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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, 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.

The authors or editors of the books reviewed in this issue are Kenneth R. Baker, Wai-Ki Ching, Michael K. Ng, Manuel Laguna, Rafael Marti, J. Cole Smith, and Jan A. Snyman.

Baker, Kenneth R. 2006. *Optimization Modeling with Spreadsheets*. Duxbury, Pacific Grove, CA. 400 pp. $75.56.

To the best of my knowledge, Kenneth Baker's *Optimization Modeling with Spreadsheets* is the first book that focuses exclusively on spreadsheet optimization models. Baker based the book on an elective course in optimization for MBA and engineering-management master's students at Dartmouth. Because of the audience, the book relies less on algebra than many management science texts and includes an excellent variety of realistic problems throughout. By realistic, I mean that some of the modeling problems are more challenging than those in typical management science texts. I particularly like the cases that appear at the ends of the chapters. They are realistic and provide students with an excellent opportunity for learning.

The text contains eight chapters. After an introduction in Chapter 1, the next four chapters deal exclusively with linear programming models, including such traditional topics as blending and covering models and networks. In Chapter 4, Baker focuses on sensitivity analysis, including the use of the solver sensitivity tool kit that comes bundled with the text. The tool allows users to easily reoptimize a model while changing model parameters over a specified range and step size for an Excel solver model. Chapter 5 deals exclusively with data-envelopment analysis. Chapters 6 and 7 concern integer and nonlinear models, respectively. Chapter 7 also contains information on converting some nonlinear models to their equivalent counterparts (for example, ratios and absolute values).

Baker's book comes bundled with Frontline System's Premium Solver for Education, which includes the evolutionary algorithm. Hence, the final chapter contains models to be used with the evolutionary option. In this chapter, Baker presents a variety of nontraditional models of traditional optimization problems. Some of these models will be unfamiliar to instructors not well versed in Excel's numerous functions. However, for students who are experts in Excel, some of these models are the natural way to think about a problem. For example, they would model a traveling salesperson problem with an "all different" constraint where the decision variables are the sequence of the tour and use the "=INDEX" function to calculate the cost of the tour from a table. This leads to a much more compact model than traditional binary integer programming approaches. Of course, the evolutionary algorithm is a heuristic; therefore, one needs to be careful to educate the students that not all models and approaches are equivalent in their guarantee (or lack thereof) of optimality.

I used Baker's text in a master's-level course on optimization modeling. The class included MS students in business and industrial engineering and some MBA students. I followed the order of the chapters in the text with the exception of the networks chapter, which I covered later, after the integer and nonlinear chapters. I wanted to expose the students to different types of models early in the class because the course required an individual project and the students needed to develop their models as the quarter progressed.

The book was well received by the students. Its strength is Baker's clear writing style and the wealth of good problems and cases. I did have to supplement the text a bit with my own notes on stochastic optimization (briefly touched on in the text in an appendix). More material on stochastic models would be a welcome addition to the next edition. I also supplemented the book with AMPL and CPLEX notes and perhaps relied more on algebraic modeling than Baker does in the text. Although the author is not likely to incorporate these modifications in a second edition as this is not his intent for the text, I find these additions important for students of OR and industrial engineering. However, for MBA or undergraduate students, I would not feel compelled to supplement.

In summary, I highly recommend Baker's text on optimization for an MBA or undergraduate business student elective in optimization modeling. I also recommend it for use in MS and engineering modeling courses and intend to use it again in my course, supplemented with my own notes on an algebraic modeling system. I also recommend the text highly for those in industry looking for a well-written reference on spreadsheet optimization.

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Ching, Wai-Ki, Michael K. Ng. 2006. *Markov Chains: Models, Algorithms and Applications*. Springer, New York. 205 pp. $99.00.

In 1906, Andrei Markov published results in which he delineated the properties of a particular kind of stochastic process. This stochastic process now bears Markov's name, and Markov chains have become a standard modeling tool for researchers in fields as disparate as biology, economics, management science, mathematics, operations research, and statistics. Ching and Ng's stated purpose in this book of eight chapters is to "outline the recent development of Markov chain models for modeling queueing systems, Internet, re-manufacturing systems, inventory systems, DNA sequences, genetic networks and many other practical systems" (p. xiii).

