



An Introduction to Dynamical Systems

By R. Clark Robinson

Download now

Read Online ➔

An Introduction to Dynamical Systems By R. Clark Robinson

This book gives an introduction into the ideas of dynamical systems. Its main emphasis is on the types of behavior which nonlinear systems of differential equations can exhibit. It is divided into two parts which can be read in either order: the first part treats the aspects coming from systems of nonlinear ordinary differential equations, and the second part is comprised of those aspects dealing with iteration of a function. For professionals with a strong mathematics background.

↓ [Download An Introduction to Dynamical Systems ...pdf](#)

📄 [Read Online An Introduction to Dynamical Systems ...pdf](#)

An Introduction to Dynamical Systems

By R. Clark Robinson

An Introduction to Dynamical Systems By R. Clark Robinson

This book gives an introduction into the ideas of dynamical systems. Its main emphasis is on the types of behavior which nonlinear systems of differential equations can exhibit. It is divided into two parts which can be read in either order: the first part treats the aspects coming from systems of nonlinear ordinary differential equations, and the second part is comprised of those aspects dealing with iteration of a function. For professionals with a strong mathematics background.

An Introduction to Dynamical Systems By R. Clark Robinson Bibliography

- Sales Rank: #2690295 in Books
- Published on: 2004-01-15
- Original language: English
- Number of items: 1
- Dimensions: 10.00" h x 1.70" w x 8.00" l, 3.05 pounds
- Binding: Paperback
- 672 pages

 [Download An Introduction to Dynamical Systems ...pdf](#)

 [Read Online An Introduction to Dynamical Systems ...pdf](#)

Editorial Review

Excerpt. © Reprinted by permission. All rights reserved.

This book is intended for an advanced undergraduate course in dynamical systems or nonlinear ordinary differential equations. There are portions that could be beneficially used for introductory master level courses. The goal is a treatment that gives examples and methods of calculation, at the same time introducing the mathematical concepts involved. Depending on the selection of material covered, an instructor could teach a course from this book that is either strictly an introduction into the concepts, that covers both the concepts on applications, or that is a more theoretically mathematical introduction to dynamical systems. Further elaboration of the variety of uses is presented in the subsequent discussion of the organization of the book.

The assumption is that the student has taken courses on calculus covering both single variable and multivariables, a course on linear algebra, and an introductory course on differential equations. From the multivariable calculus, the material on partial derivatives is used extensively, and in a few places multiple integrals and surface integrals are used. (See Appendix A.) Eigenvalues and eigenvectors are the main concepts used from linear algebra, but further topics are listed in Appendix C. The material from the standard introductory course on differential equations is used only in part one; we assume that students can solve first-order equations by separation of variables, and that they know the form of solutions from second order scalar equations. Students who have taken an introductory course on differential equations are usually familiar with linear systems with constant coefficients (at least the real-eigenvalue case), but this material is repeated in Chapter 2, where we also introduce the reader to the phase portrait. Students have taken the course covering part one on differential equations without this introductory course on differential equations; they have been able to understand the new material where they have been willing to do the extra work in a few areas that is required to fill in the missing background. Finally, we have not assumed that the student has a course on real analysis or advanced calculus. However, it is convenient to use some of the terminology from such a course, so we include an appendix with terminology on continuity and topology.

Organization

This book presents an introduction to the concepts of dynamical systems. It is divided into two parts, which can be treated in either order: The first part treats various aspects of systems of nonlinear ordinary differential equations, and the second part treats those aspects dealing with iteration of a function. Each separate part can be used for a one-quarter course, a one-semester course, a two-quarter course, or possibly even a year course. At Northwestern University, we have courses that spend one-quarter on the first part and two-quarters on the second part. In a one quarter course on differential equations, it is difficult to cover the material on chaotic attractors, even skipping many of the applications and proofs at the end of the chapters. A semester course on differential equations could also cover selected topics on iteration of functions from chapters nine through eleven. In the course on discrete dynamical systems from part two, we cover most of the material on iteration of one dimensional functions (chapters nine through eleven) in one quarter. The material on iteration of higher dimensional functions (chapters twelve through thirteen) certainly depends on the one dimensional material, but a one semester course could mix in some of the higher dimensional examples with the treatment of chapters nine through eleven. Finally, chapter fourteen on fractals can be treated after a number of the earlier chapters. Fractal dimensions could be integrated into the material on chaotic attractors at the end of a course on differential equations. The material on fractal dimensions or iterative function systems could be treated with a course on iteration of one dimensional functions.

