

## BOOK ANNOUNCEMENTS

Edward MINIEKA, *Optimization Algorithms for Networks and Graphs*, Industrial Engineering, Vol. 1 (Series editor: Wilbur Meier, Jr.) (Marcel Dekker, New York and Basel, 1978) 356 pp.

Preface. *Chapter 1: Introduction to Graphs and Networks*. Introduction. Some Concepts and Definitions. Linear programming. Exercises. References. *Chapter 2: Tree Algorithms*. Spanning Tree Algorithms. Maximum Branching Algorithms. Exercises. References. *Chapter 3: Path Algorithms*. Shortest Path Algorithm. All Shortest Path Algorithms. The K-th Shortest Path Algorithm. Other Shortest Paths. Exercises. References. *Chapter 4: Flow Algorithms*. Introduction. Maximum Flow Algorithm. Minimum Cost Flow Algorithm. Out-of-Kilter Algorithm. Dynamic Flow Algorithms. Flows with Gains. Exercises. References. *Chapter 5: Matching and Covering Algorithms*. Introduction. Maximum Cardinality Matching Algorithm. Maximum Weight Matching Algorithm. Minimum Weight Covering Algorithm. Exercises. References. *Chapter 6: Postman Problem*. Introduction. Postman Problem for Undirected Graphs. Postman Problem for Directed Graphs. Postman Problem for Mixed Graphs. Exercises. References. *Chapter 7: Traveling Salesman Problem*. Salesman Problems. Existence of a Hamiltonian Circuit. Lower Bounds. Solution Techniques. Exercises. References. *Chapter 8: Location Problems*. Introduction. Center Problems. Median Problems. Extensions. Exercises. References. *Chapter 9: Project Networks*. Critical Path Method (CPM). Minimum Cost Activity Times. Generalized Project Networks. Exercises. References. *Index*.

Albert G. HOLZMAN, editor, *Mathematical Programming for Operations Researchers and Computer Scientists*, Industrial Engineering, Vol. 6 (Series Editor: Wilbur Meier, Jr.) (Marcel Dekker, New York and Basel, 1981) 373 pp.

Preface. Contributors. Introduction. 1. *Albert G. Holzman*: Linear Programming. 2. *Hamdy A. Taha*: Integer Programming. 3. *William F. Lucas*: Game Theory. 4. *Sang M. Lee*: Goal Programming. 5. *James S. Dyer*, *Rakesh K. Sarin*: Multicriteria Decision Making. 6. *Vince Sposito*: Quadratic Programming. 7. *Katta G. Murty*: Complementarity Problems. 8. *Don. T. Phillips*: Geometric Programming. 9. *R. Saigal*: Fixed Point Computing Methods. 10. *Leon Cooper*: Classical Optimization. 11. *Mordecai Avriel*: Nonlinear Programming. *Index*.

Harvey J. GREENBERG and John S. MAYBEE, *Computer-Assisted Analysis and Model Simplification*, Proceedings of the First Symposium on Computer-Assisted Analysis and Model Simplification (Academic Press, New York, London, Toronto, Sydney, San Francisco, 1981) 522 pp.

Contributors. Preface. *George M. Lady*: On Organizing Analysis. *Harvey J. Greenberg*: The Scope of Computer-Assisted Analysis and Model Simplification. Technical Summary. *Session I: Structural Modeling* (Frank Harary, Chairman). *Frank Harary*: Structural Models and Graph Theory. *Fred. S. Roberts*: Structural Models and Graph Theory. *John N. Warfield*: Learning through Model Building. *David Nissen*: Notes on Networks and Mini-Models. Discussion. *Session II: Qualitative Stability Analysis* (James Quirk, Chairman). *James Quirk*: Qualitative Stability of Matrices and Economic Theory: A Survey Article. *Richard W. Ruppert*: Some Structural Aspects of Economic Models. *W.M. Gorman*: Comments on James Quirk's Article. *Eli Hellerman*: Comments on "Qualitative Stability of Matrices and Economic Theory: A Survey Article" by James Quirk. Discussion. *Session III: Qualitative Determinancy and Extension* (John Maybee, Chairman). *John S. Maybee*: Sign Solvability. *Kelvin Lancaster*: Maybee's "Sign Solvability". *Stedman B. Noble*: Particularizing the Generality of