To comprehend the numerous applications of Markov chains, one must first grasp the theory of Markov chains. The introductory chapter contains a primer on the theory of both discrete-time and continuous-time Markov chains. The authors provide examples of Markov chains, explain the concepts of one-step and n-step transition probability matrices, and show how to use a spreadsheet package, such as Excel, to simulate discrete-time Markov chains. They discuss the many ways in which matrix algebra can be used to solve linear systems of varying levels of complexity. Somewhat oddly, they conclude the chapter with a very brief introduction to hidden Markov models and Markov decision processes. The explanation here is not particularly lucid, and they deal with both kinds of Markovian models at much greater length in subsequent chapters.

Analysts increasingly use Markovian methods to model queuing systems, the Worldwide Web (WWW), and remanufacturing systems. The authors demonstrate the usefulness of Markovian methods in improving our understanding of these areas. For instance, how might we determine the relative importance or rank of a Web page on the Internet? They show how to answer this question with the help of Markov chains. In particular, they show that if we let N denote the total number of Web pages in the WWW and we define a matrix Q, called the *hyperlink matrix*, in a particular way, then Q "can be regarded as a transition probability matrix of a Markov chain of a random walk" (p. 47). Further, if the underlying Markov chain is irreducible, then a steady state probability distribution of the Web pages exists, and one can reason that the higher the magnitude of the steady-state probability of a particular Web page, the more important this Web page is.

Moving on to remanufacturing systems, Ching and Ng discuss an inventory model for a single item with returns. They construct a nice pictorial and theoretical model and show that this model can be used to compute the average inventory level, the approximate mean running cost, and the optimal inventory replenishment size. This interesting discussion raises several questions, and the authors shed light on some of them. For example, they show that their single-item inventory model can be "extended to [the] multi-item case when there is no limit in the inventory capacity" (p. 65). They also point out that if inventory replenishment is characterized by a lead time and if returned items must be checked or repaired, then the basic model can be reformulated as a tandem queuing model.

Firms generally construe a profitable customer as one whose revenues exceed by some margin the firm's costs of attracting, selling, and servicing this customer. This excess is often called the *customer lifetime value* (CLV), and the authors show how to analyze CLV using Markov decision processes. They first present a Markov decision theoretic model of customer behavior and then use stochastic dynamic programming to compute the CLV of customers in three different scenarios. In one scenario, the firm has a finite decision-making horizon and must contend with hard constraints. Ching and Ng show that for different values of the fixed promotion cost, the optimal strategy for customers in certain states "is to conduct no promotion" (p. 96). Although this discussion is certainly useful, their discussion of higher order Markov decision processes is less useful in large part because it is a little too concise.

The authors devote a fair amount of attention to multivariate Markov chains and aim to demonstrate the ways in which those chains can be used to model and study multiple categorical data sequences. For the case of credit rating, the authors nicely point out that one can use credibility theory to "provide an estimate for the credit transition probability matrix as a linear combination of the empirical credit transition probability matrix and a prior credit transition probability matrix" (pp. 150–151). The authors' approach is useful precisely because it gives market practitioners a straightforward way of estimating the unknown parameters and the credit transition probability matrices in the relevant multivariate Markov chain model.

I conclude with a few specific remarks. First, the discussion in parts of this book is rather dry. Second, the authors' noticeable use of clumsy or grammatically faulty sentences impedes the book's lucidity. Third, the authors intend the book mainly for advanced students and researchers interested in applications. Therefore, to get maximum mileage from this book, readers should be familiar with the theory of stochastic processes, particularly the theory of discrete- and continuous-time Markov chains and queuing theory at an introductory level (Taylor and Karlin 1998 or Ross 2000). Readers who have such a background will profit most from Ching and Ng's discussion of models, algorithms, and applications.

References

Ross, S. M. 2000. *Introduction to Probability Models*, 8th ed. Academic Press, San Diego, CA.

