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Titolo	The Fokker-Planck Equation [[electronic resource]] : Methods of Solution and Applications / / by Hannes Risken, Till Frank
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ISBN	3-642-61544-9
Edizione	[2nd ed. 1996.]
Descrizione fisica	1 online resource (XIV, 472 p. 3 illus.)
Collana	Springer Series in Synergetics, , 0172-7389 ; ; 18
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
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
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

-- 3.6 Solutions of the Langevin Equation by Computer Simulation -- 4. Fokker-Planck Equation -- 4.1 Kramers-Moyal Forward Expansion -- 4.2 Kramers-Moyal Backward Expansion -- 4.3 Pawula Theorem -- 4.4 Fokker-Planck Equation for One Variable -- 4.5 Generation and Recombination Processes -- 4.6 Application of Truncated Kramers-Moyal Expansions -- 4.7 Fokker-Planck Equation for N Variables -- 4.8 Examples for Fokker-Planck Equations with Several Variables -- 4.9 Transformation of Variables -- 4.10 Covariant Form of the Fokker-Planck Equation -- 5. Fokker-Planck Equation for One Variable; Methods of Solution -- 5.1 Normalization -- 5.2 Stationary Solution -- 5.3 Ornstein-Uhlenbeck Process -- 5.4 Eigenfunction Expansion -- 5.5 Examples -- 5.6 Jump Conditions -- 5.7 A Bistable Model Potential -- 5.8 Eigenfunctions and Eigenvalues of Inverted Potentials -- 5.9 Approximate and Numerical Methods for Determining Eigenvalues and Eigenfunctions -- 5.10 Diffusion Over a Barrier -- 6. Fokker-Planck Equation for Several Variables; Methods of Solution -- 6.1 Approach of the Solutions to a Limit Solution -- 6.2 Expansion into a Biorthogonal Set -- 6.3 Transformation of the Fokker-Planck Operator, Eigenfunction Expansions -- 6.4 Detailed Balance -- 6.5 Ornstein-Uhlenbeck Process -- 6.6 Further Methods for Solving the Fokker-Planck Equation -- 7. Linear Response and Correlation Functions -- 7.1 Linear Response Function -- 7.2 Correlation Functions -- 7.3 Susceptibility -- 8. Reduction of the Number of Variables -- 8.1 First-Passage Time Problems -- 8.2 Drift and Diffusion Coefficients Independent of Some Variables -- 8.3 Adiabatic Elimination of Fast Variables -- 9. Solutions of Tridiagonal Recurrence Relations, Application to Ordinary and Partial Differential Equations -- 9.1 Applications and Forms of Tridiagonal Recurrence Relations -- 9.2 Solutions of Scalar Recurrence Relations -- 9.3 Solutions of Vector Recurrence Relations -- 9.4 Ordinary and Partial Differential Equations with Multiplicative Harmonic Time-Dependent Parameters -- 9.5 Methods for Calculating Continued Fractions -- 10. Solutions of the Kramers Equation -- 10.1 Forms of the Kramers Equation -- 10.2 Solutions for a Linear Force -- 10.3 Matrix Continued-Fraction Solutions of the Kramers Equation -- 10.4 Inverse Friction Expansion -- 11. Brownian Motion in Periodic Potentials -- 11.1 Applications -- 11.2 Normalization of the Langevin and Fokker-Planck Equations -- 11.3 High-Friction Limit -- 11.4 Low-Friction Limit -- 11.5 Stationary Solutions for Arbitrary Friction -- 11.6 Bistability between Running and Locked Solution -- 11.7 Instationary Solutions -- 11.8 Susceptibilities -- 11.9 Eigenvalues and Eigenfunctions -- 12. Statistical Properties of Laser Light -- 12.1 Semiclassical Laser Equations -- 12.2 Stationary Solution and Its Expectation Values -- 12.3 Expansion in Eigenmodes -- 12.4 Expansion into a Complete Set; Solution by Matrix Continued Fractions -- 12.5 Transient Solution -- 12.6 Photoelectron Counting Distribution -- Appendices -- A1 Stochastic Differential Equations with Colored Gaussian Noise -- A2 Boltzmann Equation with BGK and SW Collision Operators -- A3 Evaluation of a Matrix Continued Fraction for the Harmonic Oscillator -- A4 Damped Quantum-Mechanical Harmonic Oscillator -- A5 Alternative Derivation of the Fokker-Planck Equation -- A6 Fluctuating Control Parameter -- S. Supplement to the Second Edition -- S.1 Solutions of the Fokker-Planck Equation by Computer Simulation (Sect. 3.6) -- S.2 Kramers-Moyal Expansion (Sect. 4.6) -- S. 3 Example for the Covariant Form of the Fokker-Planck Equation (Sect. 4.10) -- S.4 Connection to Supersymmetry and Exact Solutions of the One Variable Fokker-Planck Equation (Chap. 5) -- S.5 Nondifferentiability of the Potential for the Weak Noise Expansion (Sects. 6.6 and 6.7) -- S.6 Further Applications of Matrix Continued-

	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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Autore	Mainardi, Danilo
Titolo	Il comportamento animale : introduzione all'etologia / Danilo Mainardi, Marisa Mainardi
Pubbl/distr/stampa	Bologna : Zanichelli, 1970
Descrizione fisica	120 p. : ill. ; 23 cm
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Formato	Materiale a stampa
Livello bibliografico	Monografia