Economic Analysis. *Victor Klee and Richard Ladner*: Qualitative Matrices: Strong Sign-Solvability and Weak Satisfiability. Discussion. *Session IV: Embedded Structures* (Robert Bixby, Chairman). *Robert E. Bixby*: Hidden Structure in Linear Programs. *Fred Glover*: Creating Network Structure in LPs. *Gerald G. Brown and William G. Wright*: Automatic Identification of Embedded Structure in Large-Scale Optimization Models. *Linus Schrage*: Some Comments on Hidden Structure in Linear Programs. Discussion. *Session V: Query Systems* (Jack Minker, Chairman). *Jack Minker*: Logical Inference as an Aid to Analysis in Large Databases. *James E. Kalan*: Query Systems for Linear Programming Models. *Richard P. O'Neill*: How Query Systems Can Simplify Models and Aid Analysis. *J.A. Tomlin*: Comments on "Logical Inference as an Aid to Analysis in Large Databases" by Jack Minker. Discussion. *Appendix 1: Implementation Aspects of Model Management: A Focus on Computer-Assisted Analysis* by Harvey J. Greenberg. *Appendix 2: Graph-Theoretic Foundations of Computer-Assisted Analysis* by Harvey J. Greenberg, J. Richard Lundgren, and John S. Maybee. *Appendix 3: Measuring Complementarity and Qualitative Determinacy in Matricial Forms* by Harvey J. Greenberg.

Robert H. BONCZEK, Clyde W. HOLSAPPLE and Andrew B. WHINSTON, *Foundations of Decision Support Systems* (Academic Press, New York, London, Toronto, Sydney, San Francisco, 1981) 388 pp. Foreword. Preface. *Part I: Information Processing, Decision Making, and Decision Support—Some Perspectives*. *Chapter 1: Introduction to Information Processing, Decision Making, and Decision Support*. The Information Age. Decision Making. Decision Support. Conclusion. References. *Chapter 2: Frameworks for Organizational Information Processing and Decision Making*. Introductory Comments. Division of Information-Processing Labor within an Organization. Abilities Required for Decision Making. Conclusion. References. *Part II: Representative Systems for Decision Support*. *Chapter 3: Representative Decision Support Systems*. Systems That Include Models. Classification Scheme for DSS. Conclusion. References. *Chapter 4: New Ideas in Decision Support*. Generic Description for Decision Support Systems. The Shape of Systems to Come. Rationale for the Study of a Generalized Problem Processor. Conclusion. References. *Chapter 5: Formalizations of Purposive Systems*. Formalizing Purposive Behavior. The State Space Approach to Decision Support. The Problem Reduction Approach to Decision Support. A Production System Approach to DSS. Conclusion. References. *Part III: Decision Support Systems from the Data Base Angle*. *Chapter 6: Conceptual and Operational Constructs for Building a Data Base Knowledge System*. Introductory Comments. Conceptual Constructs for Representing Knowledge. Simple Files and Tables. Associative Relationship between Aggregate Concepts. References. *Chapter 7: Building a Data Base Knowledge System*. More Complex Data Structures. Indirect Associations among Concepts. The Major Varieties of Logical Data Structures. A Design Procedure. *Chapter 8: Language Systems for Data Base Knowledge Systems*. Introduction. Languages for Directing Retrieval. Languages for Directing Computations in the Case of Data Base KS. Appendix: Commands Used with MDBS. References. *Chapter 9: Problem-Processing Systems for Data Base Knowledge Systems*. Overview. Problem Processing for Retrieval – Only DSS. Problem Processors for Computationally Oriented DSS. Summary. Appendix: A Category *L* Processing Example. References. *Chapter 10: Extensions*. Introduction. Language Extensions. Data Base Extensions. Conclusion. References. *Part IV: Formal Logic Approach to Decision Support*. *Chapter 11: The Language and Knowledge Systems of a DSS Based on Formal Logic*. Introductory Remarks. Conceptual Framework. Operational Constructs. A Language System for Predicate Expressions. References. *Chapter 12: Problem-Processing Systems for Predicate Calculus*. Introduction. Information Collection. Problem Recognition. Examples of Resolution. References. *Part V: Integrating the Data Base and Formal Logic Approaches to Decision Support*. *Chapter 13: Combining the Data Base and Formal Logic Approaches*. Introduction. Viewing Retrieval as Inference. A Mixed System of Knowledge Representation and Its Problem Processor. Knowledge Representation via Frames. Conclusion. References. *Chapter 14: Operational Modeling Knowledge in Terms of Predicate Calculus*. Introduction. Conceptual Description of the Dynamic Approach. Operationalization Over-

