

Stochastic Population and Epidemic Models: Persistence and Extinction (Mathematical Biosciences Institute Lecture Series)

Linda S. Allen



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This monograph provides a summary of the basic theory of branching processes for single-type and multitype processes. Classic examples of population and epidemic models illustrate the probability of population or epidemic extinction obtained from the theory of branching processes. The first chapter develops the branching process theory, while in the second chapter two applications to population and epidemic processes of single-type branching process theory are explored. The last two chapters present multi-type branching process applications to epidemic models, and then continuous-time and continuous-state branching processes with applications. In addition, several MATLAB programs for simulating stochastic sample paths are provided in an Appendix.

These notes originated as part of a lecture series on Stochastics in Biological Systems at the Mathematical Biosciences Institute in Ohio, USA.

Professor Linda Allen is a Paul Whitfield Horn Professor of Mathematics in the Department of Mathematics and Statistics at Texas Tech University, USA.

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