Taylor, H. M., S. Karlin. 1998. *An Introduction to Stochastic Modeling*, 3rd ed. Academic Press, San Diego, CA.

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Laguna, Manuel, Rafael Marti. 2003. *Scatter Search: Methodology and Implementations in C*. Kluwer Academic Publishers, Boston, MA. 312 pp. $135.00.

Scatter search is an optimization method that belongs to the class of evolutionary methods, which include the widely known genetic algorithms. Because of the effectiveness of scatter search for solving a variety of important and difficult problems, it has recently attracted the attention of many researchers and practitioners in the optimization community, especially those interested in finding optimal or near-optimal solutions of large-scale discrete or nonlinear problems. Although introduced in early 1960s as a primal counterpart of the surrogate constraints relaxation method in mathematical programming, in the past few years it has become popular for use in the context of metaheuristics—procedures that do not guarantee optimality but guide their component heuristic strategies in a way designed to escape the trap of local optimality. Just as surrogate constraints seek to capture relevant information contained in a collection of constraints by combining these constraints to form new constraints, scatter search seeks to capture information contained in a collection of solutions by combining them to generate new solutions. The underlying motivation goes hand in hand with principles for exploiting information by memory-based strategies embodied in the adaptive memory programming (AMP) framework. The concept of AMP was first introduced in the context of the well-known tabu-search metaheuristic, and it has been the source of numerous important developments in metaheuristic optimization throughout the past decade. By drawing on their shared principles, scatter search has achieved a level of maturity in its applications. Analysts need a practical guide that deals with effective ways for implementing the method.

In this book, Manuel Laguna and Rafael Martí provide readers with the fundamental background and tools to implement scatter search algorithms. They begin with an introductory chapter containing a succinct yet thorough description of the history of the scatter search method. They discuss the foundations of the method as originally proposed in the context of mathematical programming and the milestones that gave rise to the existing evolutionary metaheuristic. They end the chapter by outlining the general template that forms the basis for most contemporary scatter search implementations. They then cover more advanced designs within the context of specific applications of the method in a variety of settings.

After introducing the definitions, notations, and conventions used in the code throughout the book, Laguna and Marti introduce the building blocks for the implementation of scatter search algorithms in three tutorial chapters, specifically focusing on the solution of (1) unconstrained nonlinear optimization problems in a continuous space, (2) classical 0-1 knapsack problems as an illustrative instance of more general integer-programming problems, and (3) linear ordering problems as a basis for illustrating applications involving permutation models. The step-by-step examples in these tutorials, along with the explanation of computer code for various scatter search components, make the book a terrific tool for anyone interested in implementing scatter search algorithms. Although models are written in standard C language and so do not take advantage of object-oriented programming, the fact that codes are especially well structured and documented makes them fairly easy to adapt to a number of other settings and provides useful insights for the implementation of more general scatter search algorithms.

Building on the basic design of scatter search presented in the context of the linear ordering problem, the authors examine more elaborate strategies that are sufficiently general to apply to a variety of additional settings in Chapter 5. They focus on exploiting strategies that are context independent and that constitute the building blocks of current state-of-the-art scatter search implementations. These strategies include enhanced strategies for generating and maintaining an appropriate reference set of solutions; they also provide a number of alternative methods for combining solutions. In this chapter, the authors also offer preliminary insights into the use of memory in scatter search. In Chapter 6, they expand these insights and review the fundamental concepts of memory in tabu search, showing how the underlying principles can be used to create adaptive memory scatter search algorithms.

In Chapter 7, Laguna and Marti discuss major conceptual differences between scatter search and genetic algorithms and present a computational study of four classes of combinatorial problems, showing how different solution combination methods may affect the performance of these evolutionary approaches. They then present an overview of the generalized form of scatter search called *path relinking* (that equips tabu search with an evolutionary component) in a second part of the chapter accompanied by computer code to illustrate the connections between the two approaches. This chapter is particularly well done; the authors put together a number of related concepts and strategies to integrate tabu search intensification and diversification strategies through a path-relinking approach. They also provide a design for advanced path-relinking algorithms associated with the scatter search template.

