1. Record Nr. UNINA9910300143903321

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Titolo	Brownian Motion and its Applications to Mathematical Analysis [[electronic resource]] : École d'Été de Probabilités de Saint-Flour XLIII – 2013 / / by Krzysztof Burdzy
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-04394-3
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (XII, 137 p. 16 illus., 4 illus. in color.)
Collana	École d'Été de Probabilités de Saint-Flour, , 0721-5363 ; ; 2106
Classificazione	MAT 606f MAT 607f SI 850 60J6560H3060G17
Disciplina	530.475
Soggetti	Probabilities Partial differential equations Potential theory (Mathematics) Probability Theory and Stochastic Processes Partial Differential Equations Potential Theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (pages 133-137).
Nota di contenuto	1. Brownian motion -- 2. Probabilistic proofs of classical theorems -- 3. Overview of the "hot spots" problem -- 4. Neumann eigenfunctions and eigenvalues -- 5. Synchronous and mirror couplings -- 6. Parabolic boundary Harnack principle -- 7. Scaling coupling -- 8. Nodal lines -- 9. Neumann heat kernel monotonicity -- 10. Reflected Brownian motion in time dependent domains.
Sommario/riassunto	These lecture notes provide an introduction to the applications of Brownian motion to analysis and, more generally, connections between Brownian motion and analysis. Brownian motion is a well-suited model for a wide range of real random phenomena, from chaotic oscillations of microscopic objects, such as flower pollen in water, to stock market fluctuations. It is also a purely abstract mathematical tool which can be used to prove theorems in "deterministic" fields of mathematics. The

notes include a brief review of Brownian motion and a section on probabilistic proofs of classical theorems in analysis. The bulk of the notes are devoted to recent (post-1990) applications of stochastic analysis to Neumann eigenfunctions, Neumann heat kernel and the heat equation in time-dependent domains.