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Book Reviews

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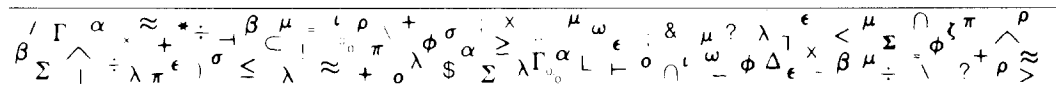


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Book Reviews

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The range of books reviewed is wide, covering theory and applications in operations research, statistics, econometrics, mathematics, computers, and information systems. In addition, we include books in other fields that emphasize technical applications. We list the books and proceedings received; not all books received can be reviewed because space and time are limited. Those who would like to review books are urged to send the Editor their names, addresses, and specific areas of expertise. The Editor commissions all reviews and does not accept unsolicited book reviews. Readers are encouraged to suggest books that might be reviewed or to ask publishers to send copies of such books to the Editor.

SAATY, THOMAS L. AND ALEXANDER, JOYCE M. 1981, *Thinking with Models*, Pergamon Press, Elmsford, New York, pp. 181, \$15.00.

This book is a very unusual operations research text, and a very welcome one. No chapter is devoted to linear programming, queueing theory, or other standard OR topic. Instead, the authors present a large number of simple mathematical models covering a great variety of problem areas. Their emphasis is not so much on solving particular problems as in illuminating the process of formulating useful models, that is, in the basic work of

operations research. It is a book on very basic mathematical modeling. The examples are drawn from many fields, including physics, chemistry, biology, and the social sciences. A great variety of mathematical techniques are used, as required by the examples. Students should, as a minimum, already have had differential and integral calculus, probability theory, and some exposure to matrix algebra. A high level of capability and a breadth of knowledge are required of an instructor to do full justice to the material. The book can serve as an excellent text for a one-semester course in modeling and,

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BOOK REVIEWS

rare for an OR text, a very useful reference for professionals in the field.

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VINCENT, THOMAS L. AND GRANTHAM, WALTER J. 1981, *Optimality in Parametric Systems*, John Wiley & Sons, New York, pp. 243, \$29.00.

The title of this book is somewhat misleading. The book deals with linear and nonlinear optimization, vector maximization, continuous games, and dynamic optimization in an optimization setting. Thus, the subject of the book is not parametric analysis as classically defined in the management science and operations research literature. Instead, a parametric system is defined by Vincent and Grantham as a system for which an optimal determination of parameters (decision variables) can be made under imposed constraints.

The book covers the following topics:

- Chapter 1 gives an overview of the types of problems to be solved, defines terms, and introduces basic theorems.
- Chapter 2 examines the problem of scalar minimization, developing first and second order optimality conditions utilizing tangent vectors and cones.
- Chapter 3 extends the theory of Chapter 2 into a realm of vector optimization and defines optimality concepts and criteria for local and global optimality.
- Chapter 4 reframes the scalar minimization problem in control notation and develops interpretations of Lagrange

multipliers, with accompanying first and second order optimality conditions.

- Chapter 5 ventures into game theory and characterizes Nash, min-max, Pareto and Stackleberg solutions using the theory developed earlier.
- Chapter 6 presents dynamic systems including both optimal control and dynamic games.

The book is a rigorous treatment largely devoid of applied material. There are small examples and problems. Thus, the book is likely to be useful only to those with a theoretical orientation.

The authors say "the text is suitable for a one-semester introductory course for senior or first year graduate students in engineering, mathematics, economics, and other areas . . ." However, the book would not be completely suitable for most management science or economics curricula because of the degree of mathematical sophistication required and the specialized terminology.

The book is potentially quite useful to those working in the theoretical mathematical programming area and provides a useful integration of game theory, nonlinear programming, multicriteria programming, and dynamic optimization.

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BONGERS, C. 1980 *Standardization, Mathematical Methods in Assortment Determination*, Martinus Nijhoff Publishing, Kluwer Boston, Inc., Hingham, Massachusetts, pp. 248, \$24.00.

termine the optimal set of sizes for a standardized product! If you have a need to become familiar with the subject of size selection, or are looking for a text to include in a business or operations research course on the subject, I can heartily recommend this one. Bongers extends the concept of optimal size selection well beyond the usual commodities like shoes and electric motors to include such things as schools. He addresses the appropriate choice of density functions for the distribution of size demands and appropriate loss functions associated with size selection, and he tackles some of the common misconceptions and simplifications in current use. He also includes all of the relevant mathematical and statistical background necessary so that the book is readable without reference to other resources. Typically, sizes are chosen according to either an arithmetic or a geometric series. Bongers not only challenges this simplification, but he provides evidence that it is in general erroneous. He includes a listing of a BASIC program to perform typical calculations in the selection of a standard size set from a continuous population of sizes. I did not test the program.

The book, in general, is quite readable. There are a few errors and inconveniences. On page 17, he has failed to normalize the consumer demand before calculating the standard size for a loaf of bread. Some sentences are reversed in structure; the logical flow is the reverse of what one expects, but this is mildly entertaining and is certainly not in error.

A ground rule stated in the introduction

is dedicated to dealing with the problems that arise when a demand density in fact is a function of time. This is a mild inconsistency and does not substantially detract from the text.

In summary, this text is easy to read, complete, and contains very few errors. I recommend it to those who want to become familiar with the topic of optimal size selection. Its format and style are recommended as a role model for authors of monographs on special topics.

D. H. Withers

782 Bravington Way, Lexington,
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- Abraham, Bovas and Ledolter, Johannes 1983, *Statistical Methods for Forecasting*, John Wiley and Sons, Somerset, New Jersey, pp. 445, \$34.95.
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