The main concepts are presented in the first sections of each chapters. These sections are followed by a section that presents some applications and then by a section that contains proofs of the more difficult results and more theoretical material. The division of material between these types of sections is somewhat arbitrary. The material on competitive populations and predator-prey systems is contained in one of the beginning sections of the chapters in which these topics are covered, rather than in the applications at the end of the chapters, because these topics serve to develop the main techniques presented. Also, some proofs are contained in the main sections when they are more computational and serve to make the concepts clearer. Longer and more technical proofs and further theoretical discussion are presented separately at the end of the chapter.

A course that covers the material from the primary sections, without covering the sections at the end of the chapter on applications and more theoretical material, results in a course on the concepts of dynamical systems with some motivation from applications.

The applications provide motivation and illustrate the usefulness of the concepts. None of the material from the sections on applications is necessary for treating the main sections of later chapters. Treating more of this material would result in a more applied emphasis.

Separating the harder proofs, allows the instructor to determine the level of theory of the course taught using this book as the text. A more theoretic course could consider most of the proofs at the end of the chapters.

Computer Programs

The book does not explicitly cover aspects of computer programming. However, a few selected problems require computer simulations to produce phase portraits of differential equations or to iterate functions. Sample Maple worksheets, which the students can modify to help with some of the more computational problems, will be available on the webpage,

<http://www.math.northwestern.edu/~clark/dyn-sys>

(Other material on corrections and updates of the book will also be available at this website.) There are several books available that treat dynamical systems in the context of Maple or Mathematica: two such books are 58 by M. Kulenovic and 70 by S. Lynch. The book 85 by J. Polking and D. Arnold discusses using Matlab to solve differential equations using packages available at **<http://math.rice.edu/~dfield>**. The book 80 by H. Nusse and J. Yorke comes with its own specialized dynamical systems package.

Users Review

From reader reviews:

Kimberly Thibault:

This An Introduction to Dynamical Systems book is absolutely not ordinary book, you have after that it the world is in your hands. The benefit you have by reading this book is usually information inside this book incredible fresh, you will get data which is getting deeper anyone read a lot of information you will get. That An Introduction to Dynamical Systems without we know teach the one who reading through it become critical in contemplating and analyzing. Don't be worry An Introduction to Dynamical Systems can bring any time you are and not make your carrier space or bookshelves' turn into full because you can have it in your lovely laptop even mobile phone. This An Introduction to Dynamical Systems having good arrangement in word and layout, so you will not feel uninterested in reading.

Willene Choate:

Here thing why that An Introduction to Dynamical Systems are different and reputable to be yours. First of all reading through a book is good however it depends in the content of computer which is the content is as delicious as food or not. An Introduction to Dynamical Systems giving you information deeper including different ways, you can find any reserve out there but there is no publication that similar with An Introduction to Dynamical Systems. It gives you thrill studying journey, its open up your own personal eyes about the thing in which happened in the world which is possibly can be happened around you. It is possible to bring everywhere like in park your car, café, or even in your method home by train. For anyone who is having difficulties in bringing the printed book maybe the form of An Introduction to Dynamical Systems in e-book can be your substitute.

Ida Vanwormer:

Spent a free a chance to be fun activity to try and do! A lot of people spent their sparetime with their family, or their friends. Usually they performing activity like watching television, gonna beach, or picnic from the park. They actually doing same task every week. Do you feel it? Do you need to something different to fill your personal free time/ holiday? Might be reading a book can be option to fill your no cost time/ holiday. The first thing you will ask may be what kinds of publication that you should read. If you want to test look for book, may be the reserve untitled An Introduction to Dynamical Systems can be excellent book to read. May be it may be best activity to you.

Teresa Propst:

Reading can called head hangout, why? Because when you are reading a book mainly book entitled An Introduction to Dynamical Systems your brain will drift away trough every dimension, wandering in each and every aspect that maybe mysterious for but surely will end up your mind friends. Imaging every single word written in a reserve then become one form conclusion and explanation this maybe you never get before. The An Introduction to Dynamical Systems giving you one more experience more than blown away the mind but also giving you useful data for your better life on this era. So now let us explain to you the relaxing pattern this is your body and mind will probably be pleased when you are finished examining it, like winning a. Do you want to try this extraordinary spending spare time activity?

**Download and Read Online An Introduction to Dynamical Systems
By R. Clark Robinson #7KQENAUC4XL**

Read An Introduction to Dynamical Systems By R. Clark Robinson for online ebook

An Introduction to Dynamical Systems By R. Clark Robinson Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read An Introduction to Dynamical Systems By R. Clark Robinson books to read online.

Online An Introduction to Dynamical Systems By R. Clark Robinson ebook PDF download

An Introduction to Dynamical Systems By R. Clark Robinson Doc

An Introduction to Dynamical Systems By R. Clark Robinson Mobipocket

An Introduction to Dynamical Systems By R. Clark Robinson EPub

7KQENAUC4XL: An Introduction to Dynamical Systems By R. Clark Robinson