OPTIMA
MATHEMATICAL PROGRAMMING SOCIETY NEWSLETTER
Number 15
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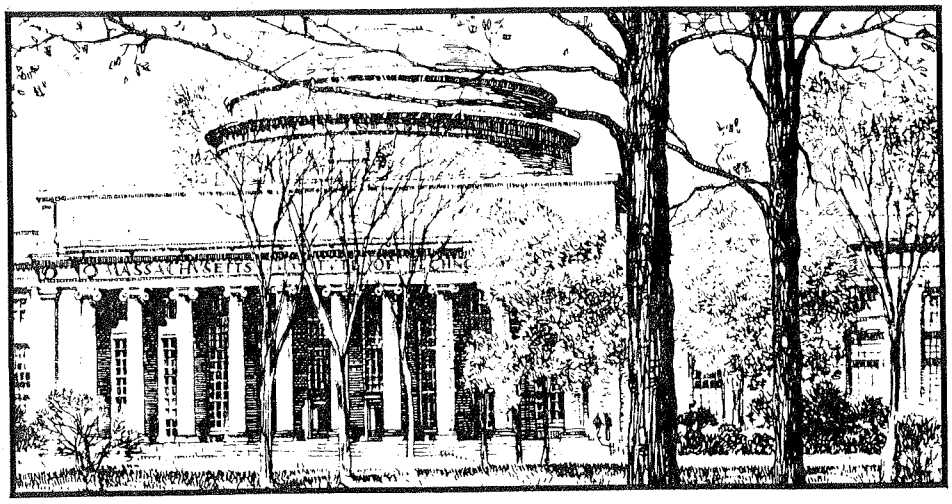
12th International Symposium on Mathematical Programming

Maclaurin Building at M.I.T.



The 12th International Symposium on Mathematical Programming will be held from August 5 to August 9 at MIT. Over 600 papers on a wide range of theoretical and applied topics have been scheduled for presentation. The program will contain sessions on all aspects of mathematical programming and will include speakers from more than 20 countries in North America, Europe, South America, and Asia.

Distinguished researchers have been invited to make one-hour presentations on topics of current interest in mathematical programming, including:

N. Christofides, *"Vehicle Scheduling and Routing."*

R. Cottle, *"On Linear Complementarity Problems."*

G. Dantzig, title to be announced.

A. Fiacco, *"Stability and Sensitivity Analysis in Nonlinear Programming."*

J-L. Goffin, *"Recent Advances in Non-Differentiable Optimization."*

Y.C. Ho, *"Stochastic Optimization."*

D. Johnson, *"Optimization by Simulated Annealing."*

N. Karmarkar, *"Further Developments in the New Polynomial-Time Algorithm for Linear Programming."*

A. Recski, *"Applications of Matroid Theory."*

A. Rinnooy Kan, *"Global Optimization."*

L. Schrage, *"Mathematical Programming on Personal Computers."*

L. Wolsey, *"Recent Results in Mixed Integer Programming Modeling."*

In addition to the program of research presentations, extensive computer demonstrations are being organized.

Accommodations for Symposium participants are available either on the MIT campus (at $30 to $34 per night) or at nearby hotels in Cambridge and Boston ($80 to $86 per night, single or double occupancy).

Among other events on the exciting social calendar are a reception at the New England Aquarium, a banquet at one of Boston area's finest hotels, a New England clambake dinner, harbor cruises, historic and scenic tours, and much more.

To receive early registration materials and other information or to arrange to present a talk in one of the topic areas, please contact the Symposium Secretary, Massachusetts Institute of Technology, Operations Research Center, Room E-40-164, Cambridge, MA 02139; telephone: 617/253-3601.

Mathematical Programming Society Announces Establishment of the A.W. Tucker Prize

The Mathematical Programming Society has established the A.W. Tucker Prize for an outstanding paper in mathematical programming authored by a student. It will first be awarded at the society's Thirteenth International Symposium (1988) and at the succeeding symposia in this triennial series.

Professor Tucker's contributions to the field have come in the form of outstanding and fundamental research as well as from his role as teacher, mentor, and counselor. His students, either literally or figuratively, have had a remarkably broad and deep impact on mathematical programming. The entire field has prospered from his stimulation and guidance. Therefore, it is especially appropriate that this prize be for student research.

All students, graduate or undergraduate, are eligible. Nominations of students who have not yet received the first university degree are especially welcome. The finalists will be invited, but not required, to give oral presentations at a special session of the symposium.

