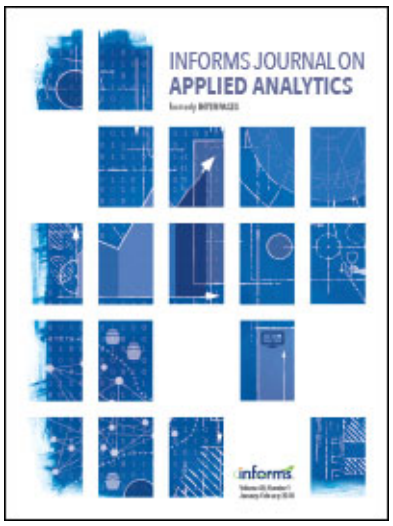

Interfaces

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

Book Reviews

To cite this article:
(2004) Book Reviews. Interfaces 34(1):73-79. https://doi.org/10.1287/inte.0103.0053

Interfaces
Vol. 34, No. 1, January–February 2004, pp. 73–79
ISSN 0092-2102 | EISSN 1526-551X | 04 | 3401 | 0073

informs

DOI 10.1287/inte.0103.0053

Book Reviews

Benjamin Lev
School of Management, The University of Michigan–Dearborn, 4901 Evergreen Road,
Dearborn, Michigan 48128-1491, blev@umich.edu

The range of books reviewed is wide, covering theory and applications in operations research, statistics, management science, econometrics, mathematics, computers, and information systems (no software is reviewed). In addition, we include books in other fields that emphasize technical applications. Publishers who wish to have their books reviewed should send them to Professor Benjamin Lev. We list the books received; not all books received can be reviewed because space is limited. Those who would like to review books are urged to send me their names, addresses, and specific areas of expertise. We commission all reviews and do not accept unsolicited book reviews. Readers are encouraged to suggest books that might be reviewed or to ask publishers to send me copies of such books.

ONWUBOLU, GODFREY C. 2002. *Emerging Optimization Techniques in Production Planning and Control*. Imperial College Press, River Edge, NJ. 632 pp. $78.00.

Onwubolu designed and organized *Emerging Optimization Techniques in Production Planning and Control* for use in a classroom of senior-level undergraduate students or first-year graduate students. He has written the book in easy English and presented the contents in a crystal-clear manner. In addition to an introduction (Chapter 1) that, briefly and in plain language, describes the various production-planning problems and the available solution methods, the book has two main parts. In the first part (Chapters 2 and 3), the author has focused on presenting the popular decision problems associated with a traditional manufacturing environment. In the second part (Chapters 4–9), he describes how a number of new adaptive memory programming approaches have been successfully applied towards solving some of these problems.

Chapters 2 and 3 contain concise, easy-to-read descriptions of methods related to forecasting, aggregate planning, materials management (MRP—material requirements planning, EOQ—economic order quantity, the newsvendor model, and so forth), scheduling (for example, job shop and flow shop), and quality control (for example, SPC—statistical process control, X-bar charts, and Taguchi loss function). Spread over more than 153 pages, these two chapters contain a lot of material of interest to students in production planning and industrial engineering. As a result, it is conceivable that an instructor could use these two chapters by themselves as the basis of a semester-long course. However, more suitable textbooks (Chopra and Meindl 2001, Nahmias 2001) are currently available for such a course.

In Chapters 4 to 8, Onwubolu describes the application of emerging solution methodologies to sets of production-planning problems. He organizes all of these chapters in a similar fashion, (1) first introducing the chosen solution methodology; (2) describing a selected set of production-planning problems; and (3) discussing how these problems can be solved with the new methodology. In Chapter 4, he describes how neural networks can be used to solve machine-tooling problems. In Chapter 5, he presents an approach in which genetic algorithms are used to solve aggregate-planning problems. In Chapter 6, he focuses on applying Tabu search to solve problems related to determining product mix. In Chapter 7, Onwubolu introduces Ant systems and their usefulness in flow-shop scheduling. In Chapter 8, he describes how to use simulated annealing to solve problems related to cell layout design.

