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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.