view. Conclusion. References. *Chapter 15: Concluding Remarks*. Introduction. Background. The setting of DSS within an Expanded View Of Decision Making. An Outline of DSS Implementation Issues. Further Research Topics. References. *Index*.

Michel L. BALINSKI and H. Peyton YOUNG, *Fair Representation: Meeting the Ideal of One man, One Vote* (Yale University Press, New Haven–London, 1982) 191 pp.

This book develops a theory of fair representation: an axiomatic framework for evaluating different methods of allocating parliamentary seats according to the populations of regions or the vote totals of parties. It is a problem in applied combinatorics: how to meet the ideal of proportionality in integers. The main text develops the problem in its historical and political setting – using the United States as a case study – and is accessible to the non-mathematician. The appendix develops the mathematical theory.

Preface. *Chapter 1: Apportionment*. The problem. *Chapter 2: Representation in the United States*. Early U.S. history. The constitutional foundations. *Chapter 3: The Methods of Jefferson and Hamilton*. The 1792 controversy. The methods. *Chapter 4: The Method of Webster*. The 1830 controversy. The methods of Lowndes, Adams, Dean, and Webster. *Chapter 5: Paradoxes*. The Alabama paradox of 1880. The 1900 controversy. The population paradox. The new states paradox. *Chapter 6: The Controversy Over Bias*. The 1920's debate. The method of Hill. Bias of methods. The 1940 decision. Hill and Webster methods compared. *Chapter 7: Overview of Methods*. Hamilton-type methods. Divisor methods. Roulette methods. *Chapter 8: Resolving the Paradoxes*. Principles of apportionment. The sketch of a theory. *Chapter 9: Eliminating Bias*. Bias defined. Bias of methods analyzed. Webster's the one unbiased divisor method. *Chapter 10: Staying Within the Quota*. Mathematical impossibility of staying within the quota and avoiding the population paradox. Webster's method in practice stays within the quota. Staying near the quota. *Chapter 11: The Choice for Federal Systems*. Consequences of the theory for federal systems. *Chapter 12: The Choice for Proportional Representation Systems*. Consequences of the theory for P.R. systems. *Appendix A: The Theory of Apportionment*. 1. The Problem. 2. Elementary Principles. 3. Traditional Approaches. 4. Population Monotonicity. 5. Bias. 6. Staying Within the Quota. 7. Staying Within the Quota and House Monotonicity. 8. Uniformity. 9. Criteria for Proportional Representation. References. *Appendix B: Representative Populations and Apportionments for Nineteen United States Censuses, 1791–1970*. Notes. *Index*.