Creating an effective implementation of an optimization algorithm for a new application can be challenging even for the most experienced researchers and professionals. In a good implementation for a specific class of problems, practitioners can generally derive significant benefit from identifying the algorithm components that are most appropriate for treating this class. Scatter search is no exception. By becoming aware of algorithmic features that have proved effective in various previous applications, one can obtain useful insights into the design of new algorithms in other settings. In Chapter 8, the authors review prominent scatter search applications. In summarizing the algorithm's design, they highlight the features that have proved critical for its performance in specific applications.

In Chapter 9, the authors discuss the design, functionality, and uses of a general-purpose simulation optimizer based on the scatter search methodology. They focus on the topic of searching for optimal solutions in those complex systems that cannot easily be formulated as mathematical models and solved with classical optimization tools. They include a demonstration of the commercial OptQuest system in the book as a software library to give the reader hands-on experience in solving the examples in the chapter.

In Chapter 10, they conclude by embedding the key implementation guidelines discussed throughout the book within the five methods they identify as composing the core of scatter search. They suggest possible directions for future research and discuss potential applications of the method to multiobjective optimization.

In sum, Laguna and Marti provide a comprehensive portrayal of scatter search by bringing together a body of useful information drawn from a large number of sources. They make the method accessible by providing implementation codes that allow readers to bridge the gap between theory and practice. Those with little interest in implementation issues will find this book a comprehensive overview of the scatter search method, and those who are computer oriented will find it a valuable guide for creating their own software, whether for research or practical application.

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Smith, J. Cole, ed. 2005. *Tutorials in Operations Research: Emerging Theory, Methods, and Applications.* INFORMS, Hanover, MD. 280 pp. $45.00.

I have always been a fan of tutorial sessions at conferences. I usually try to attend at least one tutorial at a conference, often on a subject completely unrelated to my research. I usually find them to be quite refreshing; partly because I am learning something new and different, and partly because I am not expected to be an expert when I enter the room. Often, the presentations I expect to be least interesting are the ones that are most interesting.

If you have a similar mindset, you will like the book *Tutorials in Operations Research* 2005. It is a collection of tutorials based on presentations at the 2005 INFORMS annual meeting, San Francisco/New Orleans. The book is the first volume in a new series, *Tutorials in Operations Research*, published by INFORMS. It consists of 10 chapters on a wide set of subjects, including the traditional (revenue management, supply chain planning), the technical (the COIN [COmputational INfrastructure] branch-and-cut solver), the conceptual (decision analysis), the educational (using active learning in the classroom), the application based (railroad planning, defending critical infrastructures), the methodology based (stochastic programming, branch-and-tree decomposition for discrete optimization), and the cross disciplinary (OR and experimental psychology).

The authors of the tutorials aim to present specific, emerging, or evolving areas of OR, rather than broad, fundamental areas. Thus, they generally presume knowledge of fundamental concepts in OR, such as linear programming, integer programming, probability theory, and stochastic processes. Many of the tutorials deal with optimization problems, so a good background in optimization is helpful. The papers vary in technical depth. Readers can usually skip the technical parts and still understand the core ideas being presented. The book is generally appropriate for those attending the INFORMS annual conference. Readers who are new to operations research will not get as much from the book, however, except for possibly the application-based chapters.

Because the book is adapted from the conference tutorials, it has strengths and weaknesses similar to those of conference-tutorial tracks. I generally find that tutorials increase my enthusiasm and interest in related fields. For example, I would not normally attend a conference session on "operations research in experimental psychology," but this chapter was one of the more interesting ones for me. (In fact, one of the stated goals in this tutorial is "to stir interest.") Using the secretary problem as a backdrop, the author discusses how human decision makers consistently hire the secretary "too early" relative to the optimal decision. That humans do not act optimally is not so interesting, but how they make decisions and the different heuristics they use are. Such research could be used to design systems that work well with human decision makers in the loop.

