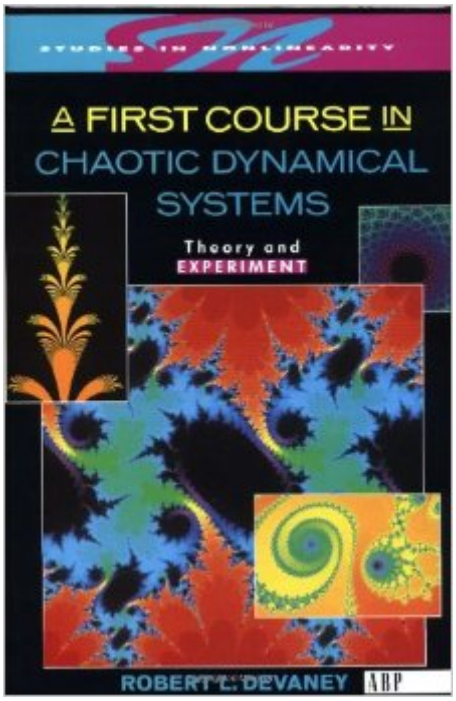
A First Course In Chaotic Dynamical Systems: Theory And Experiment (Studies In Nonlinearity)



Synopsis

A First Course in Chaotic Dynamical Systems: Theory and Experiment is the first book to introduce modern topics in dynamical systems at the undergraduate level. Accessible to readers with only a background in calculus, the book integrates both theory and computer experiments into its coverage of contemporary ideas in dynamics. It is designed as a gradual introduction to the basic mathematical ideas behind such topics as chaos, fractals, Newtonâ ™s method, symbolic dynamics, the Julia set, and the Mandelbrot set, and includes biographies of some of the leading researchers in the field of dynamical systems. Mathematical and computer experiments are integrated throughout the text to help illustrate the meaning of the theorems presented.Chaotic Dynamical Systems Software, Labs 1–6 is a supplementary laboratory software package, available separately, that allows a more intuitive understanding of the mathematics behind dynamical systems theory. Combined with A First Course in Chaotic Dynamical Systems, it leads to a rich understanding of this emerging field.

Book Information

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Customer Reviews

I went from knowing absolutlely nothing about dynamical systems to being able to look at a point on the Mandelbrot Set and visualize what the corresponding Julia Set looks like. Ever wonder why weather cannot be predicted accurately?? Read this book...

This is a fine text, and I was able to follow it fairly easily. However, it is rather dated (1992) and there

have been improvements in the subject in several areas. I found Steven Strogatz's "Nonlinear Dynamics And Chaos" (2001) a significantly better book for both content and readability.

This is a good textbook to use for a second or third year course introducing dynamical systems. Using this book you could teach a course that both isn't too simple minded and yet isn't too abstract. The material in this book also motivates a lot of further deep material in dynamical systems, and I think that it could be encouraging to students who are seeing metric spaces, complex analysis and differential equations in purer settings to see that this theory has tangible applications. This would also be a good course for students not majoring in mathematics, to see that mathematics can be exciting in a way that a first year calculus or linear algebra course is not. There aren't many mathematics courses that could usefully be taken by mathematics students and non-mathematics students; the only other topic I can see being suitable is classical geometry.

I would recommend this book to anyone who wishes to learn about nonlinear systems. As a physicist, this is a good mathematical intro to nonlinear phenomena. For a more in depth look, check out a mechanics book.

I bought this for my 16-year-old who is doing an undergraduate independent study in dynamics. His professor had him go through the material to the Feigenbaum limit. Lots of good exercises and a well-written exposition of the material. Additionally, he got the book signed by Dr. Devaney!

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