In Chapter 9, the author describes a few basic programming techniques that could be useful in implementing the procedures presented in Chapters 4 to 8. He also provides an appendix describing Pascal fundamentals and containing the Pascal source code for a simple implementation of Tabu search. In these days, when C++ and Java are popular choices as programming languages, one questions the usefulness of an appendix on Pascal.

The book has positive and negative aspects. Some of the good things about it are (1) the author deals fairly well with bringing together two diverse fields, artificial intelligence and production planning; (2) he provides an extensive list of references from both fields; (3) he has designed the book for users who intend to implement and practice these techniques; and (4) he has written it in an unassuming, friendly fashion. I have some concerns about the book: (1) because

Onwubolu covers two distinct topics, he centers major portions of the book around one of these two topics and spends very little time on material that merges these two fields; (2) he covers so much material in such a short time that the reader has little time to think about the problems or the solution approaches; and (3) he does not discuss the nonoptimal (or heuristic) nature of these solution methodologies. I believe that while these methods work well (especially in practice) the effectiveness of the resulting solutions cannot be measured, and the author devotes little attention to this aspect.

The book is intended for classroom use. I think it is most suitable for a one- or two-semester course for senior-level or graduate students who have prior experience with computer science and industrial engineering and want hands-on experience in programming these techniques and solving the problems, rather than studying the theoretical behavior of these problems.

It would have been preferable if Onwubolu had focused on just the material in Chapters 4 to 9. While he introduces the traditional production-planning problems rather well in Chapters 2 and 3, their connection to the rest of the book is rather weak. It is almost as if the book is two books in one. In addition, it would have been nice if the book included software containing implementations of these emerging techniques. Students could then have spent less time programming all of these techniques but still experience them first hand. I acknowledge and appreciate Onwubolu's effort in putting this book together, and I hope he will be encouraged to improve the book in the directions I have suggested and in other directions.

References

Chopra, S., P. Meindl. 2001. *Supply Chain Management: Strategy, Planning, and Operation.* Prentice Hall, Upper Saddle River, NJ.

Nahmias, S. 2001. *Production and Operations Management.* McGraw-Hill, New York.

Srinagesh Gavirneni
Operations and Decision Technologies, Kelley School of Business, Indiana University, Bloomington, Indiana 47405, sgavirne@indiana.edu

OSAKI, S., ED. 2002. *Stochastic Models in Reliability and Maintenance*. Springer-Verlag, Berlin, Germany. 338 pp. EUR 79.95.

Osaki's objective with this collection of 12 literature reviews is to "introduce the readers to the major up-to-date theory and practice in stochastic models in reliability and maintenance (p. VI)." The topics include renewal processes and computational aspects, stochastic orders in reliability theory, classical maintenance models, delay time analysis for modeling plant maintenance, imperfect preventive maintenance models, generalized renewal processes and repair models, two-unit redundant models, optimal maintenance problems for Markovian deteriorating systems, transient analysis of semi-Markov reliability models, software reliability models, data communication reliability models, and Monte Carlo methods. For researchers already familiar with this subject, this book provides a compact listing of results and summary papers, all of which include extensive references.

The self-contained chapters are not tutorials nor do they provide derivations for many of the reported results. Instead, this text is a collection of literature reviews. The authors generally provide little intuition or explanation, and few extensive examples to illustrate the reported results. The first two chapters are good examples. In Chapter 1, after briefly defining a renewal function but not describing the motivation or benefit of such a definition, the author provides a listing of basic continuous and discrete results, such as the elementary renewal theorem, Blackwell's theorem, and the key renewal theorem, and then results regarding analytical and numerical methods. In Chapter 2, the author surveys stochastic orders and lists useful and known results, but again little helpful explanation. No doubt stochastic orders are important in various areas of reliability and maintainability theory, but a reader unfamiliar with this material may not know why after completing this chapter.

