Preface

When speaking of queues, the first idea that comes to mind is that of everyday life: queues in supermarkets, airports, banks, etc. It is more difficult to imagine the queues used in computer systems and communication networks. However, these queues are crucial for smooth system operation and good performance. They are also more various and elaborate than those of everyday life just like bits and datagrams are more flexible than human beings.

Traffic being random, the analysis of queues relies on the theory of probability and more specifically on the Markov theory. This theory has a very simple principle, but a wide range of applications, and has become, during the last century, a fundamental tool for computer science and networking, but also for other scientific domains such as statistics, physics, biology, and economics. In the first four chapters of this book, we present the main results of the Markov theory, using only basic notions of probability.

The chapters dedicated to traffic and communication networks have benefited from our work experience in the laboratories of France Telecom, where we have experienced the importance of traffic modeling and performance evaluation in all the domains of network engineering: design, planning,

architecture, measurement, control, etc. Analyzing each part of those huge systems that are communication networks allows us to better understand their global behavior and, *in fine*, to improve their performance.

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