The authors of the tutorials are generally successful at communicating key concepts using basic examples. For example, the authors of the chapter on stochastic programming illustrate all concepts using one resource-optimization problem. The authors argue that sensitivity analysis alone is not enough to handle uncertainty. The problem is better modeled as a two-stage stochastic problem, in which the decision maker solves an optimization problem at two points in time.

The tutorials are a useful resource for anyone entering a specific area of research. Although they are not intended to be literature reviews, they generally contain a basic history of the topic in question, explanations of key concepts, discussions of modern challenges, and an extensive bibliography. For example, the tutorial on revenue management would be valuable for anyone starting work in this area.

The main weakness is that there is no unifying theme to the subjects of the tutorials. In subsequent volumes, I would be interested to see more "themed" tutorials. For example, I would like to see a volume devoted solely to application areas. Such a volume might better support one of the stated goals of the series, which is to bring wider recognition to the field of OR, particularly to industry and government organizations. At a conference, most people do not attend the entire tutorial track. Similarly, I suspect that many readers will pick chapters to read in this book and ignore the rest. The diversity is good for a conference track but less so for a book.

Overall, I recommend this book for anyone with a background in OR and an interest in the subjects covered. Although the tutorials vary somewhat in quality, they are generally well written and understandable. The authors communicate fundamental concepts in emerging areas without presenting too many technicalities. They have worked hard in presenting carefully crafted papers. I look forward to subsequent volumes.

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Snyman, Jan A. 2005. *Practical Mathematical Optimization*: *An Introduction to Basic Optimization Theory and Classical and New Gradient-Based Algorithms*. Springer, New York. 257 pp. $79.95.

Jan Snyman aims *Practical Mathematical Optimization* toward a senior-undergraduate or graduate one-semester course in optimization. He recommends the textbook for students in mathematics, engineering, computer science, and operations research; he has used this material during 20 years of teaching practical mathematical optimization to undergraduate and graduate students in engineering at the University of Pretoria. The unusually long title seems to reflect the author's intention to present "basic optimization principles and gradient-based algorithms to a general audience, in a brief and easy-to-read form without neglecting rigour" (quotation from the back cover).

Different universities have different traditions in teaching similar subjects. The material chosen for a course in optimization and the didactic approach can differ among institutions. Snyman presents an elementary introduction to optimization of nonlinear differentiable functions by means of gradient-based algorithms and also describes several algorithms he and his collaborators developed. Compared with other recently published textbooks on optimization (Bazaraa et al. 1993, Bertsekas 1995, Fiacco and McCormick 1964), Snyman's book is rather thin; it consists of 257 pages, of which 150 pages are devoted to the main material, 50 pages are devoted to the solution of example problems, and about 60 pages are devoted to proofs of some theorems, appendices, a bibliography of about 60 references, and an index.

In the introduction, the author defines terms and explains basic optimization concepts, using many graphical illustrations. In Chapter 2, he presents line search descent methods for unconstrained optimization: steepest descent, conjugate gradient, modified Newton's, and quasi-Newton's. In Chapter 3, "Standard Methods for Constrained Optimization," he considers the standard themes: necessary and sufficient minimum conditions, duality, and several well-known algorithms. He classifies the latter as penalty-function methods (a sequential unconstrained minimization technique [SUMT] known from the 1970s), classical (Lagrangian) methods, and modern (gradient projection, augmented Lagrangian, and successive quadratic programming [SQP]) methods. In Chapter 3, he discusses the quadratic programming problem and its solution. I consider consistency in citations especially important for textbooks. In introducing the gradient projection method, Snyman cites the original papers, but in discussing augmented Lagrangian and SQP methods, he does not cite the original sources (p. 81). He devotes the §3.1.3 to describing SUMT but does not cite Fiacco and McCormick (1964), who first proposed SUMT.

