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Sommario/riassunto

This book provides an introduction to the analysis of stochastic dynamic models in biology and medicine. The main aim is to offer a coherent set of probabilistic techniques and mathematical tools which can be used for the simulation and analysis of various biological phenomena. These tools are illustrated on a number of examples. For each example, the biological background is described, and mathematical models are developed following a unified set of principles. These models are then analyzed and, finally, the biological implications of the mathematical results are interpreted. The biological topics covered include gene expression, biochemistry, cellular regulation, and cancer biology. The book will be accessible to graduate students who have a strong background in differential equations, the theory of nonlinear dynamical systems, Markovian stochastic processes, and both discrete and continuous state spaces, and who are familiar with the basic concepts of probability theory.