Some chapters take a more applied track relative to the text as a whole. Chapter 4, "A review of delay time analysis for modeling plant maintenance," is the most practice oriented. The author, after noting that some rather large percentage of the Netherlands' gross domestic product (GDP) is consumed by maintenance activities, states, "Very few publications are based upon an actual maintenance situation as opposed to a postulated scenario. Only a small subset use case data, and of these very few present a validation or post study check upon the model or consider observing its influence upon decision making (p. 90)." These are well-stated points, which apply to this collection of papers with some exceptions. With the goal of reducing maintenance costs in the forefront of the author's mind, he proceeds to develop the delay time concept and associated models and includes a critical discussion of the decision-making context in which such analysis is used in practice. He also discusses the case experience of a canning facility, giving a concrete example of these models in practice. (Chapter 4 is a reprint from the *Journal of the Operational Research Society*, 1999, Vol. 50, 1120–1137.)

In the paper on software reliability models, the author also successfully combines theoretical models with practical experience. Included in this paper

is a discussion of three critical management problems related to software: the optimal software release problem, statistical testing-progress control, and the optimal testing-effort allocation problem. At the core of this analysis are software reliability growth models based on nonhomogeneous Poisson processes to reflect the fact that as testing increases, the number of latent failures decreases. Although the author does not explicitly point out the important differences in modeling the reliability of software versus hardware (computer or otherwise), the presentation is detailed enough to allow readers to arrive at some comparative conclusions. In the chapter on reliability models in data communication, the author might have included a case study or practical elements but instead focuses on model development, comparing the modeling of three error-control procedures (forward-error correction scheme, automatic-repeat-request scheme, and hybrid schemes) and giving a brief numerical example.

In the last chapter, the author discusses quick Monte Carlo methods used to evaluate rare events defined on Markovian systems, including optimal change of measure and failure biasing techniques, among others. Like the authors of most of the papers, the author of this chapter primarily reports results and provides references that would allow interested readers to gain deeper understanding or intuition. With ever-increasing computer speeds and the need to model more and more complex systems with large interdependences among components, Monte Carlo and other simulation methods are becoming increasingly important relative to analytical techniques and consequently deserve substantial attention.

This collection of survey papers is useful to those who want extensively referenced papers that provide important results in many areas of stochastic reliability and maintenance models. I do think, however, that the text falls short of the editor's objective of providing an introduction to the subject and its practice. I interpret practice to include applications, which to me would require more explanations, examples, and case studies than this collection provides.

Frank Felder
School of Business, Manhattan College, Manhattan College Parkway, Riverdale, New York 10471

Ross, Timothy J., Jane M. Booker, W. Jerry Parkinson, eds. 2002. *Fuzzy Logic and Probability Applications: Bridging the Gap*. SIAM, Philadelphia, PA. 409 pp. $114.00.

The uncertainty phenomenon concerns researchers and decision makers of different specializations. A classical theory describing the phenomenon and offering tools to cope with it is probability theory. In fact, experts in the field of uncertainty models know several probability theories (Fine 1973). Although different probability theories emphasize different aspects of uncertainty, analysts cannot attack all important applied problems related to uncertainty with the tools associated with different probability theories, that is, statistics. Zadeh (1965) initiated a new paradigm of fuzzy sets and fuzzy logic, which promised to solve problems related to uncertainty, imprecision, ambiguity, and vagueness. The new theory quickly gained many supporters and also many opponents. Although the controversy between the supporters of methods based on probability theory and the supporters of methods based on fuzzy sets is weakening, it continues. A book bridging the gap between the opposing methodologies is needed and deserves wide attention. Confirming this opinion, the book has two forewords written by the prominent scientists Lotti A. Zadeh and Patrick Suppes.

The two parts of the book are Fundamentals, consisting of six chapters, and Applications, consisting of nine chapters. The editors claim that "the book is intended for the practicing engineer or scientist at the Bachelor of Science level or above" p. xxi.

