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| Autore | Dagdug Leonardo |
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| Altri autori (Persone) | PeñaJason<br>Pompa-GarcíaIvan |
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| Nota di contenuto | Chapter 1: History of Brownian Motion in a Nutshell -- Chapter 2: The Random Elevator Game -- Chapter 3: Solution of the Diffusion Equation in Free Space -- Chapter 4: Solution of the Diffusion Equation in Free Space -- Chapter 5: Diffusion Between Two Targets -- Chapter 6: Diffusion in the Presence of a Force Field -- Chapter 7: Trapping Particles Influenced by External Forces -- Chapter 8: Splitting and Breaking Brownian Pathways: Conditional Processes -- Chapter 9: Diffusion With Stochastic Resetting -- Chapter 10: Diffusion With Stochastic Resetting -- Chapter 11: Diffusion With Stochastic Resetting |

-- Chapter 12: Two-Dimensional Systems -- Chapter 13: Reaction-Diffusion Equations -- Chapter 14: Three-dimensional Systems -- Chapter 15: Trapping Rate Coefficient -- Chapter 16: Trapping Rate Coefficient -- Chapter 17: Fick-Jacobs 1D Reduction -- Chapter 18: Zwanzig 1D Reduction -- Chapter 19: Reguera and Rubi Kinetic Equation -- Chapter 20: Kalinay and Percus Projection Method -- Chapter 21: External Transverse Field: 2D Narrow Channel -- Chapter 22: Periodical Systems -- Chapter 23: Active Brownian Particles -- Chapter 24: Diffusion in Narrow Channels Embedded on Curved Manifolds -- Chapter 25: Representation of a Channel as a Tubular Manifold: Frenet-Serret Moving Frame.

Sommario/riassunto

This book offers the reader a journey through the counterintuitive nature of Brownian motion under confinement. Diffusion is a universal phenomenon that controls a wide range of physical, chemical, and biological processes. The transport of spatially-constrained molecules and small particles is ubiquitous in nature and technology and plays an essential role in different processes. Understanding the physics of diffusion under conditions of confinement is essential for a number of biological phenomena and potential technological applications in micro- and nanofluidics, among others. Studies on diffusion under confinement are typically difficult to understand for young scientists and students because of the extensive background on diffusion processes, physics, and mathematics that is required. All of this information is provided in this book, which is essentially self-contained as a result of the authors' efforts to make it accessible to an audience of students from a variety of different backgrounds. The book also provides the necessary mathematical details so students can follow the technical process required to solve each problem. Readers will also find detailed explanations of the main results based on the last 30 years of research devoted to studying diffusion under confinement. The authors approach the physical problem from various angles and discuss the role of geometries and boundary conditions in diffusion. This textbook serves as a comprehensive and modern overview of Brownian motion under confinement and is intended for young scientists, graduate students, and advanced undergraduates in physics, physical chemistry, biology, chemistry, chemical engineering, biochemistry, bioengineering, and polymer and material sciences.