

13th International Symposium on Mathematical Programming

Chuo University
Tokyo, Japan
August 29 - September 2, 1988

THE International Symposium on Mathematical Programming is the triennial scientific meeting of the Mathematical Programming Society. The 13th Symposium will be held at Korakuen Campus, Chuo University, Tokyo, Japan. Participation is open.

The meeting will offer contributed as well as invited papers. Each contributed paper will be presented in about twenty minutes. Special sessions including Kantorovich and Beale memorial sessions will be organized. State-of-the-art tutorials are planned, in addition.

Sessions on the following topics will be organized:

- Linear Programming
- Integer Programming and Combinatorial Optimization
- Optimization on Graphs, Networks and Matroids
- Nonlinear and Nondifferentiable Optimization
- Nonconvex and Global Optimization
- Large Scale Systems in Mathematical Programming
- Dynamic Programming and Optimal Control
- Stochastic Programming and Optimization under Uncertainty
- Complementarity and Fixed Point
- Game Theory
- Multicriterion Optimization
- Computational Complexity
- Heuristics
- Parallel Computation in Mathematical Programming

- Implementation and Evaluation of Algorithms and Softwares
- Mathematical Programming on Personal Computers
- Teaching of Mathematical Programming
- Applications of Mathematical Programming in Economic Planning, Management, Engineering, Finance, Policy Science, Transportation, Energy, Agriculture, Artificial Intelligence, Computational Geometry, VLSI Design, etc.

Papers on all theoretical, computational and applied aspects of mathematical programming are welcome. The presentation of very recent results is encouraged.

Those who want to present a paper are invited to submit a title by March 1, 1988.

The deadline for abstracts and registration is May 1, 1988. Notification of acceptance will be by July 1, 1988.

The Chairman of the local organizing committee is IRI Masao (University of Tokyo), and the Vice-Chairmen are: TONE Kaoru (Saitama University) and KONNO Hiroshi (Tokyo Institute of Technology). The Committee is organized within the Operations Research Society of Japan.

The Symposium will be cosponsored by a number of academic societies, international and domestic, including IFORS (International Federation of Operational Research

Societies), APORS (Association of Asian-Pacific Operational Research Societies), etc.

Information regarding the symposium will be sent to all those who have responded to the announcement.

For further information contact:
Organizing Committee for the
13th International Symposium on
Mathematical Programming
c/o The Operations Research Society
of Japan
Gakkai-Center Bldg.
2-4-16 Yayoi, Bunkyo-ku
Tokyo 113, Japan.

-Takao Asano

OPTIMA
number 20



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Call for Papers

Parallel Optimization on Novel Computer Architectures

The Annals of Operations Research is planning the publication of a special Volume on "Parallel Optimization on Novel Computer Architectures." The purpose of this volume is to collect together papers of high quality on the state-of-the-art research, implementation and use of optimization algorithms on parallel computer architectures. Some appropriate topics include: parallel algorithms and their implementation on novel computer architectures, numerical optimization on super-computers and other parallel computer systems, data structures for parallel optimization algorithms, and the use of parallel and vector computers in expanding the scope of mathematical programming applications in operations research.

Authors are invited to submit contributions by February 28, 1987. For further information contact Stavros A. Zenios, Decision Sciences, The Wharton School, University of Pennsylvania, Philadelphia, PA 19104, (215) 898-6727 or send electronic mail to zenios@wharton-10.arpa.

All papers will be refereed, and there will be no page changes.

-S. Zenios

Fourth EURO Summer Institute EURO: The Association of European Operational Research Societies within I.F.O.R.S. Theme for 1987: Systems Science Turku, Finland June 5 - July 21, 1987

Admittance is limited to 20 promising young scientists from European countries. Each participant will present a research paper on systems science. There will be invited lectures, seminars and other research activities. Papers for a special issue of EJOR (European Journal of Operational Research) will be prepared during the summer institute.

Applicants should send their curriculum vitae together with an unpublished paper in the field of systems science to their national O.R. Society. These societies will select their national candidates and submit them before March 1, 1987, to the coordinator of the Fourth EURO Summer Institute. The final choice of the 20 participants will be made by the scientific committee.

Ninth Symposium on Mathematical Programming With Data Perturbations The George Washington University Washington, D.C. May 21-22, 1987

A Ninth Symposium on Mathematical Programming with Data Perturbations will be held at The George Washington University's Marvin Center on May 21-22, 1987.

Contributed papers in mathematical programming are solicited in the following areas: Sensitivity and stability analysis results and their applications; Solution methods for problems involving implicitly defined problem functions; Solution methods for problems involving deterministic or stochastic parameter changes; and solution approximation techniques and error analysis.

