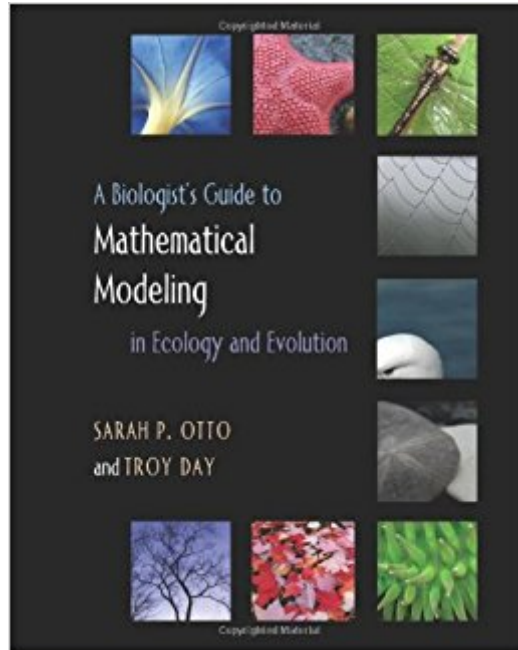


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A Biologist's Guide To Mathematical Modeling In Ecology And Evolution



Synopsis

Thirty years ago, biologists could get by with a rudimentary grasp of mathematics and modeling. Not so today. In seeking to answer fundamental questions about how biological systems function and change over time, the modern biologist is as likely to rely on sophisticated mathematical and computer-based models as traditional fieldwork. In this book, Sarah Otto and Troy Day provide biology students with the tools necessary to both interpret models and to build their own. The book starts at an elementary level of mathematical modeling, assuming that the reader has had high school mathematics and first-year calculus. Otto and Day then gradually build in depth and complexity, from classic models in ecology and evolution to more intricate class-structured and probabilistic models. The authors provide primers with instructive exercises to introduce readers to the more advanced subjects of linear algebra and probability theory. Through examples, they describe how models have been used to understand such topics as the spread of HIV, chaos, the age structure of a country, speciation, and extinction. Ecologists and evolutionary biologists today need enough mathematical training to be able to assess the power and limits of biological models and to develop theories and models themselves. This innovative book will be an indispensable guide to the world of mathematical models for the next generation of biologists. A how-to guide for developing new mathematical models in biology Provides step-by-step recipes for constructing and analyzing models Interesting biological applications Explores classical models in ecology and evolution Questions at the end of every chapter Primers cover important mathematical topics Exercises with answers Appendixes summarize useful rules Labs and advanced material available

Book Information

Hardcover: 744 pages

Publisher: Princeton University Press (March 12, 2007)

Language: English

ISBN-10: 0691123446

ISBN-13: 978-0691123448

Product Dimensions: 8.4 x 1.8 x 10 inches

Shipping Weight: 4.2 pounds (View shipping rates and policies)

Average Customer Review: 4.8 out of 5 stars Â Â See all reviews Â (10 customer reviews)

Best Sellers Rank: #223,412 in Books (See Top 100 in Books) #8 in Â Books > Science & Math > Mathematics > Applied > Biomathematics #116 in Â Books > Textbooks > Science & Mathematics > Biology & Life Sciences > Ecology #546 in Â Books > Science & Math > Biological Sciences >

Customer Reviews

Although other books may have a better presentation of the models' use and context, this is the best presentation I have seen on stability analysis, plus it presents a good quantity of model examples. The presentation of the math used is ample and clear. I highly recommend it.

This gem of a book is terrific, not just for biologists but for anyone trying to get a handle on modeling in ecology and evolution. I teach an evolutionary game theory class to a law school class (yes, that's right, law school), and couldn't find a good textbook that would teach students with a basic math proficiency what they needed to know about stability, probability theory, etc. to be able to model some of the more interesting EGT methods. This book fit the bill. My notes all come straight from here, even when we are using other textbook problem sets. Highly recommend.

This is a very clearly written, thorough, generally excellent guide. It was a great book in class, and I still use it as a reference regularly. (I even used it at work today!) The book explains everything very well, which I find rare for science textbooks. Its appendices are very helpful, and there are many examples. Well worth the investment!

This book introduces the mathematical models in use in various branches of biology and related fields. It is extremely well written and easy to follow. If you wish to own one book on this subject then this should be high on your list for consideration.

This is a must-have reference book for any computational biologist. Even those who roughly work in the computational biology realm, need to master the skills introduced in this book to be effective at what they do. It's not overpriced, and it will reward you 10fold in the end.

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