The Mathematics Behind Biological Invasions (Interdisciplinary Applied Mathematics)

Mark A. Lewis, Sergei V. Petrovskii, Jonathan R. Potts
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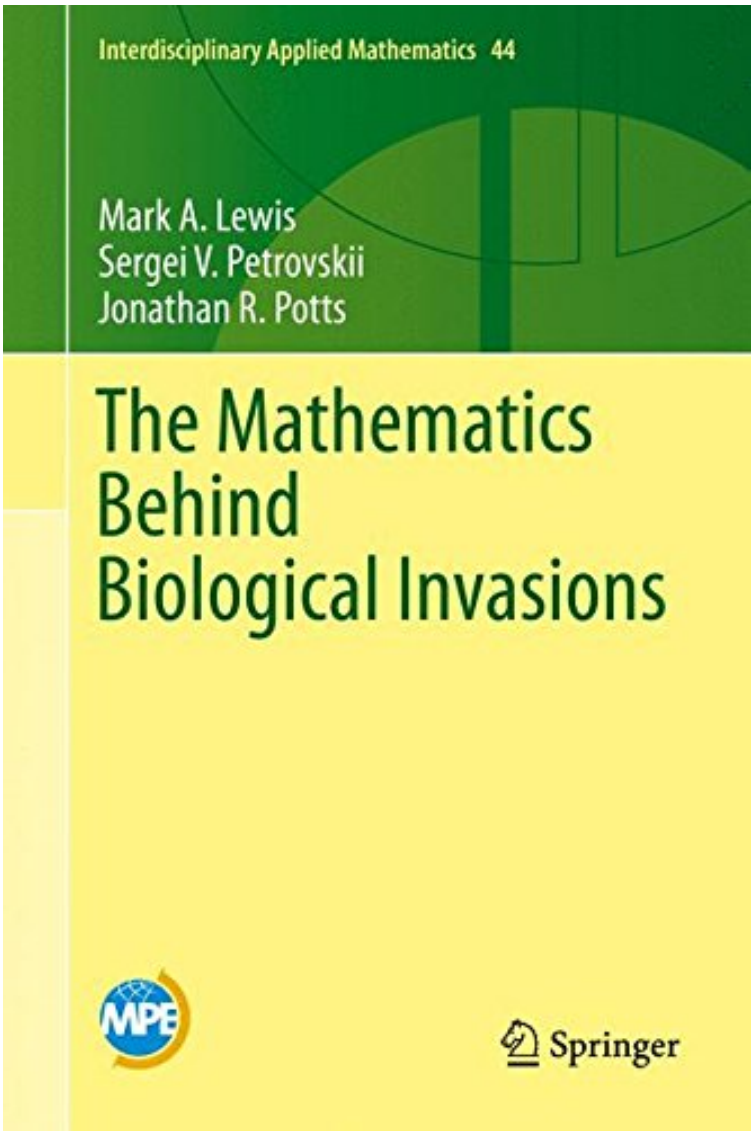

#3022841 in Books Mark A Lewis Sergei V Petrovskii Jonathan R Potts 2016-06-06Original language:EnglishPDF # 1 9.25 x .88 x 6.10l, .0 #File Name: 3319320424362 pagesThe Mathematics Behind Biological Invasions Interdisciplinary Applied Mathematics | File size: 26.Mb

Mark A. Lewis, Sergei V. Petrovskii, Jonathan R. Potts : The Mathematics Behind Biological Invasions (Interdisciplinary Applied Mathematics) before purchasing it in order to gage whether or not it would be worth my time, and all praised The Mathematics Behind Biological Invasions (Interdisciplinary Applied Mathematics):

This book investigates the mathematical analysis of biological invasions. Unlike purely qualitative treatments of ecology, it draws on mathematical theory and methods, equipping the reader with sharp tools and rigorous methodology. Subjects include invasion dynamics, species interactions, population spread, long-distance dispersal, stochastic effects, risk analysis, and optimal responses to invaders. While based on the theory of dynamical systems, including partial differential equations and integrodifference equations, the book also draws on information theory, machine learning, Monte Carlo methods, optimal control, statistics, and stochastic processes. Applications to real biological invasions are included throughout. Ultimately, the book imparts a powerful principle: that by bringing ecology and mathematics together, researchers can uncover new understanding of, and effective response strategies to, biological invasions. It is suitable for graduate students and established researchers in mathematical ecology.

This book is devoted to the mathematical modeling of biological invasions and the investigation techniques used to understand biological invasion processes and dynamics. The book is suitable for researchers working in environmental sciences, mathematical biology, mathematical ecology, applied mathematics, and environmental economics, as well as for graduate students and upper-level undergraduate students. (Natali Hritonenko, Mathematical s, December, 2016)From the Back CoverThis book investigates the mathematical analysis of biological invasions. Unlike purely qualitative treatments of ecology, it draws on mathematical theory and methods, equipping the reader with sharp tools and rigorous methodology. Subjects include invasion dynamics, species interactions, population spread, long-distance dispersal, stochastic effects, risk analysis, and optimal responses to invaders. While based on the theory of dynamical systems, including partial differential equations and integrodifference equations, the book also draws on information theory, machine learning, Monte Carlo methods, optimal control, statistics, and stochastic processes. Applications to real biological invasions are included throughout. Ultimately, the book imparts a powerful principle: that by bringing ecology and mathematics together, researchers can uncover new understanding of, and effective response strategies to, biological invasions. It is suitable for graduate students and established researchers in mathematical ecology.About the AuthorMark Lewis has worked for over 25 years on developing and applying mathematical methods to the dynamics of biological invasions. His research focuses on population spread, Allee effects, ecological dynamics, control, and risk analysis. His research also includes building connections with real biological processes and data. He is Chief Editor of the Journal of Mathematical Biology and is on seven other editorial boards. He is a Fellow of the Fields Institute and has won a number of prizes for his research in applied mathematics. His current position is Senior Canada Research Chair in Mathematical Biology at the University of Alberta, and he is a Fellow of the Royal Society of Canada.Sergei Petrovskii is an applied mathematician with about 25 years of research experience in mathematical ecology and ecological modelling. His research spans across a broad variety of problems of ecology and population dynamics, with a particular emphasis on ecological pattern formation, biological invasions, and movement ecology. He has previously published two research monographs and more than one hundred papers in peer-reviewed journals. He currently holds the position of a Chair in Applied Mathematics at the University of Leicester, UK. He is also the Editor-in-Chief of Ecological Complexity and a member of the editorial board of Journal of Biological Systems.Jonathan Potts obtained his PhD from the University of Bristol, working at the Bristol Centre for Complexity Sciences on the emergence of territorial patterns in fox populations. He then went to the University of Alberta as a postdoctoral fellow, where he continued working on mathematical models of animal movement and pattern formation, extending them to a variety of situations beyond territoriality, including landscape ecology and biological invasions. He is now a lecturer in the School of Mathematics and Statistics at the University of Sheffield, UK