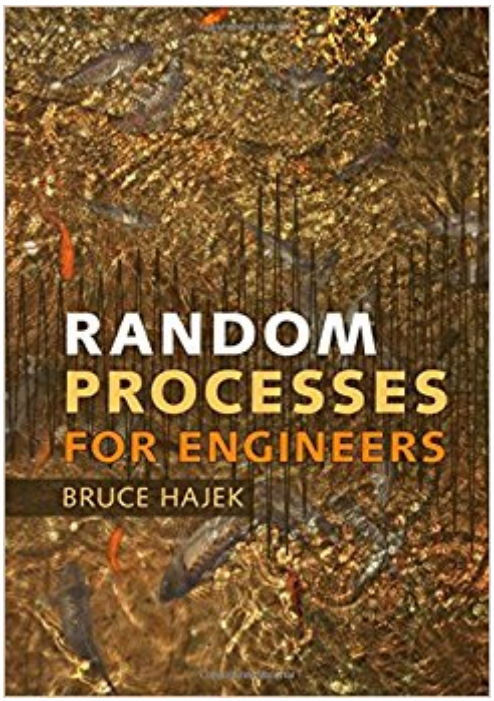
Random Processes For Engineers



Synopsis

This engaging introduction to random processes provides students with the critical tools needed to design and evaluate engineering systems that must operate reliably in uncertain environments. A brief review of probability theory and real analysis of deterministic functions sets the stage for understanding random processes, whilst the underlying measure theoretic notions are explained in an intuitive, straightforward style. Students will learn to manage the complexity of randomness through the use of simple classes of random processes, statistical means and correlations, asymptotic analysis, sampling, and effective algorithms. Key topics covered include: Ã¢â ¬Â¢ Calculus of random processes in linear systems Ã¢â ¬Â¢ Kalman and Wiener filtering Ã¢â ¬Â¢ Hidden Markov models for statistical inference Ã¢â ¬Â¢ The estimation maximization (EM) algorithm Ã¢â ¬Â¢ An introduction to martingales and concentration inequalities. Understanding of the key concepts is reinforced through over 100 worked examples and 300 thoroughly tested homework problems (half of which are solved in detail at the end of the book).

Book Information

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Customer Reviews

"A comprehensive exposition of random processes ... Abstract concepts are nicely explained through many examples ... The book will be very helpful for beginning graduate students who want a firm foundational understanding of random processes. It will also serve as a nice reference for the advanced reader." Anima Anandkumar, University of California, Irvine"This is a fantastic book from one of the eminent experts in the field, and is the standard text for the graduate class I teach in

[electrical and computer engineering] ... The material covered is perfect for a first-year graduate class in probability and stochastic processes." Sanjay Shakkottai, University of Texas, Austin"This is an excellent introductory book on random processes and basic estimation theory from the foremost expert and is suitable for advanced undergraduate students and/or first-year graduate students who are interested in stochastic analysis. It covers an extensive set of topics that are very much applicable to a wide range of engineering fields." Richard La, University of Maryland"I was fortunate to have a mature draft of [this] book when I introduced a stochastic processes course to my department ... [It] provides an entirely accessible introduction to the foundations of stochastic processes ... the students in my course enjoyed Hajek's introduction to measure theory, and ... could appreciate the value of the abstract concepts introduced at the start of the text. It includes applications of this general theory to many topics that are of tremendous interest to students and practitioners, such as nonlinear filtering, statistical methods such as the EM-algorithm, and stability theory for Markov processes. Because the book establishes strong foundations, in a course it is not difficult to substitute other applications, such as Monte-Carlo methods or reinforcement learning. Graduate students will be thrilled to learn these exciting techniques from an accessible source." Sean Meyn, University of Florida

An engaging introduction to the critical tools needed to design and evaluate engineering systems that must operate reliably in uncertain environments. It includes over 100 worked examples and over 300 end-of-chapter problems, with worked solutions to half provided in the book and the remaining solutions available online for instructors.

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