Deterministic Operations Research Solutions

Discrete Optimization with Interval DataProblems & Solutions in Inventory ManagementOptimization in Operations ResearchOperations research models for scheduling railway infrastructure maintenanceOperations Research ProblemsOperations ResearchStochastic Optimization MethodsAlgorithms for Scheduling ProblemsHandbook of Research on Emergent Applications of Optimization AlgorithmsOPERATIONS RESEARCH : PRINCIPLES AND APPLICATIONSOperations ResearchOperations Research Proceedings 2003Mathematical ProgrammingComputational Combinatorial OptimizationOperations ResearchEncyclopedia of Operations Research and Management ScienceIntroduction to Stochastic ProgrammingIntroduction to Operations ResearchDynamic OptimizationDeterministic Global OptimizationProblems in Operation Research (Principles & Solution)bureau of business research working paperRobust OptimizationOperations Research ProblemsOperations Research in Development SectorUrban Operations ResearchLinear Programming and Network FlowsProbability Models in Operations ResearchThe Design of Approximation AlgorithmsAn Introduction to Linear Programming and Game TheoryOperations ResearchModeling with Stochastic ProgrammingCommunity-Based Operations ResearchOperations Research-VerfahrenIntroduction to Operations ResearchOperations ResearchDeterministic Operations ResearchOperations ResearchDeterministic Operations ResearchOperations Research Proceedings 2012

Discrete Optimization with Interval Data

The objective of this book is to provide a valuable compendium of problems as a reference for undergraduate and graduate students, faculty, researchers and practitioners of operations research and management science. These problems can serve as a basis for the development or study of assignments and exams. Also, they can be useful as a guide for the first stage of the model formulation, i.e. the definition of a problem. The book is divided into 11 chapters that address the following topics: Linear programming, integer programming, non linear programming, network modeling, inventory theory, queue theory, tree decision, game theory, dynamic programming and markov processes. Readers are going to find a considerable number of statements of operations research applications for management decision-making. The solutions of these problems are provided in a concise way although all topics start with a more developed resolution. The proposed problems are based on the research experience of the authors in real-world companies so much as on the teaching experience of the authors in order to develop exam problems for industrial engineering and business administration studies.

Problems & Solutions in Inventory Management

Modern optimization approaches have attracted an increasing number of scientists, decision makers, and researchers. As new issues in this field emerge, different optimization methodologies must be developed and implemented. The Handbook of Research on Emergent Applications of Optimization Algorithms is an authoritative reference source for the latest scholarly research on modern optimization techniques for solving complex problems of global optimization and their applications in economics and engineering. Featuring coverage on a broad range of topics and perspectives such as hybrid systems, non-cooperative games, and cryptography, this publication is ideally designed for students, researchers, and engineers interested in emerging developments in optimization algorithms.

Optimization in Operations Research

Operations research models for scheduling railway infrastructure maintenance

Uniquely blends mathematical theory and algorithm design forunderstanding and modeling real-world problems Optimization modeling and algorithms are key components toproblem-solving across various fields of research, from operationsresearch and mathematics to computer science and engineering.Addressing the importance of the algorithm design process.Deterministic Operations Research focuses on the design ofsolution methods for both continuous and discrete linearoptimization problems. The result is a clear-cut resource forunderstanding three cornerstones of deterministic operationsresearch: modeling real-world problems as linear optimizationproblem; designing the necessary algorithms to solve theseproblems; and using mathematical theory to justify algorithmicdevelopment. Treating real-world examples as mathematical problems, theauthor begins with an introduction to operations research andoptimization modeling that includes applications form sportsscheduling an the airline industry. Subsequent chapters discussalgorithm design for continuous linear optimization problems,covering topics such as convexity. Farkas’ Lemma, and thestudy of polyhedral before culminating in a discussion of theSimplex Method. The book also addresses linear programming dualitytheory and its use in algorithm design as well as the Dual SimplexMethod. Dantzig-Wolfe decomposition, and a primal-dual interiorpoint algorithm. The final chapters present network optimizationand integer programming problems, highlighting various specializedtopics including label-correcting algorithms for the shortest pathproblem, preprocessing and probing in integer programming, liftingof valid inequalities, and branch and cut algorithms. Concepts and approaches are introduced by outlining examplesthat demonstrate and motivate theoretical concepts. The accessiblepresentation of advanced ideas makes core aspects easy tounderstand and encourages readers to understand how to think aboutthe problem, not just what to think. Relevant historical summariescan be found throughout the book, and each chapter is designed asthe continuation of the “story” of how to both modeland solve optimization problems by using the specificproblems-linear and integer programs-as guides. The book’svarious examples are accompanied by the appropriate models andcalculations, and a related Web site features these models alongwith Maple™ and MATLAB® content for the discussedcalculations. Thoroughly class-tested to ensure a straightforward, hands-onapproach, Deterministic Operations Research is an excellentbook for operations research of linear optimization courses at theupper-undergraduate and graduate levels. It also serves as aninsightful reference for individuals working in the fields ofmathematics, engineering, computer science, and operations researchwho use and design algorithms to solve problem in their everydaywork.

