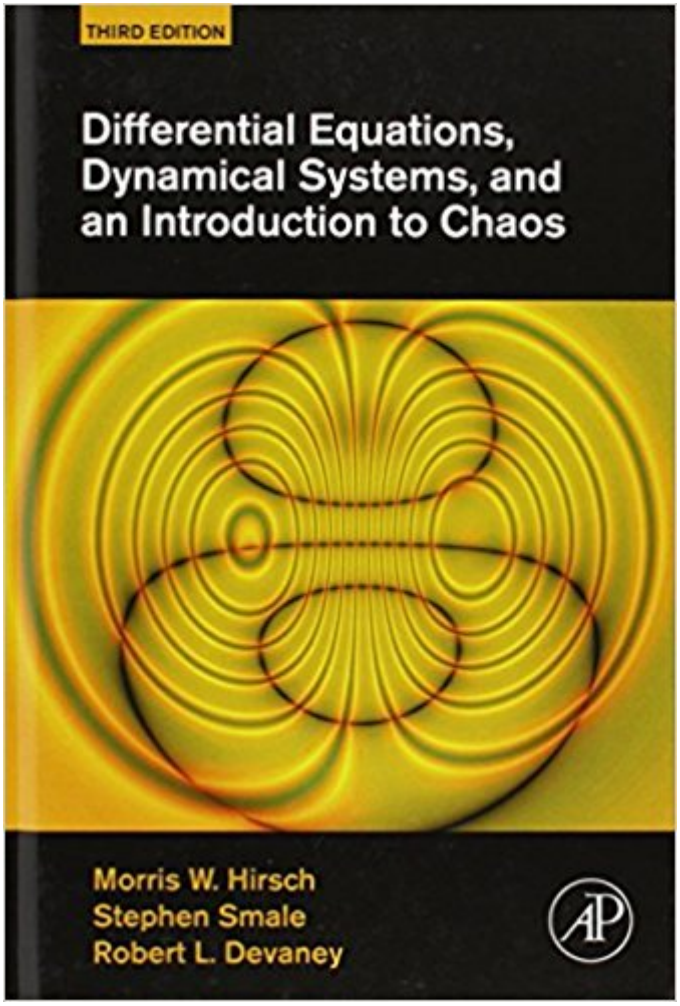
Differential Equations, Dynamical Systems, And An Introduction To Chaos, Third Edition



Synopsis

Hirsch, Devaney, and Smaleâ ™s classic Differential Equations, Dynamical Systems,Â and an Introduction to Chaos has been used by professors as the primary text for undergraduate and graduate level courses covering differential equations. It provides a theoretical approach to dynamical systems and chaos written for a diverse student population among the fields of mathematics, science, and engineering. Prominent experts provide everything students need to know about dynamical systems as students seek to develop sufficient mathematical skills to analyze the types of differential equations that arise in their area of study. The authors provide rigorous exercises and examples clearly and easily by slowly introducing linear systems of differential equations. Calculus is required as specialized advanced topics not usually found in elementary differential equations courses are included, such as exploring the world of discrete dynamical systems and describing chaotic systems.Classic text byÂ three of the worldâ ™s most prominent mathematicians Continues the tradition of expository excellenceContains updated material and expanded applications for use in applied studies

Book Information

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Customer Reviews

This book is a great balance of concrete examples and general results. It’s proven very useful for independent study and is almost entirely self contained. It would have been nice to have separate existence and uniqueness proofs in chapter 17 but the proof provided is sufficient and decent to read.

I often found myself wishing for a more structured approach to the topics covered in the book. In many early chapters key points are introduced in examples rather than as theorems or propositions or the like. It did provide some nice intuition, but overall I'd recommend getting a more "traditional" book on the subject as well if you get assigned this book for a class.

I read this book quicker than I wanted to. It will be a wonderful resource to come back with the explorations and the exercises. As such this review pertains to reading rather than getting the most out of this book. This limitation aside, this is a very clearly written and illustrated book.There is a progressive increase in complexity proceeding from one dimensional linear autonomous differential equations, to linearisation of non-linear equation, qualitative assessments through analysis of equilibrium points, Poincare maps. The section introducing chaos (focussing on hallmarks of density of periodic orbits, transitivity and sensitivity to initial conditions) is very interesting. I found the chaotic behaviour of logistic map and relation (homeomorphism) to Cantor sets very interesting.It is a very good textbook and I look forward to a time when I can maximize my learning by diving into the explorations (esp. with Mathematica).

I have been using this book for years. I wish I could get into some of the specifics that I found most useful, but I lent it to a student and they never gave it back. That makes sense--this book saved my bacon when I took an innocuously named "Applied Dynamical Systems" class (ha!), and the "borrower" can be forgiven for needing it equally much. I found that the descriptions, and particularly the illustrations, provided more detail than Strogatz, and with greater brevity, without assuming an excess of knowledge. It is also vastly gentler than, say, Guckenheimer & Holmes, and has much more information than Hale.At the time that I read this book, I had only taken an introductory class on ODEs, and a pretty light one at that. With some googling and supplemental exercises, I got through the material alright. I particularly appreciated the useful examples, which I still find myself consulting now and then, especially while preparing for lectures. I highly recommend it.

Great book and excellent service!

Great for those interested in topic excellent reference

The first chapter is maybe the most important chapter of any book, and the problem with this one is that it fails to motivate the material, while frustrating the reader because it skips many steps in the

calculation. Three to five pages in, you are already asking yourself about the merit of the small details in the calculations when the big picture of the concepts is not explained. I came back 8 years later to write this comment, which should be an indication to the enthusiastic new math student who is eager to learn this subject. As a result of the course I took with this book, I missed the very basics of differential equations, which hurt me in PDEs, and as a result, I specialized in subjects that were completely orthogonal to differential equations. While this book doesn't deserve 100% of the blame, some of it goes to the professor who was even worse than the book at glossing over important concepts, it definitely takes partial blame. What can you do, now that it's all in the past?

The main issue is that this book would leave many things undefined. It would mention things like bifurcation points, phase lines, but would never define them. Multiple times during reading it I had to look up terms in other sources to get definitions. Granted this isn't necessarily a show stopper, but when words are bold-faced it's more or less expected that they are to be defined. Often times you had to guess what something was in a diagram to get something close to a definition.This book was part of the reason why I dropped a math class I had planned on taking. Granted I had only read the first chapter, before giving up on it, so as far as I know it gets better after the chapter. On an unrelated note the publisher is known for being quite sleazy with their business practices, so that might be another reason not to use this book.

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