"Clinical" presentations that describe problems in sensitivity or stability analysis encountered in applications are also invited.

Approximately 30 minutes will be allocated for the presentation of each paper.

Abstracts should provide a good technical summary of key results, avoid the use of mathematical symbols and references, not exceed 500 words, and include a title and the name and full mailing address of each author. The deadline for submission of abstracts is March 13, 1987. They should be sent in triplicate to Professor Anthony V. Fiacco, Department of Operations Research and the Institute for Management Science and Engineering, School of Engineering and Applied Science, The George Washington University, Washington D.C. 20052, Phone: (202) 676-7511.

-Anthony V. Fiacco

Peter L. Hammer Honored by Swiss Institute of Technology - Lausanne

Dr. Peter L. Hammer, Director of RUTCOR - Rutgers University's Center for Operations Research at New Brunswick, N.J., was recently awarded the title of DOCTEUR ES SCIENCES HONORIS CAUSA by the Swiss Federal Institute of Technology in Lausanne. The citation for the award reads:

"In recognition of the dynamic researcher whose fundamental work in discrete mathematics has revealed profound connections between logic, computer science and operations research."

-C. Riescher

Conference Notes

Martin Beale Memorial Symposium

A symposium will be held at the Royal Society, London, July 6 - 8, 1987, in memory of Professor E.M.L. Beale, sponsored by Imperial College, the Institute of Mathematics and its Applications, the Institute of Statisticians, the Mathematical Programming Society, the Operational Research Society, the Royal Statistical Society, and Scicon Limited. He was active in all of these organizations, and their span reflects not only the breadth of his interests but also that his achievements ranged from academic research to real applications. Much of his career was motivated by the needs of commerce and industry; his learned contributions extended greatly the range of real problems that can be solved; and he was highly successful at applying computer calculations to investigate mathematical models. The aim of the symposium is to consider such work, particularly the interactions between its various parts.

The invited speakers include: K.C. Bowen (*Royal Holloway College*), G.B. Dantzig (*Stanford University*), P.J. Green (*University of Durham*), P. Hughes (*Logica plc*), A. Orden (*University of Chicago*), B.D. Ripley (*University of Strathclyde*), J.A. Tomlin (*Ketron Inc.*), and A.N. Other.

Further, S. Vajda (*University of Sussex*) will be the after-dinner speaker. A number of submitted papers will also be accepted. The invited papers will be addressed to all participants, but the contributed ones may be specialized, as they will be presented in parallel sessions and will be allocated only 25 minutes each including discussion. If you wish to contribute a paper, you are invited to send a summary of about 500 words to Mrs. B.A. Peberdy (Scicon Limited, Wavendon Tower, Wavendon, Milton Keynes MK17 8LX, England) to arrive no later than March 1, 1987; not more than 36 submitted contributions can be included in the programme.

NATO Advanced Research Workshop-COAL '87 Algorithms and Model Formulations in Mathematical Programming

Chr. Michelsen Institute
Bergen, Norway
June 15-19, 1987

The 1987 conference of the Committee on Algorithms of The Mathematical Programming Society is being organized by Chr. Michelsen Institute and The Department of Informatics at the University of Bergen.

Authors are invited to submit extended abstracts (one page) on recent advances that combine algorithmic and modeling aspects of one or more of the following subject areas: Linear programming, stochastic programming, network flows, integer programming and combinatorial optimization. Papers expressing viewpoints on the current state and future development of these subjects are also welcome.

Deadline for extended abstracts is February 1, 1987. They should be sent to Dr. Stein W. Wallace, COAL-87, Chr. Michelsen Institute, N-5036 FONTOFT-Bergen, Norway.

-S. Wallace

NATO Advanced Study Institute Mathematical Models for Decision Support

Val d'Isère, Haute Savoie
France
July 26 - August 6, 1987

The aim of the Advanced Study Institute is to bring together scientists working in the fields of Mathematical Programming, Fuzzy Reasoning, Relational Data Models and Multi-Attribute Decision Making to identify recent research results.

The major focus of the Institute is to create a better understanding of mathematical formulation of decision problems and to develop a framework for constructing decision support aids which incorporate software tools, mathematical models and human judgment.

Please send abstracts by March 31, 1987, or requests for further information to:

Dr. Gautam Mitra, Department of Mathematics and Statistics, Brunel University, Kingston Lane, Uxbridge, Middlesex. U.K. Tel: 0895-74000, ext. 2476/2276/2896. Telex 261173 G.

