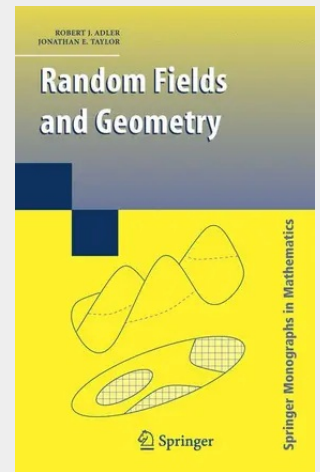


Random Fields and Geometry

This monograph is devoted to a completely new approach to geometric problems arising in the study of random fields. The groundbreaking material in Part III, for which the background is carefully prepared in Parts I and II, is of both theoretical and practical importance, and striking in the way in which problems arising in geometry and probability are beautifully intertwined.

The three parts to the monograph are quite distinct. Part I presents a user-friendly yet comprehensive background to the general theory of Gaussian random fields, treating classical topics such as continuity and boundedness, entropy and majorizing measures, Borell and Slepian inequalities. Part II gives a quick review of geometry, both integral and Riemannian, to provide the reader with the material needed for Part III, as well as providing some new results and new proofs of known results along the way. Topics such as Crofton formulae, curvature measures for stratified manifolds, critical point theory, and tube formulae are covered. In fact, this is the only concise, self-contained treatment of all of the above topics, which are necessary for the study of random fields. The new approach in Part III is devoted to the geometry of excursion sets of random fields and the related Euler characteristic approach to extremal probabilities.

Since the term 'random field' has a variety of different connotations, ranging from agriculture to statistical mechanics, let us start by clarifying that, in this book, a random field is a stochastic process, usually taking values in a Euclidean space, and defined over a parameter space of dimensionality at least 1. Consequently, random processes defined on countable parameter spaces will not appear here. Indeed, even processes on $\mathbb{R}$ will make only rare appearances and, from the point of view of this book, are almost trivial. The parameter spaces we like best are manifolds, although for much of the time we shall require no more than that they be pseudometric spaces. With this clarification in hand, the next thing that you should know is that this book will have a sequel dealing primarily with applications. In fact, as we complete this book, we have already started, together with KW (Keith Worsley), on a companion volume [8] tentatively entitled RFG-A, or Random Fields and Geometry: Applications. The current volume RFG concentrates on the theory and mathematical background of random fields, while RFG-A is intended to do precisely what its title promises. Once the companion volume is published, you will find there not only applications of the theory of this book, but of (smooth) random fields in general.



149,79 €

139,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780387481128

Medium: Buch

ISBN: 978-0-387-48112-8

Verlag: Springer

Erscheinungstermin: 12.06.2007

Sprache(n): Englisch

Auflage: 1. Auflage 2007

Serie: Springer Monographs in Mathematics

Produktform: Gebunden

Gewicht: 869 g

Seiten: 454

Format (B x H): 160 x 241 mm

