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Gaussian random variables; 4 Spectral measurement and correlation
4.1 Introduction: An approach to the spectrum of a stochastic process4.2 The definitions of the noise spectrum; 4.3 The Wiener-Khinchine theorem; 4.4 Noise measurements; 4.5 Evenness in of the noise?; 4.6 Noise for nonstationary random variables; 4.7 Appendix A: Complex variable notation; 5 Thermal noise; 5.1 Johnson noise; 5.2 Equipartition; 5.3 Thermodynamic derivation of Johnson noise; 5.4 Nyquist's theorem; 5.5 Nyquist noise and the Einstein relation; 5.6 Frequency dependent diffusion constant; 6 Shot noise; 6.1 Definition of shot noise; 6.2 Campbell's two theorems
6.3 The spectrum of filtered shot noise6.4 Transit time effects; 6.5 Electromagnetic theory of shot noise; 6.6 Space charge limiting diode; 6.7 Rice's generalization of Campbell's theorems; 7 The fluctuation-dissipation theorem; 7.1 Summary of ideas and results; 7.2 Density operator equations; 7.3 The response function; 7.4 Equilibrium theorems; 7.5 Hermiticity and time reversal; 7.6 Application to a harmonic oscillator; 7.7 A reservoir of harmonic oscillators; 8 Generalized Fokker-Planck equation; 8.1 Objectives; 8.2 Drift vectors and diffusion coefficients
8.3 Average motion of a general random variable8.4 The generalized Fokker-Planck equation; 8.5 Generation-recombination (birth and death) process; 8.6 The characteristic function; 8.7 Path integral average; 8.8 Linear damping and homogeneous noise; 8.9 The backward equation; 8.10 Extension to many variables; 8.11 Time reversal in the linear case; 8.12 Doob's theorem; 8.13 A historical note and summary (M. Lax); 8.14 Appendix A: A method of solution of first order PDEs; 9 Langevin processes; 9.1 Simplicity of Langevin methods; 9.2 Proof of delta correlation for Markovian processes
9.3 Homogeneous noise with linear damping

Sommario/riassunto

Melvin Lax was a member of the US National Academy of Sciences, and widely known for his contributions in the field of random processes in physics. This book uniquely presents Lax's theoretical treatment of random processes, including applications to laser and semiconductor physics, light propagation in scattering media, and investment decisions. - ;This respected high-level text is aimed at students and professionals working on random processes in various areas, including physics and finance. The first author, Melvin Lax (1922-2002) was a distinguished Professor of Physics at City College of