The first part of the book concerns fuzzy set theory, fuzzy logic, fuzzy systems, probability theory, Bayesian methods, some considerations for using fuzzy and probabilistic logic, and expert judgement elicited in terms of probabilities or fuzzy logic. This introduction to fuzzy set theory and fuzzy logic seems sufficient to prepare novices for the further reading. In the chapters "Probability theory" and "Bayesian methods," the authors present a mixture of definitions, formulas, and interpretations. The purpose of these chapters is not clear because readers are supposed to have knowledge of statistics at the undergraduate level, which would allow them to understand the chapters on applications in Part 2. On the other hand, the coverage of probability theory and Bayesian statistics is too superficial to support serious theoretical discussion of the differences between probabilistic and fuzzy methodologies. Some authors use the nonstandard terminology and are therefore unclear. For example, "Uncertainties combine via rules of probability that stem from axiomatic behaviorist interpretation of probability" (see §3.1, p. 73). I have never seen the expression "axiomatic behaviorist interpretation of probability" before, and it is not defined in §3.1. Nonstandard terms may be misleading; for example, the heading of §4.2, "Probability theory of Bayesian methods," may be interpreted by a novice as a reference to a specific branch of probability theory. But the Bayesian formula is the same in all probability theories; it does not depend on an interpretation of probability (Zadeh 1965). Those interested in statistics know Bayesian statistics, which concerns the development of methods related to the

Bayes formula, their applications, and the interpretation of results. Chapter 4 indeed includes material on Bayesian statistics. If this standard term does not suit the authors, they should define the new term. It is difficult to present the fundamentals of so many theories in approximately 100 pages. Maybe the audience specified by the editors will benefit from the simplified presentation of probability and statistics, but experts in statistics interested in the differences between probabilistic and fuzzy methodologies will likely be disappointed.

Part 2 concerns different applications. In two chapters, the authors compare probabilistic and fuzzy methodologies. In "Engineering process control," Parkinson and Smith compare a classical proportional-integral-derivative (PID) controller with two advanced controllers, a fuzzy-logic controller and a probabilistic controller. They conclude that the PID controller is simple and robust and therefore probably will remain the workhorse of industry. There are many options to improve the PID controller using fuzzy or probabilistic rules for adjusting constants for different conditions. On the other hand, fuzzy and probabilistic controllers are very good and provide very similar responses. The chief differences seem to be in the philosophies behind the two controllers. So developers of these advanced controllers may use the control paradigm with which they are most comfortable. In "Auto reliability project," Booker and Bement examine the traditional probabilistic approach and the use of fuzzy membership functions with respect to reliability estimation under uncertainty. They conclude that analysts should use a methodology corresponding to the manufacturing culture. If experts think in terms of probability-based reliability models, then they are better able to estimate the parameters of such models. If they think in terms of heuristic rules, then they will find the fuzzy approach easier to use. The authors discuss the advantages of combining both approaches into a fuzzy-probability hybrid approach.

In the chapters on image enhancement, structural safety, and aircraft reliability, the authors use probabilistic and fuzzy models as complementary models of uncertainty. A probabilistic method of image processing called histogram equalization is controlled by an expert system based on fuzzy rules obtained from a human expert. In a methodologically similar way, probabilistic methods in aircraft reliability are combined with experts' knowledge expressed in the form of fuzzy rules. In the chapter on structural safety, the author develops a method of combining objective and subjective information; modeling the former with probability distributions and the latter with membership functions. In "Control charts for statistical process control," Parkinson and Ross show that the efficiency of the production-process control can be enhanced with control charts designed according to a fuzzy technique. In the chapter on fault tree models, the author considers extending this method of reliability assessment, including standard Boolean, Lukasiewich, and fuzzy logic into a fault-tree-based tool for risk assessment. In the chapter on uncertainty distributions using fuzzy logic, the author considers a problem of constructing an uncertainty model and proposes constructing a probability distribution function using a rule-based technique for eliciting knowledge from experts. In "Signal validation using Bayesian belief networks and fuzzy logic," Aradhye and Heger consider the problem of detecting and isolating faults in the sensors of a process-control system. They extend the standard tool, the Bayesian belief network with fuzzy logic rules.