The first three chapters contain elementary material normally included in optimization courses. The theorems proven in Chapter 6 are related to the material in these chapters. After studying this material, a novice will be able to understand the structure of algorithms for local optimization of nonlinear differentiable functions. To understand this material, readers need only the elements of calculus and matrix theory. From both mathematical and practical points of view, the efficiency of optimization algorithms is important. Normally students gain insight into theoretical and practical efficiency while studying the convergence of algorithms and running their codes. The book does not contain even the rudiments of convergence analysis of the standard optimization algorithms considered; therefore, I cannot support the author's recommendation that instructors use this book to teach students in mathematics. Chapter 5, devoted to example problems, contains only problems to be solved by hand (not problems to be solved by computer) to demonstrate the practical efficiency of the algorithms considered. It is not clear how students are supposed to gain an understanding of the efficiency of optimization algorithms.

Chapter 4, "New Gradient-Based Trajectory and Approximation Methods," is the longest chapter in the book and is devoted to algorithms proposed by the author and his collaborators. Snyman starts by listing the difficulties in applying the classical gradient-based algorithms to real-world problems; for example, the objective functions frequently are "expensive" to compute, corrupted by noise, discontinuous, multimodal, highly dimensional, and possibly not everywhere defined. He then says, "All the above difficulties have been addressed in research done at the University of Pretoria over the past twenty years" (p. 98).

The first method he presents is called the *leap-frog method*. It is a trajectory method, a version of the golf method (Nocedal and Wright 1999), in which the search for a global minimum is modeled as a trajectory of a golf ball under the influence of gravity moving on the surface defined by an objective function. The motion equation of the leap-frog method can be obtained from the general golf method equation denying friction, that is, by assigning zero value to the coefficient of the velocity term. The leap-frog algorithm was developed for unconstrained optimization problems and can be applied to constrained problems by introducing penalties for constraints violations. The author claims the leap-frog algorithm has excellent properties: "It is extremely robust, handling steep valleys, and discontinuities and noise in the objective function and its gradient vector, with relative ease" (p. 100). It is a pity, however, that he presents no arguments to explain or prove these claims. He might have cited Pshenichnyj and Marchenko's (1967) mathematical results. Snyman likely does not know their work, however, because they published in Russian. Even so, he might have compared the leap-frog algorithm with other trajectory methods, such as Törn and Žilinskas's (1989).

In §4.3, Snyman presents a local unconstrained minimization method (the spherical quadratic steepest descent method). He proves the convergence of this algorithm for quadratic positively defined objective functions and presents some test results. He then combines the leap-frog method with successive quadratic approximation of the original problem to solve constrained problems. In §4.5, he describes one more local minimization method in which conjugate gradient search is modified by introducing the gradient-only line search. Finally, in §4.6, he presents the leap-frog method as a global minimization method, introduces a statistical stopping criterion, and discusses some testing results.

To evaluate a textbook, one would normally base a review on matching the material covered with the goals stated for the corresponding course. I do not know the goals for the course "Practical Mathematical Optimization" at the University of Pretoria. I can only guess that the textbook covers the optimization methods the author and his collaborators developed and teach in the course. The chapters on the more standard themes seem insufficient and provide only the background necessary for the main goal. I think that the textbook excellently suits such a goal. However, I am not sure that many universities state such goals for their courses in optimization.

References

Bazaraa, M. S., H. D. Sherali, C. M. Shetti. 1993. *Nonlinear Programming; Theory and Algorithms*. John Wiley and Sons, New York.

Bertsekas, D. P. 1995. *Nonlinear Programming*. Athena Scientific, Belmont, MA.

Fiacco, A. V., G. P. McCormick. 1964. Computational algorithm for the sequential unconstrained minimization technique for nonlinear problems. *Management Sci.* **10** 601–617.

Inomada, S., M. Cumada. 1964. On the golf method. *Bull. Electrotechnical Laboratory. Tokyo* **25** 495–512.

Nocedal, J., S. J. Wright. 1999. *Numerical Optimization*. Springer, New York.

Pshenichnyj, B. N., D. Marchenko. 1967. On one approach to the search for the global minimum. *Optimal Decision Theory* **2** 3–12 (in Russian). Institute of Cybernetics, Kiev.

Törn, A., A. Žilinskas. 1989. *Global Optimization.* Lecture Notes in Computer Science. Springer **350** 1–250.