-G. Mitra

SIAM Conference on Optimization Houston, Texas May 18-20, 1987

This is a conference on the state-of-the-art in practical optimization methods. Topics include The Karmarkar algorithm for linear programming, general optimization with linear constraints, general optimization with nonlinear constraints, global optimization methods and parallel optimization methods.

This conference will be preceded by a short course on Numerical Optimization on May 17, 1987.

For information, contact:
SIAM Conference Coordinator
14th Floor
117 South 17th Street
Philadelphia, PA 19103-5052
Telephone: (215) 564-2929

Technical Reports & Working Papers

Cornell University
School of Operations Research and Industrial Engineering
Upson Hall
Ithaca, NY 14853

- P. Jackson and R. Roundy, "Constructive Algorithms for Planning Production in Multi-Stage Systems with Stationary Demand," TR 632.
- J. Muckstadt, "Planning Component Delivery Intervals in Constrained Assembly Systems," TR 633.
- P. Jackson and J. Muckstadt, "Risk Pooling in a Two-Period, Two-Echelon Inventory Stocking and Allocation Problem," TR 634.
- M. Taqqu and W. Willinger, "A Geometric Approach to Constructing Martingale Measures: The Finite Case," TR 635.
- M. Taqqu and W. Willinger, "The Analysis of Finite Security Markets Using Martingales," TR 636.
- D. Crystal, "Tag Systems: A Combinatorial Abstraction of Integral Dependence," TR 637.
- P. Carvalho and L. Trotter, "An Abstract Linear Duality Model," TR 638.
- R. Bechhofer and D. Goldsman, "On the Ramey-Alam Sequential Procedure for Selecting the Multinomial Event Which Has the Largest Probability," TR 639.
- R. Bechhofer and D. Goldsman, "Truncation of the Bechhofer-Kiefer-Sobel Sequential Procedure for Selecting the Multinomial Event Which Has the Largest Probability," TR 640.
- A. Chatterjee, M. Cohen, W. Maxwell and L. Miller, "Manufacturing Flexibility: Models and Measurements," TR 641.
- R. Roundy, "A 98%-Effective Lot Sizing Rule for a Multi-Product, Multi-Stage Production/Inventory System," TR 642.
- F. Avram and M. Taqqu, "Generalized Powers of Strongly Dependent Random Variables," TR 643.
- M. Taqqu and C. Czado, "Reproducing Kernel Hilbert Space for Some Non-Gaussian Processes," TR 644.
- D. Duffy and T.J. Santner, "Confidence Intervals for a Binomial Parameter Based on Multistage Tests," TR 645.
- J. Muckstadt and R. Roundy, "Planning Shipping Intervals in Multi-Item, One-Warehouse, Multi-Retailer Distribution Systems," TR 646.
- J. Muckstadt, "The Effects of a Biased Estimate of Demand on Inventory Levels and Customer Service," TR 647.
- M. Todd and B. Burrell, "An Extension of Karmarkar's Algorithm for Linear Programming Using Dual Variables," TR 648.
- M. Johnson, "An Analysis of Optimal Production Plans for Sample GM Component Manufacture Using the MAXSTADT Planning Package," TR 649.
- P. Carvalho, "Discrete Linear Duality," TR 650.
- J. Yan, "Graphic Greedoids and Their Duals," TR 651.
- J. Yan, "Greedoid Polyhedra," TR 652.
- Y. Ikura and G.L. Nemhauser, "Computational Experience with a Polynomial-Time Dual Simplex Algorithm for the Transportation Problem," TR 653.
- P. Sanchez, "Significant Factor Identification Using Discrete Spectral Methods," TR 654.
- D. Heath and R. Jarrow, "Ex-dividend Stock Price Behavior and Arbitrage Opportunities," TR 655.
- H. Taylor and B. Rodriguez, "Optimal Replacement for Fault Tolerant Systems," TR 656.
- D. Heath, S. Orey, V. Pestien and W. Sudderth, "Minimizing or Maximizing the Expected Time to Reach Zero," TR 657.
- L. Schruben and V. Cogliano, "Frequency Domain Experiments: Spectral Amplification, Input-Output Correlations and Model Parameters," TR 658.
- W.L. Maxwell, P. Jackson, J. Muckstadt and R. Roundy, "Production-Distribution Systems Inventory Planning (SIP): Rationale, Economic and Realities," TR 659.
- J.-F. Claver and W.L. Maxwell, "Throughput Analysis of Closed Loop Material Handling Systems: Deterministic Case," TR 660.
- R. Bland and D. Jensen, "On the Computational Behavior of a Polynomial-Time Network Flow Algorithm," TR 661.
- T. Santner and D. Duffy, "A Note on Albert and Anderson's Conditions for the Existence of Maximum Likelihood Estimates in Logistics Regression Models," TR 662.
- R. Roundy, "Rounding Off to Powers of Two in the Economic Lot Scheduling Problem," TR 663.
- D. Heath and P. Sanchez, "On the Adequacy of Pseudo-Random Number Generators," TR 664.
- N.U. Prabhu, "A Class of Ruin Problems," TR 665.
- N.U. Prabhu, "Probability Modeling Across the Continents," TR 666.
- R. Bland, "A Class of Production Planning Problems Solvable by Network Flows," TR 667.
- T.R. McConnell and M. Taqqu, "Dyadic Approximation of Double Integrals with Respect to Symmetric Stable Processes," TR 668.
- L. Schruben and V. Cogliano, "An Experimental Procedure for Simulation Response Surface Model Identification," TR 669.
- B. Bhaskaran, "Almost Sure Ordering of Some Continuous Time Stochastic Processes with Applications," TR 670.