My high opinion of the book was a bit spoiled by a few imprecise statements. I will describe only one. The statement "In 1763, the Reverend Thomas Bayes of England made a significant contribution to the field of probability when he published the paper . . . ," (p. 73) should be corrected, because the essay by Bayes (1702–1761) was published posthumously in 1764 (Zadeh 1965, p. 409).

Generally speaking, the book concerns fuzzy methodology, but not exclusively. The authors consider probabilistic uncertainty models as complementary models to models based on fuzzy-set theory. When both methodologies are applicable, the authors show that they produce similar results. Other applications described in the book clearly demonstrate the advantages of combining both methodologies where appropriate. Let me finish my review by quoting from the foreword by Zadeh: "The editors, authors, and publishers have produced a book that is a 'must-read' for anyone who is interested in solving problems in which uncertainty, imprecision, and partiality of truth play important roles" (p. xvii).

References

Fine, T. 1973. *Theories of Probability*. Academic Press, San Diego, CA.
Zadeh, L. 1965. Fuzzy sets. *Inform. and Control* **8** 338–353.

Antanas Zilinskas
Institute of Mathematics and Informatics, Vytautas Magnus University, Akademijos str. 4, Vilnius LT-2600, Lithuania

SAKAWA, MASATOSHI. 2002. *Genetic Algorithms and Fuzzy Multiobjective Optimization*. Kluwer Academic Publishers, Dordrecht, The Netherlands. 288 pp. $129.95.

Sakawa's book is part of Kluwer's series on operations research and computer science interfaces, and it concerns algorithmic implementation of a modern OR technique and its applications. I fully agree

with Sakawa that nowadays genetic algorithms (GAs) make a very important contribution to optimization, adaptation, and learning in a wide variety of fields. A number of monographs and edited collections of papers on genetic algorithms and evolutionary computing have been published recently. Earlier monographs mainly concerned hard single-criteria problems. However, recent research papers and conference presentations show that very active research is extending evolutionary computing to multicriteria problems and problems with imprecisely defined parameters. Attacking such complex problems by integrating various techniques of intelligent computing seems promising, and the results are beginning to be published (Gen and Cheng 1999). Sakawa's book is the first devoted solely to applications of GAs to multicriteria and fuzzy optimization.

GAs are typical heuristic algorithms. In fact, GAs may be considered to be no more than very primitive models of genetic inheritance mechanisms in living beings. It would be difficult to understand why these algorithms work, by analyzing them from the point of view of their similarity to biologic genetic processes. Researchers developed many sophisticated GAs by trying to adapt an algorithm to a problem without any reference to *genetic* using the term only as a convenient metaphor to describe a class of heuristic randomized algorithms. Sakawa uses the genetic metaphor very successfully and in a very broad sense, for example, the inheritance, from not just two ancestors but also from some third individual called the "reference solution."

Predicting the performance of a GA (and other heuristic algorithms) based on its similarity to the modeled natural process, remains a mystery. *Heuristic* as an attribute of an algorithm most frequently means lack of theoretically estimated efficiency. The justification of a heuristic algorithm is normally reduced to carefully planned numerical experiments. The author uses such an approach to justify proposed algorithms. He uses many tables and graphs to show how well algorithms solve artificial test problems and important practical problems.

