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Record Nr.	UNISALENTO991002949319707536
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Titolo	Brownian motion and its applications to mathematical analysis : École d'été de probabilités de Saint-Flour XLIII - 2013 / Krzysztof Burdzy
Pubbl/distr/stampa	Cham [Switzerland] : Springer, c2014
ISBN	9783319043937
Descrizione fisica	xii, 137 p. : ill. (some color) ; 24 cm
Collana	Lecture notes in mathematics, 0075-8434 ; 2106
Classificazione	AMS 60-02 AMS 60G17 AMS 60H30 AMS 60J65 LC QA274.75
Altri autori (Convegni)	École d'été de probabilités de Saint-Flour <43. ; 2013 ; Saint Flour, France>
Disciplina	530.475
Soggetti	Brownian motion processes Mathematical analysis Stochastic analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
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