Book Selection

Edited by U Aickelin

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Successful Decision-Making: A Systematic Approach to Complex Problems

R Grunig and R Kuhn

Springer-Verlag, 2005. 251pp. £30.50
ISBN: 3540243070

The authors claim that the book provides a 'procedure for approaching any complex decision problem' and that its aim is to 'support the management [sic] in successfully solving complex problems.' Putting the two together, the claim is that the book's procedure, if followed, will enable the successful solving of any complex problem. This is the sort of marketing we expect from (usually American) management gurus, and it is unfortunate that the authors have made this claim in their preface. For, notwithstanding the outlandish claim, the book is very interesting and can perceptibly prove very useful to decision-makers.

The book is divided into three parts, all of which are rich in examples, diagrams, tables, and inserts. Part One explores the terrain of decision problems, types of decision-making procedures, the requirements for rational decision processes, and also provides a good discussion of the differences between heuristic and analytical decision procedures. It sets the background against which the authors present, in Part Two, their own general heuristic decision-making procedure. They illustrate each step of their procedure with examples and also provide 20 pages worth of case study analysis, which illustrates the entire procedure in one context. Part Three is a cross between an addendum and a reflection. On the one hand, it tackles two issues which are highly relevant but require separate treatment—information procurement decisions and collective decisions. On the other hand, given their pervasiveness, discussing such decisions provides focal points for reflecting on Parts One and Two, and thus rounds off the discussion rather well.

The authors' contribution is undoubtedly their systematic decision-making procedure in Part Two. Presented by the authors as a seven- to nine-step process, it is essentially a four-step process involving problem discovery, problem analysis, comparison of options, and the making of the decision. Understood as such, the procedure's quantitative inclinations may prove a useful complement to the theory and practice of the four-circle framework of the Strategic Choice Approach (SCA). The book, in other words, is highly recommended for those practitioners who wish to add conceptual and quantitative richness to their use of SCA.

No doubt the value of the authors' decision-making procedure will be judged in time. The book itself, however, provides much more than just this procedure. There are 17 inserts, for instance, which provide a wealth of information in compact, highly accessible format. For instance, one summarizes a range of important heuristic principles. Another eight-page insert provides a good reference to 'Bayes' approach for establishing the value of additional information'. The chapter on collective decision making will be most useful to those practising multi-actor decision processes—such as problem structuring methods. Here, inserts include 'Asch's experiment on group members' pursuit of conformity', 'Condorcet's voting paradox', as well as a straightforward presentation of the analytical hierarchy process, among others.

The authors have also managed to pack 100 figures into the book (about one for every two pages!). The inclusion of these figures is most welcome and an example to those writing in the field. The figures illustrate the arguments, are of excellent quality, and engage the reader into studying them carefully. Among other things, they serve to clarify concepts and calculations, present different representations of the same problem, outline decision matrices, and one even

offers an attempt at showing the tendency towards poorer decisions by a group compared to an individual.

When the figures are combined with the numerous inserts and crisp text, it is clear that this book deserves the attention of all these who study or practise decision-making. Indeed, taken as a whole, the richness of this book indicates that the reader will find at least one thing that can contribute to tackling any complex decision problem.

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Applications of Optimization with Xpress-MP

C Guéret, C Prins and M Sevaux

Dash Optimization, 2005. 284pp. £20.00
ISBN: 0954350308

Linear programming is a staple of the classical OR toolkit. The authors of this book argue that, until the relatively recent arrival of powerful PCs and efficient (but easy to use) software tools, the examples that could be covered in academic courses were of necessity limited in scope, and therefore not truly representative of the complexity of real-world problems.

The book is written for students of science, business and economics; and for professional decision-makers who have a need to apply Linear and Mixed Integer Programming. The text steers clear of detailed theoretical aspects of these techniques, choosing to focus instead on the issues associated with formulating models and implementing them in the Xpress-MP package. A limited version of the package, with sufficient functionality to address the examples given in the book, is available from the company's website—a copy of this book is also available as a free download in PDF format.

