Preface

The main topic of this book is the study of the behaviour in equilibrium of vector stochastic processes, or stochastic networks. Such processes have a wide range of applications: to give some examples, the components of the vector may represent queue sizes in a queueing network, gene frequencies in a population, or the condition of fruit trees in an orchard. When a stochastic network is reversible its analysis is greatly simplified, and the first chapter is devoted to a discussion of the concept of reversibility. Two themes emerge from the remainder of the book: first, the various uses of reversibility, in the study of the output from a queue, the flow of current in a conductor, the age of an allele, or the equilibrium distribution of a polymerization process; second, the extent to which the assumption of reversibility can be relaxed without destroying the associated tractability.

The main prerequisite is an understanding of Markov processes at about the level of Feller's *Introduction to Probability Theory and Its Applications*, Volume I. In Section 1.1 the necessary material is very briefly reviewed, primarily to establish terminology and notation.

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