Finocchiaro's concern for methodology. Galileo never developed a well worked out, coherent view of the nature of science or the nature of scientific investigation. Because the work is fecund—most often because of its very loose character—many people can find different messages in Galileo's work. Finocchiaro's attempt to put Galileo in order, while well meaning and often insightful, is doomed to failure.

Still the book is worthwhile reading for Galileo scholars because it does develop some interesting criticisms of traditional interpretations. It will not be of much use to the casual reader who just wants a good read about Galileo.

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Theory and Applications of Stochastic Differential Equations

Z. Schuss
321 pp. Wiley, New York, 1980. $25.95

Many of us need to know more about stochastic differential equations but are unprepared or unmotivated to read a lot of probability and measure theory to do so. With a good background in classical mathematical analysis and an intuitive understanding of singular perturbations and other asymptotic methods, Zeev Schuss demonstrates by example that one can actually contribute significantly to the development and application of the subject. Furthermore, by emphasizing and motivating this study through an intuitive presentation of a wide variety of physical applications, he has written a book that will appeal to a wide audience of scientists who are not willing to undertake the traditional path to learning the material. The book is, indeed, largely developed along lines suggested by recent work of Schuss and collaborating applied mathematicians and engineers, and it reveals the adventure in their discoveries and the enthusiasm generated from knowing and appreciating the significance of their applications. More definitive and more polished presentations of the mathematics involved will certainly appear. Those interested in probability and those more theoretically inclined toward pure mathematics may have complaints concerning rigor or the omission of some favored topics. Experts on asymptotics may also fuss that certain favorite references aren't cited, and applied physicists and theoretical chemists may not find the description of their special subject to be sufficiently complete. Altogether, however, Schuss very ably shows the importance of doing calculations, of generating a formalism, and of trying such a devel-

opment (as in the roots of the field) to physical models. Having developed an appetite from this text, readers will be able to branch out and study more thoroughly many different and important aspects of the theory and applications of stochastic differential equations.

The first chapter provides a rapid review of probability theory and includes meaningful and challenging exercises; the second introduces Langevin's equation, the backward and forward equations for a random process, and convergence to Brownian motion; the third motivates the need for a stochastic calculus and develops the Ito and Stratonovich integrals and stochastic differentials; the fourth chapter integrates linear equations, including that for the Ornstein–Uhlenbeck process, and discusses Markov and diffusion processes. The tie-up between stochastic differential equations and partial differential equations comes principally through Kolmogorov's formula. This is explored in Chapter 5, where coverage includes the Feynman–Kac formula, the Fokker–Planck equation, various boundary conditions, exit times and exit points, and the stability of stochastic differential equations.

Chapters 6 through 9 emphasize the asymptotic analysis of stochastic and applications. The sixth chapter explains the Smoluchowski–Kramers approximation for a particle in a force field and the diffusion approximation for Markov chains; the seventh discusses exit time problems with small diffusion and the related singular perturbation theory for elliptic equations, including expansions for the first eigenvalue problem. Chapter 8 contains a diffusion model of chemical reactions based on an analysis of the appropriate potential barrier and a discussion of atomic migration in crystals; and Chapter 9 discusses a variety of applications and new results for filtering signals in noisy channels. These later chapters cleverly take full advantage of the author's experience and expertise in partial differential equations and related parts of analysis.

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Giant Resonance Phenomena in Intermediate-Energy Nuclear Reactions

F. Cannata, H. Überall
112 pp. Springer, New York, 1980. $29.80

This short monograph summarizes in a rather succinct manner years of effort by two of the more prolific practitioners of the art of applying the Helm and generalized Goldhaber–Teller models to the analysis and interpretation of data from such diverse sources as the inelastic scattering of electrons, hadrons, pions and neutrinos, muon capture, radiative pion capture and pion photoproduction.

Within the framework of Eugene Wigner's supermultiplet theory Francesco Cannata and Herbert Überall have provided a concise summary and description of the theory of giant resonance states and their excitation by operators having various properties in spin and isospin space. These operators are associated with the probes used to study nuclear structure. The theory results in prescriptions that relate sets of empirical data obtained using photons, leptons, mesons and hadrons to each other. Unfortunately the authors insufficiently discuss the validity and limitations of the models mentioned or the problems that exist in extracting nuclear properties from experimental data. One such problem is that for inelastic electron scattering data in the continuum region there are 20% uncertainties in the radiative tail correc-