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Books Received for Review

Bouyssou, Denis, Thierrry Marchant, Marc Pirlot, Alexis Tsoukias, Philippe Vincke. 2006. *Evaluation and Decision Models with Multiple Criteria: Stepping Stones for the Analyst*. Springer, New York. 445 pp. $119.00.

Calafiore, Giuseppe, Fabrizio Dabbene, eds. 2006. *Probabilistic and Randomized Methodes for Design Under Uncertainty*. Springer, New York. 457 pp. $149.00.

Caramia, Massimiliano, Paolo Dell'Olmo. 2006. *Effective Resource Management in Manufacturing Systems: Optimization Algorithms for Production Planning*. Springer, New York. 216 pp. $139.00.

Cassidy, Anita. 2006. *A Practical Guide to Information Systems Strategic Planning*, 2nd ed. Auerbach Publications, Boca Raton, FL. 376 pp. $43.65.

Chelst, Kenneth R., Thomas G. Edwards. 2005. *Does This Line Ever Move? Everyday Applications of Operations Research*. Key Curriculum Press, Everyville, CA. 144 pp. $26.95.

Chornei, Ruslan K., Hans Daduna, Pavel S. Knopov. 2006. *Control of Spatially Structured Random Processes and Random Fields with Applications*. Springer, New York. 261 pp. $79.95.

Coelli, Timothy J., D. S. Prasada Rao, Christopher J. O'Donnell, George E. Battese. 2005. *An Introduction to Efficiency and Productivity Analysis*, 2nd ed. Springer, New York. 349 pp. $49.95.

DiPillo, Gianni, Massimo Roma, eds. 2006. *Large-Scale Nonlinear Optimization*. Springer, New York. 297 pp. $79.95.

Foussier, Pierre. 2006. *From Product Description to Cost: A Practical Approach*. Volume 1: *The Parametric Approach*. Springer, New York. 296 pp. $199.00.

Hatamura, Yotaro, ed. 2006. *Decision-Making in Engineering Design: Translated from the Japanese by Kenji Lino*. Springer, New York. 265 pp. $189.00.

Kaliszewski, Ignacy. 2006. *Soft Computing for Complex Multiple Criteria Decision Making*. Springer, New York. 164 pp. $99.00.

Keinonen, Turkka, Roope Takala, eds. 2006. *Product Concept Design: A Review of the Conceptual Design of Products in Industry*. Springer, New York. 203 pp. $169.00.

Kumar, U. Dinesh, John Crocker, T. Chitra, Haritha Saranga. 2006. *Reliability and Six Sigma*. Springer, New York. 385 pp. $99.00.

Lawphongpanich, Siriphong, Donald W. Hearn, Michael J. Smith, eds. 2006. *Mathematical and Computational Models for Congestion Charging*. Springer, New York. 240 pp. $89.95.

Levin, Mark S. 2006. *Composite Systems Decisions*. Springer, New York. 254 pp. $119.00.

Levy, Haim. 2006. *Stochastic Dominance: Investment Decision Making Under Uncertainty*, 2nd ed. Springer, New York. 439 pp. $119.00.

Liberti, Leo, Nelson Maculan, eds. 2006. *Global Optimization: From Theory to Implementation*. Springer, New York. 427 pp. $99.00.

Mattfeld, Dirk Christian. 2006. *The Management of Transshipment Terminals: Decision Support for Terminal Operations in Finished Vehicle Supply Chains*. Springer, New York. 177 pp. $99.00.

Nicholas, John, Avi Soni. 2006. *The Portal to Lean Production: Principles and Practices for Doing More with Less*. Auerbach Publications, Boca Raton, FL. 323 pp. $69.95.

Rouse, William B., ed. 2006. *Enterprise Transformation: Understanding and Enabling Fundamental Change*. John Wiley and Sons, Hoboken, NJ. 527 pp. $75.00.

Scherer, Bernd, Douglas Martin. 2005. *Introduction to Modern Portfolio Optimization: With NuOPT, S-Plus, and S + Bayes*. Springer, New York. 405 pp. $79.95.