

Springer Texts in Business and Economics

H.A. Eiselt

Carl-Louis Sandblom

Operations Research

A Model-Based Approach

2nd Edition

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“And there is so much more value in learning why a set of conditions exists than simply accepting those conditions and committing them to memory.”

Ben Stein

Preface

Since the 1960s, operations research (or, alternatively, management science) has become an indispensable tool in scientific management. In simple words, its goal on the strategic and tactical levels is to aid in decision making and, on the operational level, automate decision making. Its tools are algorithms, procedures that create and improve solutions to a point at which optimal or, at least, satisfactory solutions have been found.

While many texts on the subject emphasize methods, the focus of this book is on the applications of operations research in practice. Typically, a topic is introduced by means of a description of its applications, a model is formulated, and its solution is presented. Then the solution is discussed and its implications for decision making are outlined. We have attempted to maximize the understanding of the topics by using intuitive reasoning while keeping mathematical notation and the description of techniques to a minimum. The exercises are designed to fully explore the material covered in the chapters, without resorting to mind-numbing repetitions and trivialization.

The book is designed for (typically second year) students of business management and industrial engineering. With the appropriate deletions, the material can be used for a one-semester course in the subject, while the complete material will be sufficient for a full-year course. The reasoning and explanations are intuitive throughout. Each algorithm is followed by a numerical example that shows in detail how the method progresses. After presenting the applications and the techniques, each chapter ends with a number of fully solved examples that review the concepts covered in the chapter. Some more technical material has been taken out and is available at <http://esor.ie.dal.ca/>. The second edition adds new material on multicriteria optimization, postman problems, Lagrangian relaxation, cutting planes, machine scheduling, and Markov chains.

It is our pleasure to thank all the people who have made this volume possible. Special thanks are due to Mr. Rauscher of Springer-Verlag for his encouragement and support in our writing of the second edition of this book, as well as Sina Raeisi

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H.A. Eiselt
C.-L. Sandblom

Contents

1	Introduction to Operations Research	1
1.1	The Nature and History of Operations Research	1
1.2	The Main Elements of Operations Research	3
1.3	The Modeling Process	9
2	Linear Programming	13
2.1	Introduction to Linear Programming	13
2.2	Applications of Linear Programming	17
2.2.1	Production Planning	18
2.2.2	Diet Problems	20
2.2.3	Allocation Problems	26
2.2.4	Employee Scheduling	30
2.2.5	Dynamic Production – Inventory Models	33
2.2.6	Blending Problems	37
2.2.7	Transportation and Assignment Problems	40
2.3	Graphical Representation and Solution	57
2.3.1	The Graphical Solution Method	57
2.3.2	Special Cases	66
2.4	Postoptimality Analyses	73
2.4.1	Graphical Sensitivity Analyses	74
2.4.2	Economic Analysis of an Optimal Solution	84
2.5	Duality	96
3	Multiobjective Programming	105
3.1	Vector Optimization	106
3.2	Solution Approaches to Vector Optimization Problems	110
3.3	Goal Programming	113
4	Integer Programming	123
4.1	Definitions and Basic Concepts	123
4.2	Applications of Integer Programming	130
4.2.1	Cutting Stock Problems	132
4.2.2	Diet Problems Revisited	136
4.2.3	Land Use	137

4.2.4	Modeling Fixed Charges	139
4.2.5	Workload Balancing	142
4.3	Solution Methods for Integer Programming Problems	144
4.3.1	Cutting Plane Methods	144
4.3.2	Branch-and-Bound Methods	149
4.3.3	Heuristic Methods	154
5	Network Models	175
5.1	Definitions and Conventions	175
5.2	Network Flow Problems	177
5.3	Shortest Path Problems	186
5.4	Spanning Tree Problems	194
5.5	Routing Problems	195
5.5.1	Arc Routing Problems	196
5.5.2	Node Routing Problems	204
6	Location Models	221
6.1	The Major Elements of Location Problems	221
6.2	Covering Problems	224
6.2.1	The Location Set Covering Problem	225
6.2.2	The Maximal Covering Location Problem	230
6.3	Center Problems	233
6.3.1	1-Center Problems	234
6.3.2	p -Center Problems	235
6.4	Median Problems	236
6.4.1	Minisum Problems in the Plane	237
6.4.2	Minisum Problems in Networks	241
6.5	Other Location Problems	245
7	Project Networks	257
7.1	The Critical Path Method	258
7.2	Project Acceleration	264
7.3	Project Planning with Resources	269
7.4	The PERT Method	272
8	Machine Scheduling	283
8.1	Basic Concepts of Machine Scheduling	284
8.2	Single Machine Scheduling Models	285
8.3	Parallel Machine Scheduling Models	289
8.4	Dedicated Machine Scheduling Models	294
9	Decision Analysis	303
9.1	Introduction to Decision Analysis	303
9.2	Visualizations of Decision Problems	305
9.3	Decision Rules Under Uncertainty and Risk	308
9.4	Sensitivity Analyses	312
9.5	Decision Trees and the Value of Information	315
9.6	Utility Theory	322

10 Multicriteria Decision Making	333
10.1 The General Model and a Generic Solution Method	333
10.2 The Analytic Hierarchy Process	336
11 Inventory Models	343
11.1 Basic Concepts in Inventory Planning	343
11.2 The Economic Order Quantity (<i>EOQ</i>) Model	346
11.3 The Economic Order Quantity with Positive Lead Time	350
11.4 The Economic Order Quantity with Backorders	352
11.5 The Economic Order Quantity with Quantity Discounts	354
11.6 The Production Lot Size Model	357
11.7 The Economic Order Quantity with Stochastic Lead Time Demand	359
11.7.1 A Model That Optimizes the Reorder Point	360
11.7.2 A Stochastic Model with Simultaneous Computation of Order Quantity and Reorder Point	362
11.8 Extensions of the Basic Inventory Models	363
12 Stochastic Processes and Markov Chains	369
12.1 Basic Ideas and Concepts	369
12.2 Steady-State Solutions	374
12.3 Decision Making with Markov Chains	376
13 Waiting Line Models	381
13.1 Basic Queuing Models	382
13.2 Optimization in Queuing	389
14 Simulation	397
14.1 Introduction to Simulation	397
14.2 Random Numbers and Their Generation	399
14.3 Examples of Simulations	403
14.3.1 Simulation of a Waiting Line System	403
14.3.2 Simulation of an Inventory System	406
Appendix A: Heuristic Algorithms	417
Appendix B: Vectors and Matrices	425
Appendix C: Systems of Simultaneous Linear Equations	427
Appendix D: Probability and Statistics	431
Bibliography	439
Index	441

Symbols

The list below includes the special symbols used in the book. While we have made every possible attempt to keep notation to a minimum, some symbolism will be required.

Notation

\in : Element of

\subseteq : Subset

\subset : Proper subset

\cup : Union of sets

\cap : Intersection of sets

\emptyset : Empty set

$|S|$: Cardinality of the set S

$x \in [a, b] : a \leq x \leq b$

$x \in [a, b[: a \leq x < b$

$x \in]a, b] : a < x \leq b$

$x \in]a, b[: a < x < b$

$\lceil x \rceil$: Ceiling of x , the smallest integer greater or equal to x

$\lfloor x \rfloor$: Floor of x , the largest integer smaller or equal to x

$|x|$: Absolute value of x

$a : = a + b$: Valuation, a is replaced by $a + b$