Faculty of Mathematical Studies
University of Southampton
Southampton S09 5NH UK

- V. de Senna and A.K. Shahani, "A Single Inspection Policy for the Detection of Failure," No. 107.
H.P. Williams, "Fourier's Method of Linear Programming and its Dual," No. 118.
V. de Senna and A.K. Shahani, "Inspection for the Detection of Failure," No. OR1.
V. de Senna and A.K. Shahani, "Age of Onset of Breast Cancer," No. OR2.
H.P. Williams, "Invited Survey Presented at NATO Advanced Study Institute on Computational Mathematical Programming, Bad Windsheim, West Germany," No. OR3.
H.P. Williams, "Evolution, Game Theory and Polyhedra," No. OR4.
S.M. Lewis, A.G. Munford and A.K. Shahani, "Detection of Failure in the Weibull Case," No. OR5.
A.K. Shahani and V. de Senna, "Two-Test Scheme for the Detection of Failure," NO. OR6.
H.P. Williams, "Linear and Integer Programming Applied to Artificial Intelligence," No. OR7.

Washington State University
Department of Pure and Applied Mathematics
Pullman, Washington 99164-2930

- R. Mifflin and J. -J. Strodiot, "A Rapidly Convergent Five Point Algorithm for Univariate Minimization."
R. Mifflin, "Concepts of Better Than Linear Convergence in Nonsmooth Minimization."
R. Mifflin and J.-J. Strodiot, "A Safeguard Bracketing Technique for Obtaining Convergence and Preserving Rapid Convergence in Univariate Minimization."

◆ Journals & Studies ◆

Volume 36, No. 2

- A. Sego, "Finding the t -join Structure of Graphs."
D. Du, and X. Zhang, "A Convergence Theorem of Rosen's Gradient Projection Method."
D. Salane, "Symmetric Minimum-Norm Updates for Use in Gibbs Free Energy Calculations."
F. Barahona and A. Mahjoub, "On the Cut Polytope."
E. Barnes, "A Variation on Karmarkar's Algorithm for Solving Linear Programming Problems."
P. Gill, W. Murray, M. Saunders, J. Tomlin, M. Wright, "On Projected Newton Barrier Methods for Linear Programming and an Equivalence to Karmarkar's Projected Method."
A. Premoli, "Piecewise-Linear Programming: The Compact (CPLP) Algorithm."
W. Cunningham and J. Green-Krotki, "Dominants and Submissives of Matching Polyhedra."

Volume 36, No. 3

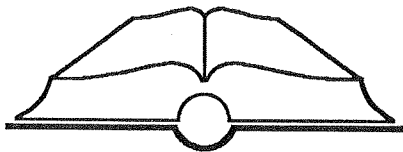
- C. McDiarmid, "On the Greedy Algorithm with Random Costs."
A.G. Buckley, "Long Vectors for Quasi-Newton Updates."
S.C. Fang, "Controlled Perturbations for Quadratically Constrained Quadratic Programs."
Ph. L. Toint, "Global Convergence of the Partitioned BFGS Algorithm for Convex Partially Separable Optimization."
M. A. Duran and I.E. Grossmann, "An Outer-Approximation Algorithm for a Class of Mixed-Integer Nonlinear Programs."

I. Diener, "Trajectory Nets Connecting all Critical Points of a Smooth Function."

M.D. Troutt, "A Stability Concept for Matrix Game Optimal Strategies and its Application to Linear Programming Sensitivity Analysis."

