

1. Record Nr.	UNINA9910792254903321
Autore	Mazo Robert M
Titolo	Brownian motion [[electronic resource]] : fluctuations, dynamics, and applications / / Robert M. Mazo
Pubbl/distr/stampa	Oxford, : Clarendon Press, 2002
ISBN	9786611998790 1-281-99879-6 0-19-156508-3 0-19-955644-X
Descrizione fisica	1 online resource (302 p.)
Collana	Oxford science publications International series of monographs on physics ; ; 112
Disciplina	530.42 530.475
Soggetti	Brownian motion processes Markov processes
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 271-284) and index.
Nota di contenuto	Contents; 1 Historical Background; 1.1 Robert Brown; 1.2 Between Brown and Einstein; 1.3 Albert Einstein; 1.4 Marian von Smoluchowski; 1.5 Molecular Reality; 1.6 The Scope of this Book; 2 Probability Theory; 2.1 Probability; 2.2 Conditional Probability and Independence; 2.3 Random Variables and Probability Distributions; 2.4 Expectations and Particular Distributions; 2.5 Characteristic Function; Sums of Random Variables; 2.6 Conclusion; 3 Stochastic Processes; 3.1 Stochastic Processes; 3.2 Distribution Functions; 3.3 Classification of Stochastic Processes; 3.4 The Fokker-Planck Equation 3.5 Some Special Processes 3.6 Calculus of Stochastic Processes; 3.7 Fourier Analysis of Random Processes; 3.8 White Noise; 3.9 Conclusion; 4 Einstein-Smoluchowski Theory; 4.1 What is Brownian Motion?; 4.2 Smoluchowski's Theory; 4.3 Smoluchowski Theory Continued; 4.4 Einstein's Theory; 4.5 Diffusion Coefficient and Friction Constant; 4.6 The Langevin Theory; 5 Stochastic Differential Equations and Integrals; 5.1 The Langevin Equation Revisited; 5.2 Stochastic Differential Equations; 5.3 Which Rule Should Be Used?; 5.4 Some Examples; 6

Functional Integrals; 6.1 Functional Integrals  
6.2 The Wiener Integral6.3 Wiener Measure; 6.4 The Feynman-Kac Formula; 6.5 Feynman Path Integrals; 6.6 Evaluation of Wiener Integrals; 6.7 Applications of Functional Integrals; 7 Some Important Special Cases; 7.1 Several Cases of Interest; 7.2 The Free Particle; 7.3 The Distribution of Displacements; 7.4 The Harmonically Bound Particle; 7.5 A Particle in a Constant Force Field; 7.6 The Uniaxial Rotor; 7.7 An Equation for the Distribution of Displacements; 7.8 Discussion; 8 The Smoluchowski Equation; 8.1 The Kramers-Klein Equation; 8.2 The Smoluchowski Equation  
8.3 Elimination of Fast Variables8.4 The Smoluchowski Equation Continued; 8.5 Passage over Potential Barriers; 8.6 Concluding Remarks; 9 Random Walk; 9.1 The Random Walk; 9.2 The One-Dimensional Pearson Walk; 9.3 The Biased Random Walk; 9.4 The Persistent Walk; 9.5 Boundaries and First Passage Times; 9.6 Random Remarks on Random Walks; 10 Statistical Mechanics; 10.1 Molecular Distribution Functions; 10.2 The Liouville Equation; 10.3 Projection Operators-The Zwanzig Equation; 10.4 Projection Operators-The Mori Equation; 10.5 Concluding Remarks  
11 Stochastic Equations from a Statistical Mechanical Viewpoint11.1 The Langevin Equation A Heuristic View; 11.2 The Fokker-Planck Equation-A Heuristic View; 11.3 What is Wrong with these Derivations?; 11.4 Eliminating Fast Processes; 11.5 The Distribution Function; 11.6 Discussion; 12 Two Exactly Treatable Models; 12.1 Two Illustrative Examples; 12.2 Brownian Motion in a Dilute Gas; 12.3 Discussion; 12.4 The Particle Bound to a Lattice; 12.5 The One-Dimensional Case; 12.6 Discussion; 13 Brownian Motion and Noise; 13.1 Limits on Measurement; 13.2 Oscillations of a Fiber  
13.3 A Pneumatic Example

---

#### Sommario/riassunto

Brownian motion- the incessant motion of small particles suspended in a fluid- is an important topic in statistical physics and physical chemistry. This book studies its origin in molecular scale fluctuations, its description in terms of random process theory and also in terms of statistical mechanics. - ;Brownian motion - the incessant motion of small particles suspended in a fluid - is an important topic in statistical physics and physical chemistry. This book studies its origin in molecular scale fluctuations, its description in terms of random process theory and also in terms of statistica

---