Branching Processes in Biology (Interdisciplinary Applied Mathematics)

Marek Kimmel, David E. Axelrod
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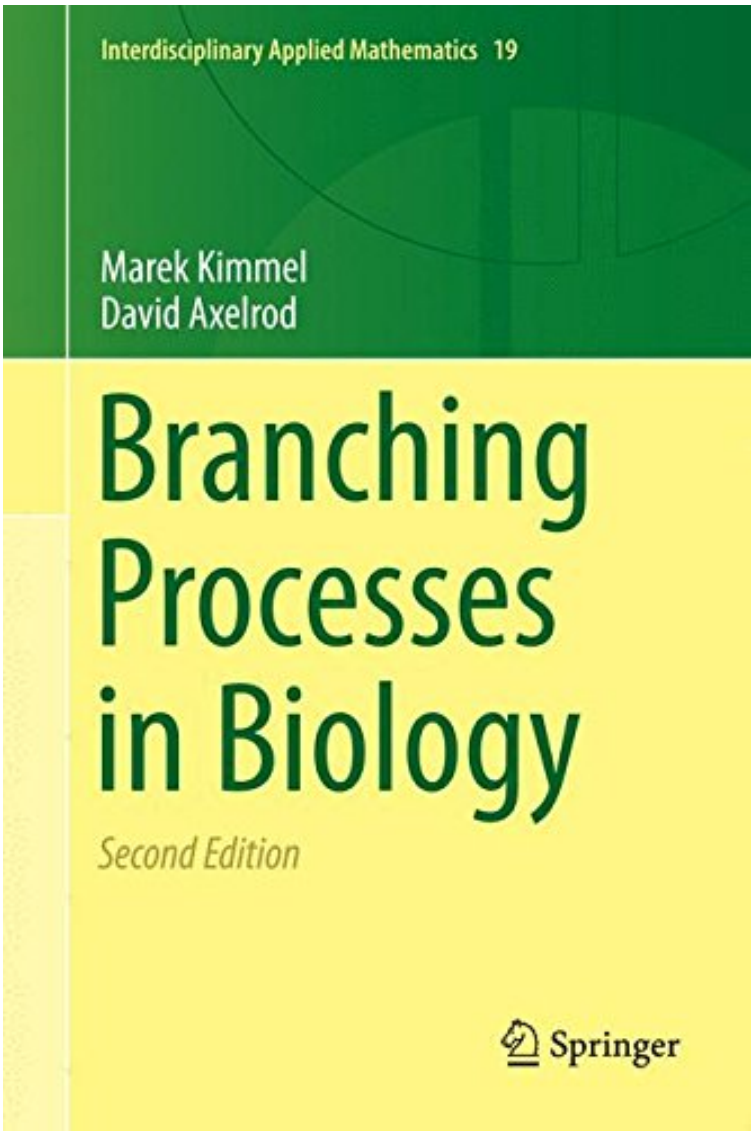

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Marek Kimmel, David E. Axelrod : Branching Processes in Biology (Interdisciplinary Applied Mathematics) before purchasing it in order to gage whether or not it would be worth my time, and all praised Branching Processes in Biology (Interdisciplinary Applied Mathematics):

This book provides a theoretical background of branching processes and discusses their biological applications. Branching processes are a well-developed and powerful set of tools in the field of applied probability. The range of applications considered includes molecular biology, cellular biology, human evolution and medicine. The branching processes discussed include Galton-Watson, Markov, Bellman-Harris, Multitype, and General Processes. As an aid to understanding specific examples, two introductory chapters, and two glossaries are included that provide background material in mathematics and in biology. The book will be of interest to scientists who work in quantitative modeling of biological systems, particularly probabilists, mathematical biologists, biostatisticians, cell biologists, molecular biologists, and bioinformaticians. The authors are a mathematician and cell biologist who have collaborated for more than a decade in the field of branching processes in biology for this new edition.This second expanded edition adds new material published during the last decade, with nearly 200 new references. More material has been added on infinitely-dimensional multitype processes, including the infinitely-dimensional linear-fractional case. Hypergeometric function treatment of the special case of the Griffiths-Pakes infinite allele branching process has also been added. There are additional applications of recent molecular processes and connections with systems biology are explored, and a new chapter on genealogies of branching processes and their applications.Reviews of First Edition:"This is a significant book on applications of branching processes in biology, and it is highly recommended for those readers who are interested in the application and development of stochastic models, particularly those with interests in cellular and molecular biology." (Siam Review, Vol. 45 (2), 2003)This book will be very interesting and useful for mathematicians, statisticians and biologists as well, and especially for researchers developing mathematical methods in biology, medicine and other natural sciences. (Short Book Reviews of the ISI, Vol. 23 (2), 2003)