Operations Research Problems

This volume contains a selection of papers referring to lectures presented at the symposium "Operations Research 2003" (OR03) held at the Ruprecht Karls-Universitiit Heidelberg, September 3 - 5, 2003. This international con ference took place under the auspices of the German Operations Research So ciety (GOR) and of Dr. Erwin Teufel, prime minister of Baden-Wurttemberg. The symposium had about 500 participants from countries all over the world. It attracted academians and practitioners working in various field of Opera tions Research and provided them with the most recent advances in Opera tions Research and related areas in Economics, Mathematics, and Computer Science. The program consisted of 4 plenary and 13 semi-plenary talks and more than 300 contributed papers selected by the program committee to be presented in 17 sections. Due to a limited number of pages available for the proceedings volume, the length of each article as well as the total number of accepted contributions had to be restricted. Submitted manuscripts have therefore been reviewed and 62 of them have been selected for publication. This refereeing procedure has been strongly supported by the section chairmen and we would like to express our gratitude to them. Finally, we also would like to thank Dr. Werner Muller from Springer-Verlag for his support in publishing this proceedings volume.

Operations Research

This book analyzes the underlying theoretical principles of multi-objective linear programming problems with multi-choice parameters. It studies transportation problems on the same domain with extension to fuzzy stochastic criteria, and offers insights into sensitivity analysis through symmetric duality and complementarity using non-convex programming. These analytical presentations provide ample scope for researchers to contemplate real-world problems with an innovative vision. The formulation, analysis and solution procedures on inventory control models in the book use both deterministic and fuzzy parameters, and provide novel optimal inventory policies. The book discusses a wide range of optimal operational techniques for policy makers, government and private agencies in the fields of e-governance and agricultural crop insurance, which are crucial for developing countries. The recommendations address the gaps and remedies in various schemes that influence decision-making in the context of the economic development of such countries.

Stochastic Optimization Methods

We take great pleasure in presenting to the readers the second throughly revised edition of the book after a number of reprints.The suggestions received from the readers have been carefully incorporated in this edition and almost the entire subject matter has been reorganised,revised and rewritten.

Algorithms for Scheduling Problems

Table of contents

Handbook of Research on Emergent Applications of Optimization Algorithms

This book explores discrete-time dynamic optimization and provides a detailed introduction to both deterministic and stochastic models. Covering problems with finite and infinite horizon, as well as Markov renewal programs, Bayesian control models and partially observable processes, the book focuses on the precise modelling of applications in a variety of areas, including operations research, computer science, mathematics, statistics, engineering, economics and finance. Dynamic Optimization is a carefully presented textbook which starts with discrete-time deterministic dynamic optimization problems, providing readers with the tools for sequential decision-making, before proceeding to the more complicated stochastic models. The authors present complete and simple proofs and illustrate the main results with numerous examples and exercises (without solutions). With relevant material covered in four appendices, this book is completely self-contained.

OPERATIONS RESEARCH : PRINCIPLES AND APPLICATIONS

Robust optimization is still a relatively new approach to optimization problems affected by uncertainty, but it has already proved so useful in real applications that it is difficult to tackle such problems today without considering this powerful methodology. Written by the principal developers of robust optimization, and describing the main achievements of a decade of research, this is the first book to provide a comprehensive and up-to-date account of the subject. Robust optimization is designed to meet some major challenges associated with uncertainty-affected optimization problems: to operate under lack of full information on the nature of uncertainty; to model the problem in a form that can be solved efficiently; and to provide guarantees about the performance of the solution. The book starts with a relatively simple treatment of uncertain linear programming, proceeding with a deep analysis of the interconnections between the construction of appropriate uncertainty sets and the classical chance constraints (probabilistic) approach. It then develops the robust optimization theory for uncertain conic quadratic and semidefinite optimization problems and dynamic (multistage) problems. The theory is supported by numerous examples and computational illustrations. An essential book for anyone working on optimization and decision making under uncertainty, Robust Optimization also makes an ideal graduate textbook on the subject.

