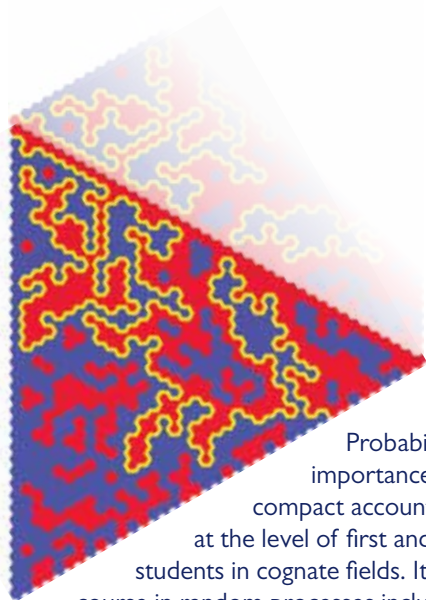# Probability

AN INTRODUCTION

Second Edition

GEOFFREY GRIMMETT & DOMINIC WELSH

Probability is an area of mathematics of tremendous contemporary importance across all aspects of human endeavour. This book is a compact account of the basic features of probability and random processes at the level of first and second year mathematics undergraduates and Masters' students in cognate fields. It is suitable for a first course in probability, plus a follow-up course in random processes including Markov chains.

A special feature is the authors' attention to rigorous mathematics: not everything is rigorous, but the need for rigour is explained at difficult junctures. The text is enriched by simple exercises, together with problems (with very brief hints) many of which are taken from examinations at Cambridge and Oxford.

The first eight chapters form a course in basic probability, being an account of events, random variables, and distributions—discrete and continuous random variables are treated separately—together with simple versions of the law of large numbers and the central limit theorem. There is an account of moment generating functions and their applications. The following three chapters are about branching processes, random walks, and continuous-time random processes such as the Poisson process. The final chapter is a fairly extensive account of Markov chains in discrete time.

This second edition develops the success of the first edition through an updated presentation, the extensive new chapter on Markov chains, and a number of new sections to ensure comprehensive coverage of the syllabi at major universities.

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Cover image: The percolation exploration process on the cover is derived from a program written by Julien Dubédat.