The book comprises two parts. The first starts with an overview of the need for a tool to conduct optimizing studies in non-trivial case studies, and then goes on to describe the characteristics of linear and integer programming. The first chapter in particular discusses the fact that modelling is seldom a linear process (even when LP is concerned!)—the need to iterate between problem description, analysis and solution is stressed, as is the need for a sense of perspective with regard to the data that underpins any model. The second, and by far the larger, part of the book comprises the example problems. This part begins with an introduction to Xpress-MP, and then 10 chapters of examples. Given the avowed intent of the book, it is understandable that there is no mention of alternative LP software tools.

Every one of the several dozen example problems, which are simplified but still complicated enough not to be solved using the proverbial 'back of an envelope', is first modelled in mathematical form. The translation of the mathematical model into the format needed by Xpress-MP then follows—this includes in many cases a deliberate examination of the implicit assumptions that are necessarily made in simplifying a real-world problem to a mathematical form. The results of the implementation are presented and discussed in detail. The scope of the set of problems is very wide—they are arranged by application area (such as mining and process industries, loading and cutting, air transport, etc). As the examples are available on the website, readers are able to conduct their own sensitivity analysis and to explore the implications of the model formulations in an interactive way. Copious references direct the curious reader to other examples of problems that have been addressed using the techniques discussed.

This is not a book to read through at a single sitting. The text reads well, though in one or two places the fact that it is a translation leaks through. It is more of a buffet than a banquet—apart from the introductory sections, it is clearly aimed as a reference source, where decision-makers faced with a problem in a specific domain can seek inspiration from the work of others. However, it is more than a recipe book—the importance of stating the problem clearly, as in the worked examples, is stressed throughout, as is the need to separate the mathematical formulation of the model from its implementation.

QinetiQ Consulting   B Spedding

Readings in Credit Scoring: Foundations, Developments, and Aims (Oxford Finance)

LC Thomas, DB Edelman and JN Crook

Clarendon Press, 2005. 338pp. £50.00
ISBN: 0198527977

With its collection of articles, the book provides an in-depth overview of sound quantitative credit scoring techniques, and responds to the growing need for credit models and rating systems. The book relates the history of credit scoring systems, discusses the features of various types of scorecard approaches as well as their applicability and goals each of them allows achieving, and ends up with an introduction of alternative methods to evaluate and take credit decisions.

The book fulfils the authors' objectives, and is written at a level suitable for quants, researchers in academia or industry and graduate students in economy, statistics, finance or operational research. The book can be used as reading material for a graduate course.

Rutgers University   M Lejeune

The Logic of Logistics: Theory, Algorithms, and Applications for Logistics and Supply Chain Management (Springer Series in Operations Research)

J Bramel, X Chen and D Simchi-Levi

Springer-Verlag, 2005. 357pp. £46.00
ISBN: 0387221999

This book is devoted to the theory, algorithms and applications of logistics management. The book essentially starts from mathematical and algorithmic foundations of logistics. These foundations are given in Part 1 of the book and include convexity and supermodularity, worst-case analysis and average analysis, and mathematical programming lower bounds. Part 1 contains a good collection of definitions and results, many with detailed proofs. Part 1 also includes material that can be found only in a few other sources, making the book basically self-contained.

Part 2 contains various inventory models. It starts with classical one-item deterministic models with constant demand and proceeds to multi-item inventory models with varying demands. In particular, the Wagner–Whitin model is described and analysed. Recognizing limited practicality of deterministic models, the authors consider stochastic inventory models with both finite and infinite horizons. They also treat multi-echelon systems. The last chapter of Part 2 is devoted to integration of inventory and pricing.