Operations Research

This tutorial contains written versions of seven lectures on Computational Combinatorial Optimization given by leading members of the optimization community. The lectures introduce modern combinatorial optimization techniques, with an emphasis on branch and cut algorithms and Lagrangian relaxation approaches. Polyhedral combinatorics as the mathematical backbone of successful algorithms are covered from many perspectives, in particular, polyhedral projection and lifting techniques and the importance of modeling are extensively discussed. Applications to prominent combinatorial optimization problems, e.g., in production and transport planning, are treated in many places; in particular, the book contains a state-of-the-art account of the most successful techniques for solving the traveling salesman problem to optimality.

Operations Research Proceedings 2003

This book presents a compilation of over 200 numerical problems and solutions that students can use to learn, practice and master the Inventory Control and Management concepts. Intended as a companion to any of the standard textbooks in Inventory Control and Management and written in simple language, it illustrates very clearly the steps students need to follow in order to solve a given problem. It also explains which solution methodologies can be used under which circumstances. Offering an ideal one-stop resource for mid-level engineering and business students who have taken Inventory Management or a related subject as an elective, this book is the only one students will ever need to prepare and gain confidence for their examinations in this subject.

Mathematical Programming

For over four decades, "Introduction to Operations Research" by Frederick Hillier has been the classic text on operations research. While building on the classic strengths of the text, the author continues to find new ways to make the text current and relevant to students. One way is by incorporating a wealth of state-of-the-art, user-friendly software and more coverage of business applications than ever before. The hallmark features of this edition include clear and comprehensive coverage of fundamentals, an extensive set of interesting problems and cases, and state-of-the-practice operations research software used in conjunction with examples from the text. The ninth edition introduces a new partnership with the Institute for Operations Research and Management (INFORMS). These two pillars of the OR world have come together to showcase some of the award-winning applications of operations research and integrate them with this text.

Computational Combinatorial Optimization

Operations Research

This book is a printed edition of the Special Issue " Algorithms for Scheduling Problems" that was published in Algorithms

Encyclopedia of Operations Research and Management Science

This monograph deals with a general class of solution approaches in deterministic global optimization, namely the geometric branch-and-bound methods which are popular algorithms, for instance, in Lipschitzian optimization, d.c. programming, and interval analysis.It also introduces a new concept for the rate of convergence and analyzes several bounding operations reported in the literature, from the theoretical as well as from the empirical point of view. Furthermore, extensions of the prototype algorithm for multicriteria global optimization problems as well as mixed combinatorial optimization problems are considered. Numerical examples based on facility location problems support the theory. Applications of geometric branch-and-bound methods, namely the circle detection problem in image processing, the integrated scheduling and location makespan problem, and the median line location problem in the three-dimensional space are also presented. The book is intended for both researchers and students in the areas of mathematics, operations research, engineering, and computer science.

Introduction to Stochastic Programming

This book examines optimization problems that in practice involve random model parameters. It details the computation of robust optimal solutions, i.e., optimal solutions that are insensitive with respect to random parameter variations, where appropriate deterministic substitute problems are needed. Based on the probability distribution of the random data and using decision theoretical concepts, optimization problems under stochastic uncertainty are converted into appropriate deterministic substitute problems. Due to the probabilities and expectations involved, the book also shows how to apply approximative solution techniques. Several deterministic and stochastic approximation methods are provided: Taylor expansion methods, regression and response surface methods (RSM), probability inequalities, multiple linearization of survival/failure domains, discretization methods, convex approximation/deterministic descent directions/efficient points, stochastic approximation and gradient procedures and differentiation formulas for probabilities and expectations. In the third edition, this book further develops stochastic optimization methods. In particular, it now shows how to apply stochastic optimization methods to the approximate solution of important concrete problems arising in engineering, economics and operations research.

Introduction to Operations Research

This book is intended to be used as an advanced beginning or an intermediate text in operations research, management science, or mathematical programming.

Dynamic Optimization

Industrial engineering has expanded from its origins in manufacturing to transportation, health care, logistics, services, and more. A common denominator among all these industries, and one of the biggest challenges facing decision-makers, is the unpredictability of systems. Probability Models in Operations Research provides a comprehensive overview of the probabilistic and stochastic modeling approaches commonly used to capture the randomness in industrial and systems engineering.