The book starts with a short introduction to GAs. Sakawa first considers a multidimensional 0–1 knapsack problem. The difficulty of generalizing known GAs designed for the knapsack problem to general problems of 0–1 programming lies in generating feasible points. The author proposes a simple solution: to assume a known feasible point, and transform an infeasible point into a feasible point by moving it towards the feasible point. The analyst should find the feasible point (the reference point) by using a standard technique, for example, by minimizing a penalty function. Sakawa describes a new algorithm based on double strings with the reference solution. He considers fuzzy multiobjective 0–1 problems and presents genetic algorithms for such problems. He also covers GAs for integer programming and fuzzy multiobjective integer programming. He generalizes the decoding of double strings with reference solutions from 0–1 variables to integer variables. The latter implies straightforward generalization of the other components of algorithms: generation of the initial population, operators of reproduction, crossover, and mutation. He notes a disadvantage of GAs for multiobjective integer programming (for example, vector evaluated genetic algorithms): although they generate Pareto solutions, the solutions are usually biased towards some Pareto points. Sakawa circumvents this difficulty by using a fuzzy multiobjective formulation of the problem and an interactive method of solution. The proposed algorithm enables an expert working in an interactive mode to find a satisfactory solution in the extended Pareto set.

The author devotes two chapters to nonlinear programming. It is well known that nonlinearity of constraints is a crucial difficulty for GAs. Sakawa proposes a modification of a method described by Horst et al. (1995). Their method maintains two populations: search points in the region defined by linear constraints only and reference points in the feasible region. Evolution of the population of search points influences the evolution of reference points as follows: the analyst selects a pair of points from both populations and generates a new feasible point randomly at the line segment joining the two selected points. If the hypervolume of the feasible set is small, one might need too many trials to find a feasible point. Sakawa describes a modified method. First, by using bisection, find a boundary point of the feasible region on the segment. Second, generate a feasible point randomly on the segment joining the boundary point and the reference point. He includes two examples to compare the original version and the modified version. He also applies the modified method to search for Pareto solutions in multiobjective nonlinear programming problems. He reformulates the problem as a decision-making problem with fuzzy goals and reduces it to an auxiliary minimax problem whose solutions are Pareto points of the initial multiobjective problem.

The last three chapters concern scheduling problems. Sakawa considers the standard formulation of job-shop scheduling and its generalizations, including many objectives, fuzzy processing time, and fuzzy due date. He describes applications of the GAs developed, including flexible scheduling in a machine center, operations planning of district heating and cooling plants, and coal-purchase planning in an electric power plant.

Sakawa presents material that should be especially valuable to experts in evolutionary computing and to readers aiming to apply genetic algorithms to problems like those he considers: multidimensional knapsack, integer programming, and scheduling. They will appreciate learning about the latest advances in applying GAs, the details of the algorithms, and the subtle differences among various versions of GAs. The preface and the text on the back cover imply a very broad audience for the book. It seems difficult, however, for such a book to succeed with diverse audiences with varying interests. The experts in other branches of optimization and experts in OR in general normally expect to find comparisons of the performance of proposed methods with performance of known methods. Although Sakawa includes many test results in the book, they concern only GAs with no comparisons with other approaches. Such a comparison would also interest readers wishing to choose an algorithm for their applied problems, because other heuristic approaches are intended for similar problems (Horst and Tuy 1996, Michalewicz and Schoenauer 1996). Two test problems used in the chapter on nonlinear programming (with continuous variables) may be efficiently solved using deterministic methods: the first by a quadratic-programming routine, and the second by nonconvex optimization methods (Pardalos and Resende 2002, Reeves 1995). It does not seem reasonable to use a GA for such problems. But Sakawa's opinion is unclear; he shows only that for these test functions, one version of GA is better than another. In my opinion, Sakawa's book contains important advanced material on the applications of GAs to various problems. Libraries of institutions involved in research on evolutionary computing should add the book to their holdings because it covers an interesting subject of active research.

References

Gen, M., R. Cheng. 1999. *Genetic Algorithms and Engineering Optimization*. John Wiley and Sons, New York.

Horst, R., H. Tuy. 1996. *Global Optimization—Deterministic Approaches.* Springer, New York.

Horst, R., N. Thoai, P. Pardalos. 1995. *Introduction to Global Optimization.* Kluwer, Dordrecht, The Netherlands.

Michalewicz, Z., M. Schoenauer. 1996. Evolutionary algorithms for constrained parameter optimization problems. *Evolutionary Comput.* **4**(1) 1–32.

