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Nota di contenuto	Machine generated contents note: 1. Introduction; Part I. Probability, Random Variables and Statistics: 2. Probability; 3. Discrete random variables; 4. Continuous random variables; 5. Functions of random variables and their distributions; 6. Fundamentals of statistical analysis; 7. Distributions derived from the normal distribution; Part II. Transform Methods, Bounds and Limits: 8. Moment generating function and characteristic function; 9. Generating function and Laplace transform; 10. Inequalities, bounds and large deviation approximation; 11. Convergence of a sequence of random variables, and the limit theorems; Part III. Random Processes: 12. Random process; 13. Spectral representation of random processes and time series; 14. Poisson process, birth-death process, and renewal process; 15. Discrete-time Markov chains; 16. Semi-Markov processes and continuous-time

Markov chains; 17. Random walk, Brownian motion, diffusion and its processes; Part IV. Statistical Inference: 18. Estimation and decision theory; 19. Estimation algorithms; Part V. Applications and Advanced Topics: 20. Hidden Markov models and applications; 21. Probabilistic models in machine learning; 22. Filtering and prediction of random processes; 23. Queuing and loss models.

Sommario/riassunto

Together with the fundamentals of probability, random processes and statistical analysis, this insightful book also presents a broad range of advanced topics and applications. There is extensive coverage of Bayesian vs. frequentist statistics, time series and spectral representation, inequalities, bound and approximation, maximum-likelihood estimation and the expectation-maximization (EM) algorithm, geometric Brownian motion and Ito process. Applications such as hidden Markov models (HMM), the Viterbi, BCJR, and Baum-Welch algorithms, algorithms for machine learning, Wiener and Kalman filters, and queueing and loss networks are treated in detail. The book will be useful to students and researchers in such areas as communications, signal processing, networks, machine learning, bioinformatics, econometrics and mathematical finance. With a solutions manual, lecture slides, supplementary materials and MATLAB programs all available online, it is ideal for classroom teaching as well as a valuable reference for professionals.