Deterministic Global Optimization

Mathematical Programming, a branch of Operations Research, is perhaps the most efficient technique in making optimal decisions. It has a very wide application in the analysis of management problems, in business and industry, in economic studies, in military problems and in many other fields of our present day activities. In this keen competetive world, the problems are getting more and more complicated ahnd efforts are being made to deal with these challenging problems. This book presents from the origin to the recent developments in mathematical programming. The book has wide coverage and is self-contained. It is suitable both as a text and as a reference. * A wide ranging all encompasing overview of mathematical programming from its origins to recent developments * A result of over thirty years of teaching experience in this feild * A self-contained guide suitable both as a text and as a reference

Problems in Operation Research (Principles & Solution)

bureau of business research working paper

The objective of this book is to provide a valuable compendium of problems as a reference for undergraduate and graduate students, faculty, researchers and practitioners of operations research and management science. These problems can serve as a basis for the development or study of assignments and exams. Also, they can be useful as a guide for the first stage of the model formulation, i.e. the definition of a problem. The book is divided into 11 chapters that address the following topics: Linear programming, integer programming, non linear programming, network modeling, inventory theory, queue theory, tree decision, game theory, dynamic programming and markov processes. Readers are going to find a considerable number of statements of operations research applications for management decision-making. The solutions of these problems are provided in a concise way although all topics start with a more developed resolution. The proposed problems are based on the research experience of the authors in real-world companies so much as on the teaching experience of the authors in order to develop exam problems for industrial engineering and business administration studies.

Robust Optimization

Operations Research Problems

This rapidly developing field encompasses many disciplines including operations research, mathematics, and probability. Conversely, it is being applied in a wide variety of subjects ranging from agriculture to financial planning and from industrial engineering to computer networks. This textbook provides a first course in stochastic programming suitable for students with a basic knowledge of linear programming, elementary analysis, and probability. The authors present a broad overview of the main themes and methods of the subject, thus helping students develop an intuition for how to model uncertainty into mathematical problems, what uncertainty changes bring to the decision process, and what techniques help to manage uncertainty in solving the problems. The early chapters introduce some worked examples of stochastic programming, demonstrate how a stochastic model is formally built, develop the properties of stochastic programs and the basic solution techniques used to solve them. The book then goes on to cover approximation and sampling techniques and is rounded off by an in-depth case study. A well-paced and wide-ranging introduction to this subject.

Operations Research in Development Sector

Urban Operations Research

Linear Programming and Network Flows

Praise for the Second Edition: "This is quite a well-done book: very tightly organized,better-than-average exposition, and numerous examples,illustrations, and applications." —Mathematical Reviews of the American MathematicalSociety An Introduction to Linear Programming and Game Theory, ThirdEdition presents a rigorous, yet accessible, introduction tothe theoretical concepts and computational techniques of linearprogramming and game theory. Now with more extensive modelingexercises and detailed integer programming examples, this bookuniquely illustrates how mathematics can be used in real-worldapplications in the social, life, and managerial sciences,providing readers with the opportunity to develop and apply theiranalytical abilities when solving realistic problems. This Third Edition addresses various new topics and improvementsin the field of mathematical programming, and it also presents twosoftware programs, LP Assistant and the Solver add-in for MicrosoftOffice Excel, for solving linear programming problems. LPAssistant, developed by coauthor Gerard Keough, allows readers toperform the basic steps of the algorithms provided in the book andis freely available via the book's related Web site. The use of thesensitivity analysis report and integer programming algorithm fromthe Solver add-in for Microsoft Office Excel is introduced soreaders can solve the book's linear and integer programmingproblems. A detailed appendix contains instructions for the use ofboth applications. Additional features of the Third Edition include: A discussion of sensitivity analysis for the two-variableproblem, along with new examples demonstrating integer programming,non-linear programming, and make vs. buy models Revised proofs and a discussion on the relevance and solution ofthe dual problem A section on developing an example in Data EnvelopmentAnalysis An outline of the proof of John Nash's theorem on the existenceof equilibrium strategy pairs for non-cooperative, non-zero-sumgames Providing a complete mathematical development of all presentedconcepts and examples, Introduction to Linear Programming andGame Theory, Third Edition is an ideal text for linearprogramming and mathematical modeling courses at theupper-undergraduate and graduate levels. It also serves as avaluable reference for professionals who use game theory inbusiness, economics, and management science.