Pardalos, P., G. Resende, eds. 2002. *Handbook of Applied Optimization*. Oxford University Press, London, U.K.

Reeves, C., ed. 1995. *Modern Heuristic Techniques for Combinatorial Problems*. McGraw-Hill, New York.

Antanas Zilinskas
Institute of Mathematics and Informatics, Vytautas Magnus University, Akademijos str. 4, Vilnius LT-2600, Lithuania

SAVAGE, SAM L. 2003. *Decision Making with Insight*. Thomson Learning, Belmont, CA. 360 pp. $45.86.

If you are in corporate management and want a first-hand understanding of management science techniques and what spreadsheet modeling can do, you are unlikely to find a better book than this one by Sam Savage. Or if you are a business school professor looking for a book to impart the same understanding to your entry-level students in management science, again you couldn't do better than to use this book as a medium. From the basic concepts of probability and statistics to the more advanced concepts in optimization, Savage explains everything with delightful wit and humor.

Decision Making with Insight comes with a CD containing a number of very useful EXCEL add-ins and other simulation and optimization software. This includes Insight.xla 2.0 suite, Queue.xla, Q-NET.xla, Markov.xls, XLForecast, XLTree, Extend + MFG LT, Premium Solver for Education, and What's Best. The CD also has the data required to work all the examples in each topic. The CD loads smoothly and effortlessly, and the book contains detailed instructions to start each software, read the data, and carry out the numerous analyses with which the author brings out the power of the particular management science technique as well as of the software.

Topics covered include elementary probability and statistics, queues and queue-networks, discrete-event simulation, time-series analysis and forecasting, decision analysis, and linear and nonlinear optimization. The emphasis is on how to solve problems in these areas with EXCEL and the add-ins provided with the book, not on the theory. The book thus becomes an excellent complement to a main text in introductory courses in OR/MS, many of which students feel are rather dry because they cover theory exclusively.

Savage conveys the main lessons of each topic through sections entitled "Tutorials" within each chapter. In these tutorials, he presents a particular scenario or problem situation and shows how to model it in the appropriate software and derive a variety of outputs that provide insight into the situation as well as the solution technique.

Savage's exposition of decision analysis is particularly noteworthy. He starts out with an introductory example of a decision-modeling scenario and then moves into a tutorial that takes readers step by step through the process of using XLTree to build a decision tree, entering utility values, and evaluating the decision tree. Then, he further explains basic concepts such as utility, probabilities, Bayes' theorem, and expected values. The chapter concludes with good discussions on the value of perfect and imperfect information, the use of state variables, and the need for sensitivity analysis. This is done in a crisp

and clear manner, which should leave readers with the feeling that a new world has opened up for them and that they could now go ahead and model such situations on their own.

Almost every page has screen shots of the dialogue boxes and the tool bars and the EXCEL sheets involved in the solution of the problems. Savage has also included numerous diagrams, fine illustrations, graphs, and charts of outputs, which further explain the issues involved in each problem. I cannot imagine anybody having any difficulty working through these examples with the author and understanding the issues involved.

In addition, Savage has scattered numerous exercises through each chapter, by which readers can acquire additional understanding and confidence in modeling with spreadsheets, the add-ins, and the simulation and optimization software included in the CD.

However, I would suggest that the book's usefulness could be enhanced by the inclusion in future editions of a couple of other topics that are becoming increasingly relevant and interesting to modern managers and therefore to managers in the making. The topics I have in mind are statistical techniques in process and product quality improvement (such as total quality management, Taguchi methods, and six sigma), Thomas Saaty's analytical hierarchy process, and data envelopment analysis pioneered by Charnes, Cooper, and Rhodes.

All said and done, this is a fine book, sure to be very educational for entry-level students in the management sciences and for most practicing managers not familiar with management science. The latter will also find the book of practical utility, because the included software will allow them to solve many of the small-to-medium problems they may encounter in their daily work.