Mathematical Programming Study Nonlinear Analysis and Optimization Edited by B. Cornet, V.H. Nguyen and J.P. Vial

- Y. Chabrillac and J.-P. Crouzeix, "Continuity and Differentiability Properties of Monotone Real Functions of Several Real Variables."
B. Cornet, "Regularity Properties of Open Tangent Cones."
G. Haddad, "The Role of Tangent and Normal Cones in the Viability Theory of Inclusion."
S.M. Robinson, "Local Structure of Feasible Sets in Nonlinear Programming, Part III: Stability and Sensitivity."
B. Gollan, "Eigenvalue Perturbations and Nonlinear Parametric Optimization."
J.P. Bulteau and J.P. Vial, "Curvilinear Path and Trust Regions in Unconstrained Optimization: A Convergence Analysis."
A. Auslender, "Numerical Methods for Nondifferentiable Convex Optimization."
A. Bihain, V.H. Nguyen and J.-J. Strodiot, "A Reduced Subgradient Algorithm."
H. Tuy, "Global Minimization of a Difference of Two Convex Functions."



BOOK REVIEWS

Network Flows and Monotropic Optimization

By R.T. Rockafellar
John Wiley, New York, 1984
ISBN 0-471-88078-7

Flows in networks form a class of mathematical programming problems in which duality plays a central role in computation, theory and interpretation. Starting from flows and potentials in networks, the author unfolds the underlying combinatorial structures and convexity properties and shows that these notions govern a much broader area of mathematical programming, including linear programming and problems where a pre-separable convex function is minimized subject to linear constraints. (A convex function is called pre-separable if it is the sum of linear functions composed of convex functions of a single variable.) He calls this latter optimization problem "monotropic programming problem," since convex functions of a single variable vary in one direction only.

The main objective of this book is to forge theoretical links between problems and procedures that might seem quite different at first glance, namely network programming, linear programming and its generalization to oriented real matroids as well as monotropic programming in its general form. As by-products many contributions to classical fields and beyond are presented, for example, a thorough treatment of network flow problems with nonlinear costs as well as extensions of the simplex method and of the out-of-kilter method to general piecewise linear programming. Further, the theory of conjugate convex functions is developed in a constructive manner with numerous examples and applications.

The book is organized into eleven chapters: 1. Networks; 2. Paths and Cuts; 3. Flows and Capacities; 4. Analysis of Flows; 5. Matching Theory and Assignment Problems; 6. Potentials and Spans; 7. Networks with Linear Costs; 8. Optimal Flows and

Potentials; 9. Algorithms for Convex Costs; 10. Linear Systems of Variables and 11. Monotropic Programming.

Every chapter contains exercises (with additional material) and ends with supplementary comments and references. This clearly and well-written monograph will serve as an important contribution which reveals common structures in mathematical programming governed by duality.

-R. Burkard

Discrete Computational Structures

By R. Korfhage
Academic Press, London, 1983
ISBN 0-12-420860-6

Anyone writing an introductory text for a mathematics or computer science class is in a dilemma: Is it better to restrict interest to a small number of topics and study them in depth or to deal with many themes superficially to keep the book portable?

This book is of the second kind, but it avoids tedious sequences of definitions. The dilemma mentioned above is reflected by the fact that some of the (algebraic) chapters in the first edition have been replaced in this second edition by chapters treating more current topics and that the word "polynomial" occurs nowhere in the book in an algebraic context.

The first part presents numerous algebraic structures together with their machine realizations. The author makes clear by several examples how much the efficiency of some manipulations may depend on the particular representations of the data.

The second part of the volume is devoted to the foundations of computability and logic and contains introductions to automata and formal language theory, Boolean algebra, and propositional and predicate calculus.

The author's style is fluent and readable. The text is nearly free of formal argument. The main work is relegated to the



exercises, many of which are solved in an appendix.

The book makes evident what mathematics and computer science can do for one another and should therefore motivate both mathematics and computer science students to examine interesting topics in detail. However, this is prevented by the poor reference lists at the end of each chapter.

—Roman König

The Equivalence of Some Combinatorial Matching Theorems

By P.F. Reichmeider

Polygonal Publishing House, Washington, 1985

ISBN 0-936428-09-0

In this work the author explores a set of classical results in combinatorics – the theorems by Hall, König, Dilworth, Menger and Ford and Fulkerson – which are typically called matching theorems. A number of (different) proofs, the historical and the most elegant ones, are presented.

