

# Contents

Preface .....	v
Contents .....	vii
<b>Part 1: Theory</b>	
An Algorithm for Vectorial Control Approximation Problems .....	3
H. Benker, A. Hamel, and Christiane Tammer	
Multiple Criteria Models with the Linear Pseudoboolean Functions and Disjunctive Restrictions .....	13
Vladimir I. Donskoy and Igor A. Perekhod	
Optimality Conditions in Set-Valued Vector Optimization .....	22
Johannes Jahn	
A Multiple Objective Approach to Nash Equilibria in Bimatrix Games .....	31
Michael M. Kostreva	
The Bargaining Model for Characteristic-Function Game .....	40
Tatiana Kulakovskaya	
Calculus of Choquet Boundaries Using Pareto Sets .....	47
Vasile Postolică	
Generalized Mond-Weir Duality for Multiobjective Nonsmooth Programming .....	55
Vasile Preda and Ioan M. Stancu-Minasian	
The Nucleolus in Multiobjective $n$ -Person Cooperative Games .....	64
Masatoshi Sakawa and Ichiro Nishizaki	
Sufficient Conditions in the Vector-Valued Maximin Problems .....	74
Mindia E. Salukvadze and Vladislav I. Zhukovskiy	
Error Estimates for the Crude Approximation of the Trade-Off Curve .....	83
Ilya M. Sobol and Yu. L. Levitan	
Stability and Sensitivity Analysis in Noncooperative Games .....	93
Tetsuzo Tanino, Hun Kuk, and Masahiro Tanaka	
Limiting Solution Set Structure for Converging Multiple Objective Dynamic Problems Sequence .....	103
Alexander L. Topchishvili	

## Part 2: Methods

### Part 2.1: Methodology

Choosing and Ranking on the Basis of Fuzzy Preference Relations with the “Min in Favor” .....	115
Denis Bouyssou and Marc Pirlot	
Models of Cooperative Decision Making .....	128
Petr Fiala	
The Predictive Power of the Self Explicated Approach and the Analytic Hierarchy Process: A Comparison .....	137
Eelko K. R. E. Huizingh and Hans C. J. Vrolijk	
Group Decision Making and Hierarchical Modelling .....	147
Josef Jablonsky	
Propagation of Errors in Multicriteria Location Analysis: A Case Study .....	154
Jacek Malczewski	
Reference Distribution - An Interactive Approach to Multiple Homogeneous and Anonymous Criteria .....	156
Włodzimierz Ogryczak	
Rank-Ordering of Alternatives in Multiattribute Decision with Incomplete Information .....	166
Kyung Sam Park and Soung Hie Kim	
Structuring Techniques in Multiset Spaces .....	174
Alexey B. Petrovsky	
The Sensitivity Analysis of “Inexact” Multicriteria Decisions .....	185
Mitchell S. Robinson and Richard M. Soland	
Goal Programming and Multiple Criteria Decision Making: Some Reflections .....	192
Carlos Romero	
Stopping Rules in Collective Expert Procedures .....	199
Michael V. Schneidermann	
Multiple Criteria Discrete Dynamic Programming .....	202
Tadeusz Trzaskalik	
MCDM and Models of Voting Decision Making .....	212
František Turnovec	
Distributed Multiobjective Optimization Problems and Methods for Their Solution .....	222
Victor L. Volkovich	

Decision Making: Some Experiences, Myths and Observations .....	233
Stanley Zionts	
<b>Part 2.2: Algorithms</b>	
An Interior Multiobjective Linear Programming Algorithm Using Aspirations .....	245
Ami Arbel and Pekka Korhonen	
A Fuzzy Solution Approach to a Fuzzy Linear Goal Programming Problem .....	255
M. Mar Arenas Parra, Amelia Bilbao Terol, Maria Victoria Rodriguez Uria, and Mariano Jimenez	
COPE-ing with V-I-S-A - Integrated Support from Problem Structuring through to Alternative Evaluation .....	265
Valerie Belton, Fran Ackermann, and Ian Shepherd	
An Algorithmic Package for the Resolution and Analysis of Convex Multiple Objective Problems .....	275
Rafael Caballero, Lourdes Rey, Francisco Ruiz de la Rúa, and Mercedes González	
From TRIMAP to SOMMIX - Building Effective Interactive MOLP Computational Tools .....	285
João Carlos Namorado Clímaco, Carlos Henggeler Antunes, and Maria João Alves	
Pareto Simulated Annealing .....	297
Piotr Czyżak, and Andrzej Jaszkievicz	
A Reference Direction Interactive Algorithm of the Multiple Objective Nonlinear Integer Programming .....	308
Vassil G. Gouljashki, Leonid M. Kirilov, Subhash C. Narula, and Vassil S. Vassilev	
Rough Set Approach to Multi-Attribute Choice and Ranking Problems .....	318
Salvatore Greco, Benedetto Matarazzo, and Roman Słowiński	
Concepts of a Learning Object-Oriented Problem Solver (LOOPS) .	330
Thomas Hanne	
Outranking-Driven Search Over a Nondominated Set .....	340
Andrzej Jaszkievicz and Roman Słowiński	
An Interactive Method for Solving Multiple Objective Quadratic-Linear Programming Models .....	350
Pekka Korhonen and Guang Yuan Yu	