O. MOESCHLIN and P. PALLASCHKE, *Game Theory and Mathematical Economics*, Proceedings of the Seminar on Game Theory and Mathematical Economics, Bonn/Hagen, 7–10 October, 1980. (North-Holland, Amsterdam – New York – Oxford, 1981) 464 pp.

Preface. *Part I: Game Theory*. *W. Albers*: Some solution concepts based on power potentials. *W. Armbruster*: Repeated games with unknown utility functions. *E.E.C. Van Damme*: History-dependent equilibrium points in dynamic games. *M. Egea*: Jeux flous coopératifs. *M.J.M. Jansen and S.H. Tijs*: Solutions of a finite arbitration game: structure and computation. *R.E. Kihlstrom, A.E. Roth and D. Schmeidler*: Risk aversion and solutions to Nash's bargaining problem. *J. Kindler*: Some consequences of a double limit condition. *J.F. Mertens and A. Neyman*: Minimax theorems for undiscounted stochastic games. *P. Milgrom and R.J. Weber*: Topologies on information and strategies in games with incomplete information. *B. Peleg*: Monotonicity properties of social choice correspondence. *Y. Tauman*: Values of markets with a majority rule. *S.H. Tijs*: Bounds for the core and the  $\tau$ -value. *J. Van Der Wal*: Successive approximations for the average reward Markov game; the communicating case. *S. Weber*: On core and weak core of quasi-balanced games. *J. Wessels*: Conditions for equilibrium strategies in non-zero sum stochastic games. *A. Wiczeorek*: Mixing spaces and normal games. *Part II: Mathematical Economics*. *A. Borglin and H. Keiding*: Existence of equilibrium without Walras' law. *B. Fuchssteiner*: Disintegration methods in mathematical economics. *J.H. Van Geldrop*: First- and second

order conditions for Pareto optima in a pure exchange economy. *J. Greenberg and B. Shitovitz*: Cores of finite oligopolistic markets with non-convex preferences for small traders. *C. Klein*: The observation of a deterministic microeconomic model of a large economy. *O. Moeschlin*: The existence of an equilibrium to the partitioned v. Neumann model. *W.F. Richter*: A normative justification of progressive taxation: How to compromise on Nash and Kalai–Smorodinsky. *H.J. Skala*: On the foundations of the social ordering problem. *Part III: Fixed-Point and Optimization Theory*. *S. Dolécki*: Role of lower semicontinuity in optimality theory. *K. Fan*: A further generalization of Shapley’s generalization of the Knaster–Kuratowski–Mazurkiewicz theorem. *S. Hart*: A variational problem arising in economics: Approximate solutions and the law of large numbers. *A. Hordijk and L.C.M. Kallenberg*: Linear programming and Markov games I. *A. Hordijk and L.C.M. Kallenberg*: Linear programming and Markov games II. *A. Irle*: Minimax theorems in convex situations. *K.M. Przyluski*: Remarks on continuous dependence of an optimal control on parameters. *R.T. Rockafellar*: Optimality conditions for convex control problems with nonnegative states and the possibility of jumps. *S. Rolewicz*: On sufficient conditions of optimality for Lipschitzian functions. *M. Schal*: Utility functions and optimal policies in sequential decision problems. *L.S. Shapley*: On the accessibility of fixed points. *S. Simons*: Minimax and variational inequalities. Are they of fixed-point or Hahn–Banach type? *J.E. Springarn*: On generic properties of variational problems. *Part IV: Measure Theoretic Concepts and Other Tools*. *D. Bierlein*: A measure theoretic aspect of game theory. *E.-E. Doberkat*: Nondeterminism of stochastic automata – an etude in measurable selections. *B. Mityagin*: Invertibility of band matrices. *D. Mussmann and D. Plachky*: The Radon–Nikodym theorem in the light of Choquet’s theorem. *D. Przeworska–Rolewicz*: Concerning Euler–Lagrange equations in algebras with right invertible operators. *S.M. Robinson*: Inverse sums of monotone operators. List of participants. Author Index.