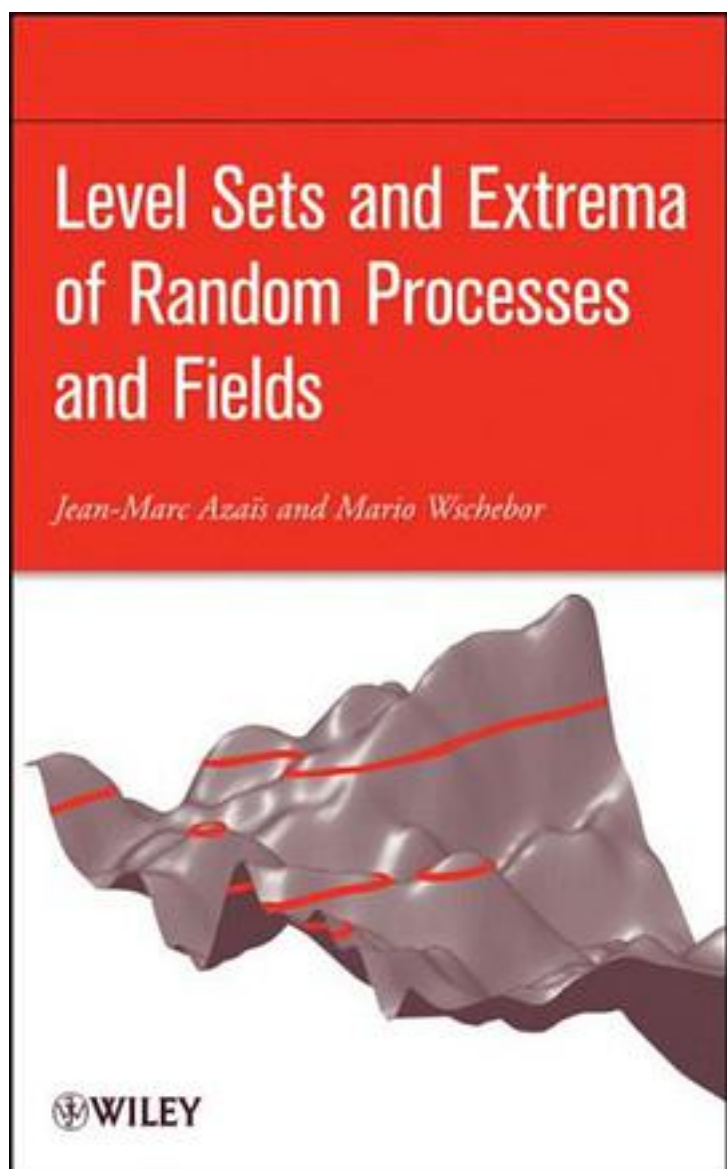


Level Sets and Extrema of Random Processes and Fields



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A timely and comprehensive treatment of random field theory with applications across diverse areas of study *Level Sets and Extrema of Random Processes and Fields* discusses how to understand the properties of the level sets of paths as well as how to compute the probability distribution of its extremal values, which are two general classes of problems that arise in the study of random processes and fields and in related applications. This book provides a unified and accessible approach to these two topics and their relationship to classical theory and Gaussian processes and fields, and the most modern research findings are also discussed. The authors begin with an introduction to the basic concepts of stochastic processes, including a modern review of Gaussian fields and their classical inequalities. Subsequent chapters are devoted to Rice formulas, regularity properties, and recent results on the tails of the distribution of the maximum. Finally, applications of random fields to various areas of mathematics are provided, specifically to systems of random equations and condition numbers of random matrices. Throughout the book, applications are illustrated from various areas of study such as statistics, genomics, and oceanography while other results are relevant to econometrics, engineering, and mathematical physics. The presented material is reinforced by end-of-chapter exercises that range in varying degrees of difficulty. Most fundamental topics are addressed in the book, and an extensive, up-to-date bibliography directs readers to existing literature for further study. *Level Sets and Extrema of Random Processes and Fields* is an excellent book for courses on probability theory, spatial statistics, Gaussian fields, and probabilistic methods in real computation at the upper-undergraduate and graduate levels. It is also a valuable reference for professionals in mathematics and applied fields such as statistics, engineering, econometrics, mathematical physics, and biology.

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