Jamshed A. Modi
Institute for Technology and Management, Sector 4, Kharghar, New Bombay 410 210, India

Books Received for Review

Alpern, Steve, Shmuel Gal. 2003. *The Theory of Search Games and Rendezvous.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 319 pp. $130.00.

Cao, Bing-Yuan. 2002. *Fuzzy Geometric Programming.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 266 pp. $135.00.

Castillo, Oscar, Patricia Melin. 2003. *Soft Computing and Fractal Theory for Intelligent Manufacturing.* Springer-Verlag, New York. 283 pp. $78.00.

Chu, Wai C. 2003. *Speech Coding Algorithms: Foundation and Evolution of Standardized Coders.* John Wiley and Sons, New York. 558 pp. $115.00.

Deb, Kalyanmoy. 2002. *Multi-Objective Optimization Using Evolutionary Algorithms.* John Wiley and Sons, New York. 515 pp. $98.00.

De Klerk, Etienne. 2002. *Aspects of Semidefinite Programming: Interior Point Algorithms and Selected Applications.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 283 pp. $97.00.

Demeulemeester, Erik L., Willy S. Herroelen. 2002. *Project Scheduling: A Research Handbook.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 685 pp. $185.00.

Dubin, Daniel. 2003. *Numerical and Analytical Methods for Scientists and Engineers Using Mathematica.* John Wiley and Sons, New York. 633 pp. $120.00.

Faigle, Ulrich, Walter Kern, George Still. 2002. *Algorithmic Principles of Mathematical Programming.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 337 pp. $103.00.

Ferry, Georgina. 2003. *A Computer Called LEO: Lyons Teashops and the World's First Office Computer.* Fourth Estate, London, U.K. 240 pp. $19.00.

Fortheringham, A. Stewart, Chris Brunsdon, Martin Chartlon. 2002. *Geographically Weighted Regression: The Analysis of Spatially Varying Relationships.* John Wiley and Sons, New York. 269 pp. $95.00.

Haslinger, Jaroslav, Raino A. E. Makinen. 2003. *Introduction to Shape Optimization: Theory, Approximation, and Computation.* SIAM, Philadelphia, PA. 273 pp. $76.00.

Kak, Avinash C. 2003. *Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and JAVA.* John Wiley and Sons, New York. 1,115 pp. $79.95.

Komzsik, Louis. 2003. *The Lanczos Method: Evolution and Application.* SIAM, Philadelphia, PA. 87 pp. $42.00.

Kossiakoff, Alexander, William N. Sweet. 2003. *Systems Engineering: Principles and Practice.* John Wiley and Sons, New York. 463 pp. $94.95.

Ponniah, Paulraj. 2003. *Database Design and Development: An Essential Guide for IT Professionals.* John Wiley and Sons, New York. 734 pp. $84.95.

Raeisaenen, Vilho. 2003. *Implementing Service Quality in IP Networks.* John Wiley and Sons, New York. 326 pp. $69.95.

Reeves, Colin R., Jonathan E. Rowe. 2003. *Genetic Algorithms—Principles and Perspectives: A Guide to GA Theory.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 332 pp. $120.00.

Spall, James C. 2003. *Introduction to Stochastic Search and Optimization: Estimation, Simulation, and Control.* John Wiley and Sons, New York. 595 pp. $94.95.

Stadtler, Hartmut, Christoph Kilger, eds. 2002. *Supply Chain Management and Advanced Planning: Concept, Models, Software and Case Studies*, 2nd ed. Springer-Verlag, New York. 429 pp. $49.95.

Tomsen, Mai-lan, Ron Faith. 2003. *Reaching the Interactive Customer: Integrated Services for the Digital World.* Cambridge University Press, New York. 166 pp. $25.00.

Wang, John. 2003. *Data Mining: Opportunities and Challenges.* Idea Group Publishing, Hershey, PA. 468 pp. $79.95.

Woodruff, David L., ed. 2003. *Network Integration and Stochastic Integer Programming.* Kluwer Academic Publishers, Dordrecht, The Netherlands. 125 pp. $95.00.