An Approximation to the Value Efficient Set .....	360
Alfonso Mateos and Sixto Rios-Insua	
Choosing a Finite Set of Nondominated Points with Respect to a Finite Set of Reference Points .....	372
Boyan Metev and Ilia Braianov	
A Method for Searching Rationality in Pairwise Choices .....	374
Jacinto González-Pachón and Sixto Rios-Insua	
Zero-One Goal Programming Under Interdependence of Actions .....	383
Siamak Rajabi, D. Marc Kilgour, and Keith W. Hipel	
An Interactive Fuzzy Decomposition Method for Large-Scale Multiobjective Nonlinear Programming Problems .....	393
Masatoshi Sakawa and Hitoshi Yano	
Basic Concepts in Derivation of Fuzzy Multiattribute Utility Functions .....	403
Fumiko Seo	
Feed-Forward Neural Networks for Approximating Pairwise Preference Structures .....	413
Antonie Stam, Minghe Sun, and Marc Haines	
A Comparison Between Goal Programming and Regression Analysis for Portfolio Selection .....	421
Mehrdad Tamiz, Rishma Hasham, and Dylan F. Jones	
A General Purpose Interactive Goal Programming Algorithm .....	433
Mehrdad Tamiz and Dylan F. Jones	
A Tchebycheff Metric Approach to the Optimal Path Problem with Nonlinear Multiattribute Cost Functions .....	445
Malgorzata M. Wiecek and Paul T. Hadavas	

### **Part 3: Applications**

#### **Part 3.1: Applications in Engineering**

Multicriteria Optimization of ABS Control Algorithms Using a Quasi-Monte Carlo Method .....	457
Timothy Ward Athan and Panos Y. Papalambros	
Dynamic System Design via Multicriteria Optimization .....	467
Dieter Bestle and Peter Eberhard	

Quality-Driven Decision Making in Digital System Design .....	479
Lech Jóźwiak and S. Andy Ong	
Deriving a Maintenance Strategy Through the Application of a Multiple Criteria Decision Making Methodology .....	481
Ashraf W. Labib, Glyn B. Williams, and Richard F. O'Connor	
Ring Network Design: An MCDM Approach .....	491
Ugo Mocci and Luigi Primicerio	
A Construction Accuracy Control System of Cable Stayed Bridge Using a Multi-Objective Programming Technique .....	501
Hirotaka Nakayama, Kazuyoshi Kaneshige, Shinji Takemoto, and Yasuo Watada	
MCDM in Water Resources Investment Planning .....	510
Serafim Opricovic and Branislav Djordjevic	
Optimal and Robust Shapes of a Pipe Conveying Fluid .....	519
Masao Tanaka and Shinji Tanaka	
Multi-Objective Modeling for Engineering Applications in Decision Support .....	529
Andrzej P. Wierzbicki and Janusz Granat	
<b>Part 3.2: Applications in Environment</b>	
Multi-Criteria Decision Making to Rank the Jordan-Yarmouk Basin Co-Riparians Water Allocations According to the Helsinki and ILC Rules .....	543
Bashar Al-Kloub and Tarik T. Al-Shemmeri	
Multi-Criteria Decision Support System for Water Strategic Planning in Jordan .....	545
Bashar Al-Kloub, Tarik T. Al-Shemmeri, and Alan Pearman	
An Application of MCDM in Local Water Resources Management ..	556
Jifa Gu and Xijin Tang	
Application of ELECTRE III for the Integrated Management of Municipal Solid Wastes in the Greater Athens Area .....	568
Avraam Karagiannidis and Nicolas Moussiopoulos	
<b>Part 3.3: Applications in Management</b>	
A Multidimensional Framework for Strategic Decisions .....	581
Malin Brännback and Jaap Spronk	
The Multiobjective Metaheuristic Approach for Optimization of Complex Manufacturing Systems .....	591
Piotr Czyżak and Andrzej Jaszkievicz	

Portfolio Selection Using the Idea of Reference Solution .....	593
Cezary Dominiak	
Model “Inflation - Non Payment - Production - Loans” and Its Implementation in Russia .....	603
Oleg Dranko	
Equity and MCDA in the Event of a Nuclear Accident .....	612
Simon French, Emma Halls, and David Ranyard	
The Evolving Role of MCDM in Risk Management .....	622
Yacov Y. Haimes	
Integer Goal Programming Model for Nursing Scheduling: A Case Study .....	634
Fenghueih Huarng	
Multiple Criteria Vendor Selection: A Case Study .....	644
Birsen Karpak, Rammohan Kasuganti, and David Adams	
Scheduling of Unit Processing Time Jobs on a Single Machine .....	654
Suna Köksalan Kondakci, Elif Emre, and Murat Köksalan	
Linear Goal Programming Model for Managing Balance Sheet of a Commercial Bank .....	661
Jerzy Michnik and Tadeusz Trzaskalik	
Local Tax Planning with AHP and Delphi .....	667
H. Roland Weistroffer, Blue E. Wooldridge, and Rahul Singh	
Conference Organization and Sponsors .....	676
List of Participants .....	677