Of course, the results are not new. On the contrary, these theorems appear in every first course on combinatorics and graphs. Yet, the primary interest and the value of this book is the comprehensive discussion of the relationships that exist between them. Even the fact that these theorems have equivalencies is well known, and proofs that two specific candidates are related could be located in the literature. However, what makes this booklet a nice and welcome contribution is the organisation of this deep relationship into one compact and really appetizing work.

—U. Derigs

Linear Programming: Active Set Analysis and Computer Programs

By M.J. Best and K. Ritter

Prentice Hall, Hemel Hempstead, 1985

ISBN 13-536996-7

In the preface the authors state: "The essential idea of a solution method for a linear programming problem is to move from one extreme point of the feasible region to an adjacent one in such a way as to improve the objective function value. In virtually any presentation of the subject, this is illustrated by graphical examples. Our method of presentation is new in that it

is based on a direct generalization of this geometric notion." This generalization is the active set analysis.

Although computationally equivalent to the simplex method, active set analysis provides a clearer understanding of the mechanics of the method and as such it is a valuable educational tool.

Combined with the very nice printing, the readable style of writing, a good choice of more advanced topics (GUB, parametric programming, Bland's rule) and some nice descriptions of models for applications, there is ample opportunity for recommendation of this volume. But I have doubts on two points:

First, who is the intended audience? This book is certainly not intended for either users (too technical) or researchers (too simple) of LP. Also, in my opinion, business and engineering students are far better off with a textbook that stresses model formulations and use of input for and output from LP software, instead of algorithmic details. The only group for which the text might be suitable is undergraduate students of mathematics. But for them I would certainly hope an additional textbook is used to illustrate what one can do with LP.

Second, one third of the book is an appendix, listing the computer programs (FORTRAN) of the algorithms described. While the presentation of the programs is well done (more comments could be inserted in the coding), its relevance and use are limited at best. Who copies his own LP codes? Who studies LP coding in a textbook? I would be surprised if more than a handful of readers do so.

It seems to have grown into a habit to include listings of computer programs in a textbook. However, if the programs do not form an integral part of the course in which the book is used, they only serve to show that the author can write a computer program.

In summary, Best and Ritter have produced a good looking textbook with a nice educational starting point, of which the last one third is virtually useless and for which the audience is limited.

—J. Telgen



Integer Programming and Related Areas: A Classified Bibliography 1981-1984

Lecture Notes No. 243

Edited by R.v. Randow
Springer, Berlin, 1985

This book constitutes the fourth volume of the bibliography on integer programming and related areas. It covers the following subjects: theory and methods of general integer programming, combinatorial and graph-theoretical optimization problems related to integer programming, and applications of integer programming.

The structure of this volume is much the same as that of the previous ones. In Part 1 the publications are listed alphabetically by the first author together with a reference code allowing the user to identify them. Part 2 is a subject classification with 50 main subject headings. Part 3 is an alphabetical catalogue of all authors. The period from mid-1981 to autumn 1984 is covered. There are 4751 new publications by 3690 authors.

The first three volumes have already proven to be very useful for anyone working in this field, and it is without any doubt that this fourth volume will continue to serve as an easy-to-handle and comprehensive survey of all publications appearing in the field of integer programming.

—Reinhardt Euler

Linear and Nonlinear Programming

By David G. Luenberger

Addison Wesley, Amsterdam, 1984
ISBN 0-201-15794-2

This is a second edition of the popular book first published in 1973 and notable for being well written and clearly explained. It is divided into 3 parts.

Part I is a self-contained introduction to Linear Programming, including chapters of Basic Properties, The Simplex Method, Duality, and Transportation and Network Flow Problems. Part II covers optimality conditions and algorithms for Unconstrained Optimization and includes chapters on Basic Properties, Descent Methods, Conjugate Direction Methods and Quasi-Newton Methods. Part III extends these ideas to cover Constrained Optimization, with chapters on Optimality Conditions, Primal Methods, Penalty and Barrier Methods, Dual and Cutting Plane

Methods, and Lagrange Methods. There are appendices covering various aspects of mathematical notation, convex analysis and linear algebra. Each chapter is augmented by exercises which both illustrate and extend the material in the text and also by a brief literature survey of relevant references. The book is in hard cover and is very well produced and set out. Bold face is used for vector notation.

The material that has been newly introduced in the second edition includes the section on transportation and network flow in Part 1. In Part III many of the important developments in nonlinear programming over the last ten years have been incorporated into several new sections and a new chapter on Lagrange methods. Finally, more explanation and applications exercises have been added to various parts of the book.

