

Preface

Computer and telecommunication sectors are important for global dynamic economic development. The design and deployment of future networks are subject to uncertainties such as capacity prices, demand and supply for services, and shared infrastructure. Moreover, recent trends in those sectors have led to considerable increase in the level of uncertainty. Optimal policies of the operators and design of complex network functionalities require decision support methodologies that take into account uncertainty in order to improve performance, cost-effectiveness, risk and security and ensure robustness. Stochastic modeling, decision making, and game-theoretic techniques ensure the optimum end-to-end performance of general network systems. Optimal system design unifying performance modeling and decision making provides a generic approach.

Real-time optimal decision making is inevitably intended to improve efficiency. Risk management injects robustness and ensures that effects of uncertainty are taken into account. The achievement of best performance may conflict with the minimization of the associated risk. Robustness in view of traffic variations, changes in network capacity, or topology, is important for both network operators and end users. A robust network allows operators to hedge against uncertainty and hence save costs and yield performance benefits to end users. Robustness can be achieved by introducing diversity at transport level and using flow or congestion control.

This book considers recent developments in the design, operation, and management of telecommunication and computer network systems in performance engineering and addresses issues of uncertainty, robustness, and risk. The book consists of 10 chapters that provide a reference tool for scientists and engineers in telecommunication and computer networks. Moreover, it is intended to motivate a new wave of research in the interface of telecommunications and operations research.

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