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BOOK REVIEW

Jagers, P., *Branching Processes with Biological Applications.* John Wiley and Sons, 1975, 268 pp. $28.50.

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This book is highly recommended to those interested in stochastic models of populations. The first of the nine chapters contains a historical sketch, some generalities about populations, and a survey of results. Particularly impressive from the historical point of view is the list of luminaries whose widely varied careers at one time or another touched on problems of branching processes, among them Euler in mathematics, Lotka in demography, Fisher in statistics and mathematical genetics, and Kolmogorov in probability.

Chapters 2 and 3, preparatory to the study of the general process, are devoted to the classical Galton–Watson process and its neighbors. They cover such standard topics as the extinction probability for the Galton–Watson process and the usual trichotomy of critical, subcritical, and supercritical processes. In addition there are sections dealing with the total progeny of a branching process and such statistical topics as estimating the offspring distribution by maximum likelihood and Bayesian methods. Neighbors of the Galton–Watson process include a branching process with immigration, limit theorems for increasing numbers of ancestors, and a diffusion approximation first outlined by Feller. Also treated is the Galton–Watson process in varying environments (varying offspring distributions), which is of interest in its own right and also leads naturally to a brief discussion of branching processes in random environments. Throughout Chapters 2 and 3 theorems are stated and proved in terms of minimal conditions currently in vogue in the analysis of branching processes. Because the writing style is clear and terse, some readers may find Jager's treatment of the Galton–Watson process and its neighbors easier to read than previous ones. Aside from a brief account of multitype Galton–Watson process in Chapter 4 and some discussion of a special kind of two-type general branching process in Chapter 9, the theory of multitype branching processes is ignored.

Chapter 5 contains material on martingales, renewal theory, and point processes useful in the construction and analysis of branching processes. The chapter starts out with nice proofs of the martingale theorem, the zero-one laws of Kolmogorov and Hewitt–Savage, and the ballot theorem via martingale theory. There follows a section on aspects of renewal theory needed in the analysis of the general branching process. The chapter closes with a very brief discussion of point processes later used in the definition of the general branching process.

It is Chapters 6 through 9 that contribute most to distinguishing the book