Markov Processes: An Introduction for Physical Scientists

By Daniel T. Gillespie

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Markov process theory is basically an extension of ordinary calculus to accommodate functions whos time evolutions are not entirely deterministic. It is a subject that is becoming increasingly important for many fields of science. This book develops the single-variable theory of both continuous and jump Markov processes in a way that should appeal especially to physicists and chemists at the senior and graduate level.

- A self-contained, prgamatic exposition of the needed elements of random variable theory
- Logically integrated derviations of the Chapman-Kolmogorov equation, the Kramers-Moyal equations, the Fokker-Planck equations, the Langevin equation, the master equations, and the moment equations
- Detailed exposition of Monte Carlo simulation methods, with plots of many numerical examples
- Clear treatments of first passages, first exits, and stable state fluctuations and transitions
- Carefully drawn applications to Brownian motion, molecular diffusion, and chemical kinetics

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