

Günter Fandel Tomas Gal (Eds.)
In collaboration with Thomas Hanne

Multiple Criteria Decision Making

Proceedings of the
Twelfth International Conference,
Hagen (Germany)



Springer

Contents

| | |
|----------------|-----|
| Preface | v |
| Contents | vii |

Part 1: Theory

| | |
|--|-----|
| 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 | |

Part 2.2: Algorithms

| | |
|--|-----|
| 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 Rua, 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 Slowiński | |
| Concepts of a Learning Object-Oriented Problem Solver (LOOPS) . | 330 |
| Thomas Hanne | |
| Outranking-Driven Search Over a Nondominated Set | 340 |
| Andrzej Jaszkievicz and Roman Slowiński | |
| 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 |
| Boyana 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 | |

Part 3.2: Applications in Environment

| | |
|--|-----|
| 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 | |

Part 3.3: Applications in Management

| | |
|--|-----|
| 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 Jaskiewicz | |

| | |
|--|-----|
| 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 |