mentioning and for nearly the same price the elementary methematical statistics textbooks by American authors, such as, Freund, Brunk, Hoel, Tucker, and others, are preferable for a variety of reasons.

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Systèmes Échantillonnés Non Linéaires. BY PIERRE VIDAL. Gordon and Breach, New York (1968). xiv+363 pp. U.S. $27.50.

The first in a series of monographs devoted to various aspects of systems theory, the present volume is a substantial summary of the methods and techniques presently employed in the study of nonlinear sampled-data systems. The first two chapters on the calculus of finite differences and the z-transform lay the groundwork for a good portion of the text. Separate chapters treat the methods based on signal flow graphs, describing functions (method of the first harmonic), and the incremental phase plane. The major chapters are concerned with problems of stability, time response, and linear oscillations. Stability is discussed under the two broad headings of geometric criteria (Cypkin and Jury-Lee) and algebraic criteria based on Liapunov's method. The latter criteria are associated with the names Kalman-Bertram, Wegrzyn-Vidal, Shea, Puri-Drake, Szegö-Kalman. The book concludes with two major applications: pulse width modulation systems and quantized systems.

The treatment in places is highly abbreviated; for example, the brief statement of functional analysis techniques could stand substantial elaboration. Fortunately a well chosen bibliography is appended to each chapter. Even in this era of relative affluence the price is not quite right. Note: the preface indicates that the volumes in this series are published simultaneously in English and in French.

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Combinatorial Methods in the Theory of Stochastic Processes. BY LAJOS TAKACS. Wiley, New York (1967). vi+262 pp.

This book is both interesting and useful for anyone concerned with queueing theory and other applications of stochastic processes. The main topic is the study

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of fluctuations in stochastic processes. For this study the author presents a general method which is not only novel and extremely elegant but which also has a large number of applications.

The author has arranged the material in two principal parts. The first (Chapters 1 through 4) contains the general results. The second (Chapters 5 through 8) contains mostly the application to special processes of the material developed in the first part.

Chapter 1 begins with a statement of the classical ballot theorem due to J. Bertrand, and with a description of its history. But the fundamental result of the chapter, which may be regarded as the real starting point of the book, is an elegant combinatorial result (Theorem 4 of §2) on successive partial sums of nonnegative integers.

Chapter 2 contains a systematic study of the distribution of certain quantities associated with the sum N_r of inter-changeable random variables $\nu_1, \nu_2, \ldots, \nu_r$ taking on nonnegative integral values. In particular, the author obtains simple formuli for the following probabilities:

$$P\{N_r < r \quad \text{for } r = 1, \ldots, n \mid N_n = k\} \tag{1}$$

$$P\{\max_{1 \le r \le n} (N_r - r) < k\} \tag{2}$$

$$P\{\max_{1 \le r < n} (r - N_r) < k\} \tag{3}$$

$$P\{\rho(k) = n\}, \quad \text{for } k \ge 1 \tag{4}$$

where $\rho(k)$ is the smallest r such that $N_r = r - k$. Additional results are obtained for the case where $\nu_1, \nu_2, \ldots, \nu_r, \ldots$ are mutually independent and identically distributed. These results include an elegant and useful generalization of the classical ruin theorem.

Chapter 3 develops similar results for the case where N_r is replaced by a stochastic process $\chi(t)$ with interchangeable increments or stationary independent increments. Chapter 4 specializes the material of the two preceeding chapters to certain random walk processes.

Chapters 5, 6, 7 apply the previous results to queueing theory, to dam and storage processes, and to insurance risks, respectively. Although in the context of the book these applications seem straightforward, it is precisely in these applications that one can really appreciate the power and elegance of the method developed by the author. Many results originally obtained by diverse methods are then developed through a unified technique, thereby giving a great deal of coherence to one of the most applicable branches of probability.

Chapter 8 contains applications to Order Statistics. Each chapter contains excellent references and problems with solutions. And the book contains, as an appendix, a good summary of the fundamental results of probability theory and of complex analysis that are frequently used in the book.

The preceeding remarks indicate the relevance of the book for those concerned with the kind of stochastic problems that find continued practical applications. But a further point, namely the suitability of the book as a text for instruction, should be raised. This book does not appear to be designed as an introductory text in the theory of stochastic processes. It gives no hint of the present development of the theory along measure-theoretic lines in close association with potential theory. But on the other hand, it does an excellent job of maintaining in the foreground the intuitive motivation and the possible application of the theory. In the reviewer's opinion, the book would be best for students who are already familiar with a standard course in probability and an introduction to stochastic processes.

The only criticism that the reviewer can make is that the style of writing, by excessive conciseness, makes some proofs difficult to follow.

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Generalized Functions and Partial Differential Equations. By G. E. Shilov. Gordon and Breach, New York (1968). xii+345 pp. U.S. $21 (20% discount for payment in advance).

Part I: Generalized functions. Here the standard elementary theory of generalized functions (i.e. Schwartz distributions) is presented. Some special topics to be used in the second part are included.

Part II: Partial differential equations. Two particular problems are discussed in detail, for operators with constant coefficients: (a) Ellipticity, and especially hypoellipticity; (b) Well posed boundary problems in a half-space.

This book is elementary in the sense that only standard results from functional analysis and integration theory are used, and no previous knowledge of differential equations is assumed. It would be suitable for a first graduate course; in fact most graduate students could read it on their own. There are numerous well chosen exercises to make the book easier and more pleasant to work with. The text is clear and elegant, and provides an excellent introduction to contemporary work in partial differential equations.

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