The chapter of Transportation and Network Flow is a welcome addition to Part I which now provides a conventional but wide-ranging treatment of linear programming. My main criticism of this section is that degeneracy is almost entirely neglected, apart from an exercise on Bland's rules, which will tend to perpetuate the point of view that degeneracy is unimportant in practice – misguided in my opinion. Nothing is mentioned of recent developments in ellipsoid algorithms.

Part II of the book shows its age in that it was largely conceived in the "DFP era" before the BFGS method attained its current pre-eminence. The merits of the BFGS method are not sufficiently stressed, and the advantages of self-scaling methods are over stated. Nothing is said about developments in trust region methods, apart from a brief mention of the Levenberg-Marquardt method. The book also lacks any treatment of the practically important subject of nonlinear least squares and the Gauss-Newton method.

Part III has now become something of a hotch-potch of numerous methods, new and old, for solving nonlinear programming problems. Perhaps this is inevitable in view of the uncertain state of the art in this area. The book does say something about important new subjects such as l_1 exact penalty functions and sequential quadratic programming. However, I feel that the treatment of quadratic programming itself is unduly brief. Other subjects whose absence I noted included geometric programming, integer programming and any general treatment of nonsmooth optimization.

Overall however, I am sure that the book will continue to sell well and provide a useful basis for student courses at various levels.

—R. Fletcher



Topics on Perfect Graphs

By C. Berge and V. Chvatal

North-Holland, Amsterdam, 1984

ISBN 0-444-86587-X

This book, published in 1984, on the 25th anniversary of perfect graphs, presents selected results on this topic in a single volume. These are reprints of classical papers on this subject as well as surveys and new results.

The editors divided the whole volume into several parts according to different points of view or techniques (polyhedral methods, optimization, purely graph theoretical approaches, etc.) rather than ordering the various contributions chronologically. Therefore, this book does not provide much insight into how the field developed over the years (one can find a brief sketch of the history of perfect graphs in the Introduction), but it does provide quite complete survey of the important body of work stimulated by the perfect graph conjecture, leading up to the frontiers of current research.

-W. Kern

Surveys in Combinatorics 1985

Edited by I. Anderson

London Math. Society, London, 1985

ISBN 0-521-31524-7

This book contains written versions of eight of the nine invited lectures delivered at the tenth British Combinatorial Conference held in Glasgow from July 22 - 26, 1985. The incredible speed at which they were made available in book form is a tribute to the efficiency of the publisher and (one suspects) to the ruthless driving power of the editor. Perhaps this explains why one of the nine lectures was not included.

The eight that made it in time make agreeable reading. The OPTIMA public will probably derive most pleasure from the contributions of G.R. Grimmett on various probabilistic models for network and electrical flow, of A.J. Hoffman on greedy algorithms that find the optimal solution, and of N. Robertson and P.D. Seymour who survey their work on graph minors including their impressive algorithmic results on the disjoint connecting paths problem. In addition, G. Andrews discusses a new approach to a class of q-series originally studied by Ramanujan; J. Beck (who recently received the Fulkerson Prize) describes some of his beautiful work on the relations between

measure theoretic and combinatorial discrepancy theory; H.J. Beker reviews adaptive algorithms for communication; J.H van Lint discusses three open problems from coding theory and C.St.J.A. Nash-Williams studies existence results for detachments of graphs.

How useful are proceedings such as these? If at all, then only if they are produced as quickly as these have been. All the interesting new results contained here will surely find their way into the regular journals. Undoubtedly, these journals would also be delighted to publish authoritative surveys written by experts such as those assembled on this occasion. So, unless proceedings are set up to function completely like an introductory textbook, they serve a very temporary purpose. With that in mind, we can be grateful to Ian Anderson for granting us this quick peek behind the scenes of some very interesting current research.

-A.H.G. Rinnooy Kan

Mathematical Programming with Data Perturbations I/II

Edited by A.V. Fiacco

Dekker, New York, 1982

ISBN 0-8247-1543-8/1789-9

The articles in these two volumes are based on papers presented at the first Symposium on Mathematical Programming with Data Perturbations. This symposium was held May 24 - 25, 1979, at the George Washington University and organized by A.V. Fiacco and S.M. Robinson. The field of mathematical optimization with data perturbations (also called parametric optimization) has an increased importance for many topics (e.g. stochastic optimization, multiobjective optimization, solution procedures of nonlinear optimization, duality theory, ill-posed optimization problems, model-building, approximation theory). Furthermore, the theoretical and numerical results in parametric optimization are often helpful for solving real-life practical problems.

The reader will find a wide range of important and deep basic results and applications in both volumes which can be recommended to mathematicians who are in basic research and/or applications in mathematical optimization.

