from 2003 - 2007. At COA Feldman has taught over twenty different courses in physics, mathematics, and computer science.

Feldman's research interests lie in the fields of statistical mechanics and nonlinear dynamics. In his research, he uses both analytic and computational techniques. Feldman has authored research papers in journals including Physical Review E, Chaos, and Advances in Complex Systems. He has recently begun a research project looking at trends in extreme precipitation events in Maine.

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