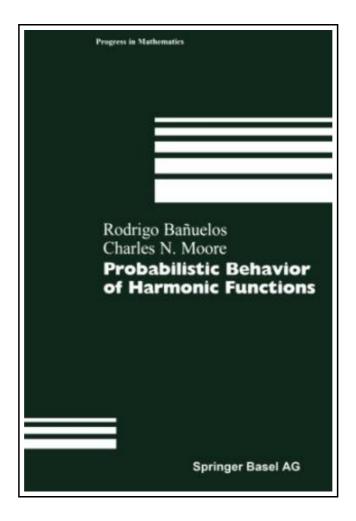
Probabilistic Behavior of Harmonic Functions



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(Laron Cartwright)

PROBABILISTIC BEHAVIOR OF HARMONIC FUNCTIONS



Book Condition: New. Publisher/Verlag: Springer, Basel | Harmonic analysis and probability have long enjoyed a mutually beneficial relationship that has been rich and fruitful. This monograph, aimed at researchers and students in these fields, explores several aspects of this relationship. The primary focus of the text is the nontangential maximal function and the area function of a harmonic function and their probabilistic analogues in martingale theory. The text first gives the requisite background material from harmonic analysis and discusses known results concerning the nontangential maximal function and area function, as well as the central and essential role these have played in the development of the field. The book next discusses further refinements of traditional results: among these are sharp good-lambda inequalities and laws of the iterated logarithm involving nontangential maximal functions and area functions. Many applications of these results are given. Throughout, the constant interplay between probability and harmonic analysis is emphasized and explained. The text contains some new and many recent results combined in a coherent presentation. | 1 Basic Ideas and Tools.- 1.1 Harmonic functions and their basic properties.- 1.2 The Poisson kernel and Dirichlet problem for the ball.- 1.3 The Poisson kernel and Dirichlet problem for R+n+1.- 1.4 The Hardy-Littlewood and nontangential maximal functions.- 1.5 HP spaces on the upper half space.- 1.6 Some basics on singular integrals.- 1.7 The g-function and area function.- 1.8 Classical results on boundary behavior.- 2 Decomposition into Martingales: An Invariance Principle.- 2.1 Square function estimates for sums of atoms.- 2.2 Decomposition of harmonic functions.- 2.3 Controlling errors: gradient estimates.- 3 Kolmogorov's LIL for Harmonic Functions.- 3.1 The proof of the upper-half.- 3.2 The proof of the lower-half.- 3.3 The sharpness of the Kolmogorov condition.- 3.4 A related LIL for the Littlewood-Paley g -function.- 4 Sharp Good-? Inequalities for A and N.- 4.1...



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