Probability Models in Operations Research

Audience: Anyone concerned with the science, techniques and ideas of how decisions are made."--BOOK JACKET.

The Design of Approximation Algorithms

An Introduction to Linear Programming and Game Theory

Operations Research

Modeling with Stochastic Programming

This book contains selected papers presented at the "International Annual Conference of the German Operations Research Society (OR2012)" which was held September 4 -7, 2012 at the Leibniz Universität Hannover, Germany. The international conference, which also serves as the annual meeting of the German Operations Research Society (GOR), attracted more than 500 participants from more than 39 countries. Special attention at the conference was given to the three topics "Energy, Markets and Mobility". The OR2012 conference has addressed these topics from an OR perspective, treating them not only in isolation, but also with respect to their numerous and exciting interconnections, such as new energy for new mobility concepts and new market mechanisms for sustainable energy production to name but a few. The proceedings show that this conference topic is an important and promising area to apply Operations Research. The book also contains numerous papers addressing the full scope of fields in Operations Research.

Community-Based Operations Research

This edited volume is an introduction to diverse methods and applications in operations research focused on local populations and community-based organizations that have the potential to improve the lives of individuals and communities in tangible ways. The book's themes include: space, place and community; disadvantaged, underrepresented or underserved populations; international and transnational applications; multimethod, cross-disciplinary and comparative approaches and appropriate technology; and analytics. The book is comprised of eleven original submissions, a re-print of a 2007 article by Johnson and Smilowitz that introduces CBOR, and an introductory chapter that provides policy motivation, antecedents to CBOR in OR/MS, a theory of CBOR and a comprehensive review of the chapters. It is hoped that this book will provide a resource to academics and practitioners who seek to develop methods and applications that bridge the divide between traditional OR/MS rooted in mathematical models and newer streams in 'soft OR' that emphasize problem structuring methods, critical approaches to OR/MS and community engagement and capacity-building.

Operations Research-Verfahren

While there are several texts on how to solve and analyze stochastic programs, this is the first text to address basic questions about how to model uncertainty, and how to reformulate a deterministic model so that it can be analyzed in a stochastic setting. This text would be suitable as a stand-alone or supplement for a second course in OR/MS or in optimization-oriented engineering disciplines where the instructor wants to explain where models come from and what the fundamental issues are. The book is easy-to-read, highly illustrated with lots of examples and discussions. It will be suitable for graduate students and researchers working in operations research, mathematics, engineering and related departments where there is interest in learning how to model uncertainty. Alan King is a Research Staff Member at IBM's Thomas J. Watson Research Center in New York. Stein W. Wallace is a Professor of Operational Research at Lancaster University Management School in England.

Introduction to Operations Research

For first courses in operations research, operations management. Covers a broad range of optimization techniques, including linear programming, network flows, integer/combinational optimization, and nonlinear programming. Emphasizes the importance of modeling and problem formulation, this text teaches students how to apply algorithms to real-world problems to arrive at optimal solutions. Visit the author-maintained web site athttp://comp.uark.edu/~rrardin/oorbook

Operations Research

Discrete optimization problems are everywhere, from traditional operations research planning (scheduling, facility location and network design); to computer science databases; to advertising issues in viral marketing. Yet most such problems are NP-hard; unless P = NP, there are no efficient algorithms to find optimal solutions. This book shows how to design approximation algorithms: efficient algorithms that find provably near-optimal solutions. The book is organized around central algorithmic techniques for designing approximation algorithms, including greedy and local search algorithms, dynamic programming, linear and semidefinite programming, and randomization. Each chapter in the first section is devoted to a single algorithmic technique applied to several different problems, with more sophisticated treatment in the second section. The book also covers methods for proving that optimization problems are hard to approximate. Designed as a textbook for graduate-level algorithm courses, it will also serve as a reference for researchers interested in the heuristic solution of discrete optimization problems.