-Jürgen Guddat

Nominations for the George B. Dantzig Prize being taken

This is a call for nominations for the George B. Dantzig Prize which will be awarded at the annual SIAM meeting in San Diego, July 18-22, 1988. The prize is awarded for original work which, by its breadth and scope, constitutes an outstanding contribution to the field of mathematical programming. The contributions eligible for consideration are not restricted with respect to the age or number of their authors, although preference should be given to the singly-authored work of "younger" people. The nomination for the award will be presented by the Prize Committee (Olvi L. Mangasarian, Chairman, George L. Nemhauser, Katta G. Murty and Margaret H. Wright) to the

Executive Committees of the SIAM Council and of the Mathematical Programming Society. Past recipients of the George B. Dantzig Prize have been: M.J.D. Powell and R.T. Rockafellar in 1982 and E.L. Johnson and M.W. Padberg in 1985.

Please send your nominations by May 15, 1987 to Olvi L. Mangasarian, Computer Sciences Department, University of Wisconsin, 1210 West Dayton Street, Madison, Wisconsin 53706, U.S.A. Nominations should provide a brief one or two page description of the nominee's outstanding contributions and a current resume including a list of publications.

—O.L. Mangasarian

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C A L E N D A R

27 October 1986

Maintained by the Mathematical Programming Society (MPS)

This Calendar lists noncommercial meetings specializing in mathematical programming or one of its subfields in the general area of optimization and applications, whether or not the Society is involved. (The meetings are not necessarily 'open'.)

Anyone knowing of a meeting that should be listed here is urged to inform Dr. Philip Wolfe, IBM Research 33-2, POB 218, Yorktown Heights, NY 10598, USA; Telephone 914-945-1642, Telex 137456.

Some of these meetings are sponsored by the Society as part of its world-wide support of activity in mathematical programming. Under certain guidelines the Society can offer publicity, mailing lists and labels, and the loan of money to the organizers of a qualified meeting.

Substantial portions of meetings of other societies such as SIAM, TIMS, and the many national OR societies are devoted to mathematical programming, and their schedules should be consulted.

1987

April 6-8: "CO87", a Conference on Combinatorial Optimization, Southampton, U.K.

Contact: Dr. C.N. Potts, Faculty of Mathematical Studies, University of Southampton, Southampton SO9 5NH, United Kingdom. (Sponsored by the London Mathematical Society. Deadline for abstracts, 5 January 1987.)

May 18-20: SIAM Conference on Optimization, Houston, TX.
Contact: SIAM, 14th Floor, 117 South 17th Street, Philadelphia, PA. (215) 564-2929.

June 15-19: "COAL '87", NATO Workshop on Algorithms and Model Formulations in Mathematical Programming, Bergen, Norway. Contact: Dr. Stein Wallace, Chr Michelsen Institute, N-5036, FONTOFT- Bergen, Norway.

July 6-8: Martin Beale Memorial Symposium, London, U.K.
Contact: Professor M.J.D. Powell, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Silver Street, Cambridge (CB3 9EW, United Kingdom. Telephone (0223) 337889, Telex 81240.

1988

August 29 - September 2: Thirteenth International Symposium on Mathematical Programming in Tokyo, Japan.
Contact: Professor Masao Iri (Chairman, Organizing Committee), Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo 113. Official triennial meeting of the MPS.

Gallimaufry

Jan Karel Lenstra, Centre for Mathematics and Computer Science, Amsterdam, is the new Chairman of the MPS Executive Committee....The MPS Council now consists of: **Michel Balinski** (Chairman), **Alex Orden** (Vice Chairman), **Al Williams** (Treasurer), and the four members-at-large, **Martin Grotshcel**, **Karla Hoffman**, **Masao Iri**, and **Robert B. Schnabel**....IFORS XI will be held August 10 - 14, 1987 in Buenos Aires, Argentina. Contact: **M.E. Thomas**, ISyE, Georgia Tech., Atlanta, GA....*OR Letters* announces a special software section. Contact: **Harvey Greenberg**, Associate Editor, Math Department, Campus Box 170, University of Colorado at Denver, Denver, CO 80202, phone (303) 556-8464....**Donald Hearn** (Florida) will be on sabbatical at MIT (Sloan School) during 1987.

Deadline for the next OPTIMA is April 15, 1987.

Books for review should be sent to the Book Review Editor, Prof. Dr. Achim Bachem, Mathematisches Institute der Universität zu Köln, Weyertal 86-90, D-5000 Köln, West Germany.

Journal contents are subject to change by the publisher.

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OPTIMA

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