

The main body of the text is its last three chapters. First the author discusses a one-unit system. When the system is repairable (that is, it can be in either one of the states "up" or "down") then its availability at any time t is of interest. The author develops the availability theory for such a one-unit system. Also described are several replacement policies. Optimal replacement policies are derived under suitable assumptions and criteria.

A thorough discussion involving two-unit redundant systems is given next. Both parallel and standby redundant systems are considered. Using signal-flow graphs, the author shows how to obtain explicit expressions for various Laplace transforms of interest. From these Laplace transforms one can derive various probabilistic quantities of interest such as the "mean time to first failure" or the "mean downtime." Finally, more complex stochastic models for fault-tolerant computing systems are similarly analyzed.

Overall the book is a useful one. I do not agree with the author that it can be used as a one-semester text in reliability, but it can be handy for workers in this area of reliability theory. Also, research workers will be less irritated than graduate or undergraduate students by the grammatical errors found throughout the text.—*Moshe Shaked, Mathematics, University of Arizona*

Empirical Processes with Applications to Statistics. Galen R. Shorack and Jon A. Wellner. Wiley Series in Probability and Mathematical Statistics. 938 pp. Wiley, 1986. \$59.95.

This is an important book; it belongs in every statistics library. The authors have drawn together and systematized material from a scattered literature (the references fill 21 pages) into what will soon become a standard reference in many fields of statistics. For example, it would be the logical starting place for anyone needing to know about rank tests, procedures based on empirical distribution functions, or martingale methods for the study of censored data. The appendix on inequalities could alone be the basis for a whole undergraduate course, but overall the treatment is more at the graduate level: as in any tome that covers the areas from the classical theories to the recent frontiers of research, the technicalities become formidable in places. Highly recommended.—*D. Pollard, Statistics, Yale University*

Measures of Infinite Dimensional Spaces. Yasuo Yamasaki. Series in Pure Mathematics, 5. 256 pp. World Scientific, 1985. \$28.

The book is divided into two parts. Part A, containing three chapters, deals

with the general question of constructing a measure on an infinite dimensional space as the limit of measure on finite dimensional ones. Measures on topological vector spaces are treated in detail and with considerable care. Part B, consisting of five chapters, is devoted to the invariance and quasi-invariance of measures on infinite dimensional spaces. Conditions for quasi-invariance are given in terms of what the author (fittingly) calls the Kakutani topology. Some new work of the author is also enclosed.

A special feature of the monograph is the fairly extensive and meticulously careful treatment of nuclear spaces and their duals and the Bochner-Minlos-Sazonov theorems.

The book is suitable for a special topics course. Parts of it can be used by students of advanced probability theory and, in view of the current interest in infinite dimensional stochastic processes, also by researchers in the field.—*G. Kallianpur, Statistics, University of North Carolina*

Computation and Cognition: Toward a Foundation for Cognitive Science. Zenon W. Pylyshyn. 292 pp. MIT Press, 1984. \$9.95 paper.

Pylyshyn's book summarizes his views of the issues raised in a number of lively discussions concerning cognition. These forums between computer and information scientists (known in Europe as "informaticians"), especially from the area of artificial intelligence, and cognitive scientists generally can be found in *The Study of Information: Interdisciplinary Messages*, edited by Machlup and Mansfield (Wiley, 1983), and in various issues of *The Behavioral and Brain Sciences* (e.g., 1980).

The author discusses the many levels of specification detail of the cognitive processes from the most abstract (specifying only the states before and after cognition), called "high level" or "weakly equivalent," through many stages of detail (not only of intermediate states in the process but also of the physical means by which the states are achieved) down to the extremely detailed, called "low level" or "strongly equivalent." These specification levels range from the purely computational details through psychological and sociological levels down to involving, say, detailed biochemical and biophysical neurological processes—all of which, however, are capable of symbolic simulation by programs on modern computers. These many levels of thinking about thinking in the cognitive sciences (neuroscience, psychology, anthropology, philosophy, linguistics, and informatics) have engendered characteristic attitudes. Pylyshyn, as both a psychologist and a computer scientist, insists on a fairly strong equivalence level that makes him demand a sharp separation of the cogni-

tive architecture (the hardware) from the cognitive process (the software) in spite of their mutual simulability.

Just as the digital computer since the late forties has become a general symbol manipulator with common storage of instructions and data that can perform and modify instructions and then immediately carry out the modification—a capability that is known as being able to operate "interpretively"—so can thinking and resulting behavior be modified by thoughts expressing a change of intentions, purposes, or beliefs. I have called the machines that mix "object language" with "metalanguage" in this way possessors of "unstratified control." Pylyshyn calls thoughts and behavior that are capable of being modified by other thoughts or behavior "cognitively penetrable." In my opinion, his insistence that cognition is computation is strongly equivalent to identifying the brain's cognitive behavior with that of a computer with unstratified control, thereby making the process of thinking cognitively penetrable.—*Saul Gorn, Computer and Information Science, University of Pennsylvania*

Boundary Value Problems for Higher Order Differential Equations. Ravi P. Agarwal. 307 pp. World Scientific, 1986. \$35.

This monograph provides a good summary of recent research on analytic and numerical methods for treating boundary value problems in ordinary differential equations. The background needed for following its developments is an advanced undergraduate or beginning graduate course in ordinary differential equations that includes the usual pertinent numerical techniques. The book can be used by a variety of readers: the student who plans to do research on boundary value problems, the reader who seeks techniques for solving a specific problem, or the instructor who wishes to incorporate some of the methods into an advanced applied course. In view of the author's aims and his style of writing, I would use the monograph as a reference but not as a text. Some statements have awkward structures, and one must pay particular attention to the presentations of theorems. What is often written as a hypothesis may, in fact, be a new definition. With some reasonable care, the reader should be able to separate the two. The reader must be well motivated in the subject because the author usually moves directly into mathematical technicalities. For the proofs of many of the stated theorems, the reader is directed to the original papers.

The topics covered are standard to the subject and include linear problems, Green's functions, the method of complementary functions, the method of ad-