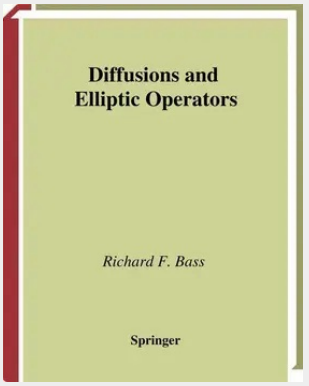
Bass

Diffusions and Elliptic Operators

A discussion of the interplay of diffusion processes and partial differential equations with an emphasis on probabilistic methods. It begins with stochastic differential equations, the probabilistic machinery needed to study PDE, and moves on to probabilistic representations of solutions for PDE, regularity of solutions and one dimensional diffusions. The author discusses in depth two main types of second order linear differential operators: non-divergence operators and divergence operators, including topics such as the Harnack inequality of Krylov-Safonov for non-divergence operators and heat kernel estimates for divergence form operators, as well as Martingale problems and the Malliavin calculus. While serving as a textbook for a graduate course on diffusion theory with applications to PDE, this will also be a valuable reference to researchers in probability who are interested in PDE, as well as for analysts interested in probabilistic methods.

This book will serve as a reference book for graduate students and researchers in probability theory or partial differential equations who want to learn more about the interplay of these two areas.



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