This book is the result of a fruitful and long collaboration between a mathematician and a cell biologist. Capturing the best of both worlds, the book provides not only the biology and mathematical background for this topic, but also offers numerous examples which render it accessible to (post-graduate) students and researchers . this book can be treated as an excellent textbook for a wide audience varying from students to lecturers. (Irina Ioana Mohorianu, zbMATH 1312.92004, 2015)"This book treats the theory of several important types of branching processes and demonstrates their usefulness by many interesting and important applications. Mathematical theory and biological applications are nicely interwoven. This text will be useful both to mathematicians (including graduate students) interested in relevant applications of stochastic processes in biology, as well as to mathematically oriented biologists working on the above mentioned topics." (R. Brger, Monatshefte fr Mathematik, Vol. 143 (1), 2004)"This is a significant book on applications of branching processes in biology, and it is highly recommended for those readers who are interested in the application and development of stochastic models, particularly those with interests in cellular and molecular biology." (Charles J. Mode, Siam , Vol. 45 (2), 2003)"This is a book written jointly by a mathematician and a cell biologist, who have collaborated on research in branching processes for more than a decade. In their own words, their monograph is intended for mathematicians and statisticians who have had an introduction to stochastic processes but have forgotten much of their college biology, and for biologists who wish to collaborate with mathematicians and statisticians. They have largely succeeded in achieving their goal. The book can be strongly recommended to all students of branching processes; all libraries should have a copy." ZENTRALBLATT MATH From the Back CoverThis book provides a theoretical background of branching processes and discusses their biological applications. Branching processes are a well-developed and powerful set of tools in the field of applied probability. The range of applications considered includes molecular biology, cellular biology, human evolution and medicine. The branching processes discussed include Galton-Watson, Markov, Bellman-Harris, Multitype, and General Processes. As an aid to understanding specific examples, two introductory chapters, and two glossaries are included that provide background material in mathematics and in biology. The book will be of interest to scientists who work in quantitative modeling of biological systems, particularly probabilists, mathematical biologists, biostatisticians, cell biologists, molecular biologists, and bioinformaticians. The authors are a mathematician and cell biologist who have collaborated for more than a decade in the field of branching processes in biology for this new edition. This second expanded edition adds new material published during the last decade, with nearly 200 new references. More material has been added on infinitely-dimensional multitype processes, including the infinitely-dimensional linear-fractional case. Hypergeometric function treatment of the special case of the Griffiths-Pakes infinite allele branching process has also been added. There are additional applications of recent molecular processes and connections with systems biology are explored, and a new chapter on genealogies of branching processes and their applications. s of First Edition: "This is a significant book on applications of branching processes in biology, and it is highly recommended for those readers who are interested in the application and development of stochastic models, particularly those with interests in cellular and molecular biology." (Siam , Vol. 45 (2), 2003)This book will be very interesting and useful for mathematicians, statisticians and biologists as well, and especially for researchers developing mathematical methods in biology, medicine and other natural sciences. (Short Book s of the ISI, Vol. 23 (2), 2003)About the AuthorMarek Kimmel is a Professor of Statistics at Rice University. Professor Kimmel's research focuses on probabilistic modeling and statistical analysis in biosciences. He is particularly interested in applications of his work in cell and molecular biology

and in cancer research. From the mathematical point of view, his interests lie in Markov and branching processes and in estimation theory. David Axelrod is a Professor at Rutgers University, where he works in a laboratory focusing on the heterogeneity and progression of human breast cancers using methods of molecular biology, cell biology, computer simulation, and mathematical modeling.