

Description

This book presents articles on original material from invited talks given at the "IMS Workshop on Applied Probability" organized by the Institute of Mathematical Sciences at the Chinese University of Hong Kong in May 1999. The goal of the workshop was to promote research in applied probability for local mathematicians and engineers and to foster exchange with experts from other parts of the world. The main themes were mathematical finance and stochastic networks.

The topics range from the theoretical study such as ergodic theory and diffusion processes, to very practical problems, such as convertible bonds with market risk and insider trading.

The wide scope of coverage in the book make it a helpful reference for graduate students and researchers, and for practitioners working in mathematical finance.

Applied Probability

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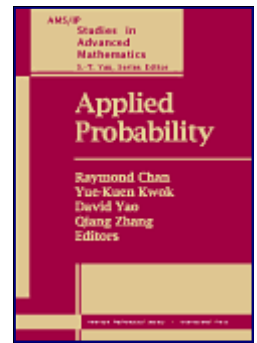


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Bosonic Strings: A Mathematical Treatment

Description

Presented in this book is a mathematical treatment of Bosonic string theory from the point of view of global geometry. The author presents the theory of point particles and Feynman path integrals. He considers the theory of strings as a quantization of the classical Plateau problem for minimal surfaces. The conformal variance of the relevant functional, the Polyakov action or (in mathematical terminology) the Dirichlet integral, leads to an anomaly in the process of quantization. The mathematical concepts needed to resolve this anomaly via the Faddeev-Popov method are introduced, specifically the geometry of the Teichmüller and moduli spaces of Riemann surfaces and the corresponding function spaces, i.e., Hilbert spaces of Sobolev type and diffeomorphism groups. Other useful tools are the algebraic geometry of Riemann surfaces and infinite-dimensional determinants. Also discussed are the boundary regularity questions. The main result is a presentation of the string partition function as an integral over a moduli space of Riemann surfaces. Some new physical concepts, such as D-branes, are also discussed. This volume offers a mathematically rigorous treatment of some aspects of string theory, employs a global geometry approach, systematically treats strings with boundary, and carefully explains all mathematical concepts and tools.

