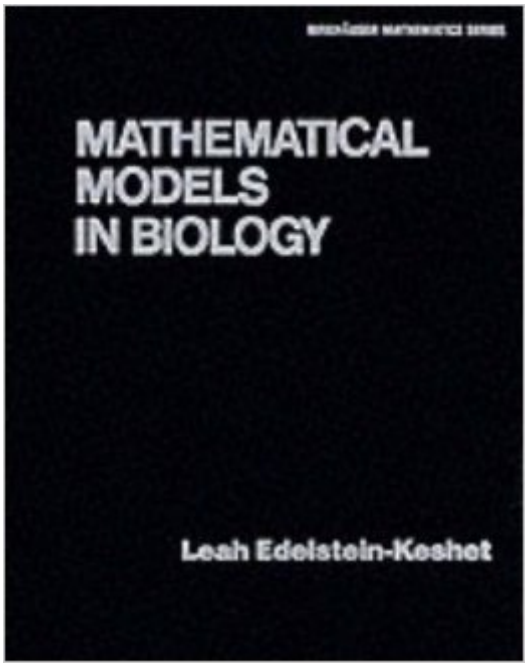
Mathematical Models In Biology



Synopsis

The major aim of this book is to present instances of interaction between two major disciplines, biology and mathematics. The goal has been that of addressing a fairly wide audience. Biology students will find this text useful as a summary of modern mathematical methods currently used in modelling, and furthermore, applied mathematics students may benefit from examples of applications of mathematics to real-life problems. As little background as possible has been assumed throughout the book: prerequisites are basic calculus so that undergraduate students, as well as beginning graduate students, will find most of the material accessible.

Book Information

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Customer Reviews

There are lots of books about mathematical modeling, and many of them cover biological systems. But no book I’ve ever seen even comes close to the quality of this beautiful work by Edelstein-Keshet. So what is it that makes this book so special? First of all, the book is both accessible and self-contained. Just start at the beginning, and you’re guaranteed to learn A LOT of math. Second, the style of writing and the way in which the author presents the material is utterly beautiful. It is impossible NOT to understand, but the material is not at all ’chewed out’ for the reader. Third of all, the book really encourages the reader to pick up pen and paper, go out there and MODEL something; dozens of inspiring and high-quality exercises and research projects are to be found throughout the book. Fourth, the various techniques are easily applied to non-biological

problems. Fifth, the book will help to gain insight in the qualitative aspects of biological phenomena. What Peter Atkins is to chemistry, Edelstein-Keshet is to mathematical biology. Sadly, she is not as widely known. Get this book while you can!

This is a nice introductory book on math biology models. It is easy to understand and a necessary reading for those who want to approach more difficult books such as Mathematical Physiology. The exercises presented are useful for active learning of this topic.Be aware: this book requires prior knowledge of calculus (differential equations, partial derivatives, Taylor series expansion...).

A classic textbook in mathematical biology, and still one of the best I know. It is a testament to the quality of this book that many other textbooks that have been published after it essentially follow the template of this book.No other book does a better job at explaining clearly and concisely the biological background. The tone is precise and approachable without being aloof.There are two flaws about this book: One is the mathematical exposition, which is sometimes simply wrong. (The whole section about the Hopf bifurcation is very poor, and I couldn’t use this section in classes I taught. It has to be supplemented by other textbooks.) The other, related, flaw is the flood of typos. This is the text with the most typos I’ve ever seen. (The latest errata list has 16 pages, and there are still many unlisted typos.) And this is the second edition! Normally typos don’t bother me too much, but there are so many here that it truly becomes a nuisance.Overall, though, this is a good textbook. I wish the author would decide to update the text and clean up the typos and some of the math sections.

I come from a Physics background, so I have extensive knowledge of Differential Equations, Calculus, etc. This has to be one of the WORST books I’ve ever read. First of all, it’s filled with almost 15 pages of "Errata" - including the author messing up a Taylor Series Expansion. That’s ridiculous - no publisher should have allowed this book to go on the market so full of mistakes with the author so unwilling to correct them.Secondly, the book teaches you absolutely no Math at all. Half of the lectures in each chapter are obscure, random models the author picked, and suddenly is capable of making assumptions about each model that seem completely arbitrary. There is no reasoning behind half of the steps the author takes.I’m sorry, but I swear I’m becoming bad at math trying to use this textbook. Using this book is a waste of time and money. I can’t wait to put it in the fireplace.

I’ve taught out of this text several times; the positive is that it contains a wealth of material that would require extensive knowledge of the literature for an instructor to reproduce on their own.There is a major negative: the text is pedagogically opaque. The author’s technique is to begin with a difficult problem, involve the reader in complex computations, then leave the reader flat, with no discussion of what’s been accomplished, how or why a model might be modified and what that might mean biologically, etc.Nowhere is this clearer than in the treatment of the Hodgkin-Huxley equations. I think one would be hard put to gain any understanding of the derivation of the equations, or their biological meaning, from the text. This was Nobel Prize work, and has led to other Nobels; it deserves better.There’s an old saying: when you do mathematical biology, you can emphasize the first word or the second. This text is firmly on the ’mathematical’ side.

The book is very easy to read and appropriate for undergraduate and postgraduate level, whether it be review or introduction to a particular topic. The biology and how it relates to the mathematics is clearly explained. Overall I would highly recommend this book to students entering the biomathematics arena or who simply have an interest in this area.

This is an excellent book for teaching. However due to the rapid progress in the field I hope that the auther will consider a new and enlarged version of the book. Also a paperback edition will be helpful especially for thos in third world countries.I thank the auther for this book.

1965-1996 (Oxford Science Publications) Mathematical Apocrypha: Stories and Anecdotes of Mathematicians and the Mathematical (Spectrum) Lecture Notes on Mathematical Olympiad Courses: For Junior Section (Mathematical Olympiad Series) Transformation Groups for Beginners (Student Mathematical Library, Vol. 25) (Student Mathematical Library, V. 25) Algorithms in Bioinformatics: A Practical Introduction (Chapman & Hall/CRC Mathematical and Computational Biology) Mathematical Modeling in Systems Biology: An Introduction (MIT Press) Complexity in Chemistry, Biology, and Ecology (Mathematical and Computational Chemistry) Mathematical Biology: I. An Introduction (Interdisciplinary Applied Mathematics) (Pt. 1)