Part 3 considers design and coordination models. The first chapter describes many results obtained quite recently. It contains material on wholesale, buy back, revenue sharing and portfolio contracts. The section on portfolio contracts is based on a 2002-paper by Martinez-de-Albeniz and Simchi-Levi. Part 3 considers mathematical analysis of some recent business management approaches, in particular, outsourcing. Part 3 contains also supply chain planning models and facility location problems.

Part 4 provides a wealth of material on the vehicle-routing problems with equal and unequal demands, with and without window constraints. As in other parts of the book, the main focus is on various heuristics rather than exact algorithms owing to the higher practical value of heuristics. The authors start from simple heuristics including the iterated tour partitioning and savings heuristics and conclude Part 4 with a column generation approach.

Part 5 consists of two chapters devoted to logistics algorithms in practice. Both chapters are of interest, but the second one, on New York City school bus routing, seems outdated (not updated from the first edition of the book), which significantly affects its value. The first chapter in Part 5 is a new chapter included in the second edition of the book. Two chapters out of three in Part 3 are also new chapters.

I think the book contains a wealth of interesting and important material and the second edition's new chapters and sections add significantly to the book value. As I mentioned, earlier the book has a great advantage of being self-contained. Mathematical and algorithmic results and definitions given in the book may well be of interest not only to graduate students, but also to researchers working in operations research, management and computer science. The book could have even higher value if it contained more exercises and Part 5 had more and newer material.

The book is well written and can be used for teaching of graduate students or be read individually by research students, researchers and practitioners. The book is certainly good value for money, and I would highly recommend it as an essential purchase for a university library.

Royal Holloway   G Gutin

An Annotated Timeline of Operations Research: An Informal History (International Series in Operations Research and Management Science)

SI Gass and AA Assad

Kluwer Academic Publishers, 2005. 232pp. £48.00
ISBN: 140208112X

As the title accurately suggests, this book gives a comprehensive account of important events that have originated and shaped the development of operational research as a discipline. This historical account is organized as a timeline, which allows the reader to get an idea of how operations research emerged and evolved into the consolidated discipline we know today. Reading this book will be an entertaining experience to anyone interested in operations research. Its timeline format makes this book more suitable as a reference item than a historical narration.

This book is appropriate for all levels, from expert operational research scientists and practitioners to young undergraduate students entering the field. The reader will enjoy knowing details of crucial contributions that have made an impact on the development of OR from the 16th to the 21st centuries. Of particular interest is the account in Chapter 3 of those events prior to World War II that motivated the origins of OR. The book broadly covers all those developments during World War II that further instigated the application of OR techniques to solve a variety of problems mainly in military applications during war time. The reader can get a good picture of how during war times, multi-disciplinary teams of scientists and practitioners collaborated not only to solve problems but also to make military operations more efficient and effective. The book also describes the series of important events that meant the transfer of OR techniques to applications in industry and commerce in peace time.

An annotated timeline of operations research focuses on the chronicle of events related to the progress of OR in USA and the UK. This book should be read by all those interested in learning about the origins of organizations such as the ACM, EURO, ORSA, TIMS, UK OR society, IFORS and INFORMS. The reader will also learn about the origins and creators of important techniques and theories such as the simplex method, integer programming, non-linear programming, dynamic programming, branch and bound, goal programming, multiple criteria decision-making, meta-heuristics, evolutionary algorithms, constraint programming, stochastic programming, complexity theory, graph theory, etc. Also, the book describes events related to the formulation of classical OR problems such as the travelling salesman problem, prisoner's dilemma, integer programming problem, transportation problem, stochastic programming, scheduling problems, etc. The reader will also find that the book includes a comprehensive list of bibliographic items that have provided a solid basis for the development of OR.

In summary, An Annotated Timeline of Operations Research is interesting reading for anyone (scientists, practitioners, students) with an interest in OR. However, the reader should not expect a historical narrative but the description of a series of important events that have shaped the progress of OR.

University of Nottingham   D Silva