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Fundamentals of Stochastic Networks

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📖 DESCRIPTION

An interdisciplinary approach to understanding queueing and graphical networks

In today's era of interdisciplinary studies and research activities, network models are becoming increasingly important in various areas where they have not regularly been used. Combining techniques from stochastic processes and graph theory to analyze the behavior of networks, *Fundamentals of Stochastic Networks* provides an interdisciplinary approach by including practical applications of these stochastic networks in various fields of study, from engineering and operations management to communications and the physical sciences.

The author uniquely unites different types of stochastic, queueing, and graphical networks that are typically studied independently of each other. With balanced coverage, the book is organized into three succinct parts:

- Part I introduces basic concepts in probability and stochastic processes, with coverage on counting, Poisson, renewal, and Markov processes

- Part II addresses basic queueing theory, with a focus on Markovian queueing systems and also explores advanced queueing theory, queueing networks, and approximations of queueing networks

- Part III focuses on graphical models, presenting an introduction to graph theory along with Bayesian, Boolean, and random networks

The author presents the material in a self-contained style that helps readers apply the presented methods and techniques to science and engineering applications. Numerous practical examples are also provided throughout, including all related mathematical details.

Featuring basic results without heavy emphasis on proving theorems, *Fundamentals of Stochastic Networks* is a suitable book for courses on probability and stochastic networks, stochastic network calculus, and stochastic network optimization at the upper-undergraduate and graduate levels. The book also serves as a reference for researchers and network professionals who would like to learn more about the general principles of stochastic networks.

ABOUT THE AUTHOR

OLIVER C. IBE, ScD, is Associate Professor in the Department of Electrical and Computer Engineering at the University of Massachusetts at Lowell. He has more than thirty years of experience in academia and the telecommunications industry in various technical and management capacities. Dr. Ibe's research interests include stochastic systems modeling, bioinformatics, and communication network performance modeling. He is the author of *Converged Network Architectures: Delivering Voice over IP, ATM, and Frame Relay* (Wiley).

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