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Titolo	The Fokker-Planck Equation [[electronic resource]] : Methods of Solution and Applications / / by Hannes Risken, Till Frank
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 1996
ISBN	3-642-61544-9
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Classificazione	58G32 60J65
Disciplina	530.1/3
Soggetti	Probabilities Physics Statistical physics Dynamical systems Applied mathematics Engineering mathematics Probability Theory and Stochastic Processes Applied and Technical Physics Complex Systems Mathematical Methods in Physics Applications of Mathematics Statistical Physics and Dynamical Systems
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	1. Introduction -- 1.1 Brownian Motion -- 1.2 Fokker-Planck Equation -- 1.3 Boltzmann Equation -- 1.4 Master Equation -- 2. Probability Theory -- 2.1 Random Variable and Probability Density -- 2.2 Characteristic Function and Cumulants -- 2.3 Generalization to Several Random Variables -- 2.4 Time-Dependent Random Variables -- 2.5 Several Time-Dependent Random Variables -- 3. Langevin Equations -- 3.1 Langevin Equation for Brownian Motion -- 3.2 Ornstein-Uhlenbeck Process -- 3.3 Nonlinear Langevin Equation, One Variable -- 3.4 Nonlinear Langevin Equations, Several Variables -- 3.5 Markov Property

Fractions (Chap. 9) -- S.7 Brownian Motion in a Double-Well Potential (Chaps. 10 and 11) -- S.8 Boundary Layer Theory (Sect. 11.4) -- S.9 Calculation of Correlation Times (Sect. 7.12) -- S.10 Colored Noise (Appendix A1) -- S.11 Fokker-Planck Equation with a Non-Positive-Definite Diffusion Matrix and Fokker-Planck Equation with Additional Third-Order-Derivative Terms -- References.

Sommario/riassunto

This book deals with the derivation of the Fokker-Planck equation, methods of solving it and some of its applications. Various methods such as the simulation method, the eigenfunction expansion, numerical integration, the variational method, and the matrix continued-fraction method are discussed. This is the first time that this last method, which is very effective in dealing with simple Fokker-Planck equations having two variables, appears in a textbook. The methods of solution are applied to the statistics of a simple laser model and to Brownian motion in potentials. Such Brownian motion is important in solid-state physics, chemical physics and electric circuit theory. This new study edition is meant as a text for graduate students in physics, chemical physics, and electrical engineering.

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