Deterministic Operations Research

Uniquely blends mathematical theory and algorithm design forunderstanding and modeling real-world problems Optimization modeling and algorithms are key components toproblem-solving across various fields of research, from operationsresearch and mathematics to computer science and engineering.Addressing the importance of the algorithm design process.Deterministic Operations Research focuses on the design ofsolution methods for both continuous and discrete linearoptimization problems. The result is a clear-cut resource forunderstanding three cornerstones of deterministic operationsresearch: modeling real-world problems as linear optimizationproblem; designing the necessary algorithms to solve theseproblems; and using mathematical theory to justify algorithmicdevelopment. Treating real-world examples as mathematical problems, theauthor begins with an introduction to operations research andoptimization modeling that includes applications form sportsscheduling an the airline industry. Subsequent chapters discussalgorithm design for continuous linear optimization problems,covering topics such as convexity. Farkas’ Lemma, and thestudy of polyhedral before culminating in a discussion of theSimplex Method. The book also addresses linear programming dualitytheory and its use in algorithm design as well as the Dual SimplexMethod. Dantzig-Wolfe decomposition, and a primal-dual interiorpoint algorithm. The final chapters present network optimizationand integer programming problems, highlighting various specializedtopics including label-correcting algorithms for the shortest pathproblem, preprocessing and probing in integer programming, liftingof valid inequalities, and branch and cut algorithms. Concepts and approaches are introduced by outlining examplesthat demonstrate and motivate theoretical concepts. The accessiblepresentation of advanced ideas makes core aspects easy tounderstand and encourages readers to understand how to think aboutthe problem, not just what to think. Relevant historical summariescan be found throughout the book, and each chapter is designed asthe continuation of the “story” of how to both modeland solve optimization problems by using the specificproblems-linear and integer programs-as guides. The book’svarious examples are accompanied by the appropriate models andcalculations, and a related Web site features these models alongwith Maple™ and MATLAB® content for the discussedcalculations. Thoroughly class-tested to ensure a straightforward, hands-onapproach, Deterministic Operations Research is an excellentbook for operations research of linear optimization courses at theupper-undergraduate and graduate levels. It also serves as aninsightful reference for individuals working in the fields ofmathematics, engineering, computer science, and operations researchwho use and design algorithms to solve problem in their everydaywork.

Operations Research

This text, now in the Third Edition, aims to provide students with a clear, well-structured and comprehensive treatment of the theory and applications of operations research. The methodology used is to first introduce the students to the fundamental concepts through numerical illustrations and then explain the underlying theory, wherever required. Inclusion of case studies in the existing chapters makes learning easier and more effective. The book introduces the readers to various models of Operations Research (OR), such as transportation model, assignment model, inventory models, queueing theory and integer programming models. Various techniques to solve OR problems’ faced by managers are also discussed. Separate chapters are devoted to Linear Programming, Dynamic Programming and Quadratic Programming which greatly help in the decision-making process. The text facilitates easy comprehension of topics by the students due to inclusion of: • Examples and situations from the Indian context. • Numerous exercise problems arranged in a graded manner. • A large number of illustrative examples. The text is primarily intended for the postgraduate students of management, computer applications, commerce, mathematics and statistics. Besides, the undergraduate students of mechanical engineering and industrial engineering will find this book extremely useful. In addition, this text can also be used as a reference by OR analysts and operations managers. NEW TO THE THIRD EDITION • Includes two new chapters: – Chapter 14: Project Management—PERT and CPM – Chapter 15: Miscellaneous Topics (Game Theory, Sequencing and Scheduling, Simulation, and Replacement Models) • Incorporates more examples in the existing chapters to illustrate new models, algorithms and concepts • Provides short questions and additional numerical problems for practice in each chapter

Deterministic Operations Research

Operations Research Proceedings 2012

Operations research often solves deterministic optimization problems based on elegantand conciserepresentationswhereall parametersarepreciselyknown. In the face of uncertainty, probability theory is the traditional tool to be appealed for, and stochastic optimization is actually a signi?cant sub-area in operations research. However, the systematic use of prescribed probability distributions so as to cope with imperfect data is partially unsatisfactory. First, going from a deterministic to a stochastic formulation, a problem may becomeintractable. Agoodexampleiswhengoingfromdeterministictostoch- tic scheduling problems like PERT. From the inception of the PERT method in the 1950’s, it was acknowledged that data concerning activity duration times is generally not perfectly known and the study of stochastic PERT was launched quite early. Even if the power of today’s computers enables the stochastic PERT to be addressed to a large extent, still its solutions often require simplifying assumptions of some kind. Another di?culty is that stochastic optimization problems produce solutions in the average. For instance, the criterion to be maximized is more often than not expected utility. This is not always a meaningful strategy. In the case when the underlying process is not repeated a lot of times, let alone being one-shot, it is not clear if this criterion is realistic, in particular if probability distributions are subjective. Expected utility was proposed as a rational criterion from ?rst principles by Savage. In his view, the subjective probability distribution was - sically an artefact useful to implement a certain ordering of solutions.