The paper may concern any aspect of mathematical programming; it may be original research, an exposition or survey, a report on computer routines and computing experiments, or a presentation of a new and ingenious application. The paper must be solely authored and completed since the beginning of the calendar year in which the preceding Symposium was held. The paper and the work on which it is based should have been undertaken and completed in conjunction with a degree program.

Nominations must be made in writing to the chairman of the awards committee by a faculty member at the institution where the nominee was studying for a degree when the paper

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CONFERENCE NOTES

IFIP
Working Conference
Computational Issues in Combinatorial Optimization
Capri, Italy
March 24-28, 1986

The conference is promoted by the IASI CNR (Institute of Systems Analysis and Computer Science of the National Research Council of Italy) and the Department of Statistics and Operations Research of the Graduate School of Business Administration of New York University and is sponsored by IFIP TC7 (Technical Committee on Modelling and Optimization). The conference will be the first scientific meeting of a new proposed IFIP working group on "Discrete Optimization" and will take place in the CNR conference center on the island of Capri in Italy.

During this conference theoretical and computational progress made to date in combinatorial problem solving will be discussed. Topics covered include:

-integer and mixed-integer programming
-algorithmic graph theory
-polyhedral approaches to combinatorial optimization
-empirical studies in combinatorial problem solving
-computational complexity of combinatorial problems.

The principal speakers at this conference will include Egon Balas, Michel Balinski, Claude Berge, Harlan Crowder, Giorgio Gallo, Martin Grotschel, Peter Hammer, Ellis Johnson, Bernhard Korte, George Nemhauser, Manfred Padberg, M.R. Rao, Paolo Toth, and Lawrence Wolsey.

Attendance at the conference is open, and interested researchers and practitioners of combinatorial optimization are cordially invited to submit a title and an extended abstract for consideration, by November 15, 1985 to:

Dr. ANTONIO SASSANO
IASI-CNR
Viale Manzoni, 30
00185 Rome, Italy

Authors will be notified of acceptance by February 1, 1986. Due to limited space at the conference site, attendance is limited to 100 participants. It is intended to publish conference proceedings after due refereeing in a series or journal of high standing.

-A. Sassano

Mathematische Optimierung
Oberwolfach
January 6-12, 1985

The rapid development in recent years of mathematical optimization as part of applied mathematics is also reflected in the Oberwolfach meetings on mathematical optimization, which have become almost a tradition by now. Organized by B. Korte (Bonn) and K. Ritter (München), this year's conference gathered researchers from 12 different countries in the informal atmosphere of Oberwolfach to discuss the results and problems of the current state of the art.

The presentations covered the whole spectrum of optimization theory. The central motivation thereby derived from the need to develop efficient solution methods for nonlinear as well as combinatorial optimization problems. (More detailed information may be obtained from the "Tagungsbericht" of the Mathematisches Forschungsinstitut Oberwolfach, which is available at all scientific libraries.)

-U. Faigle

Call for Papers:

A Workshop on Global Optimization will be organized by the International Institute for Applied Systems Analysis (IIASA). It will be held in Sopron, Hungary, the week of December 9, 1985. Those interested in contributing should contact Alexander H.G. Rinnooy Kan, Econometric Institute, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands, Phone: (10) 525511 ext. 3030.

Mathematical Programming Society Announces Establishment of the A.W. Tucker Prize . . .from page one

was completed. Letters of nomination must be accompanied by four copies each of: the student's paper; a separate summary of the paper's contributions, written by the nominee and no more than two pages in length; and a brief biographical sketch of the nominee. The awards committee may request additional information. Nominations and the accompanying documentation are due seven months prior to the beginning of the symposium and must be written in a language acceptable to the awards committee.

This committee will have four members, including a chairman, all appointed by the chairman of the society. The members will serve staggered terms covering two successive symposia, with two members retiring after each symposium.

The awards committee will select the finalists at least three months prior to the beginning of the symposium. It will notify the chairman of the society and the chairman of the executive committee at that time. The winner will be selected by the awards committee, subsequent to the oral presentations by the finalists. Selection will be based on the significance of the contribution, the skillfulness of the development, and the quality of the exposition. The winner will be presented the award prior to the conclusion of the symposium.

The winner will receive an award of $750 (U.S.) and a certificate. The other finalists will also receive certificates. The society will pay partial travel expenses for each finalist to attend the symposium. These reimbursements will be limited in accordance with the amount of endowment income available. A limit in the range of $500 to $750 (U.S.) is likely. The institutions from which the nominations originate will be encouraged to assist any nominee selected as a finalist with the additional travel expense reimbursement.

-R.G. Bland

Stochastic Programming Codes Available

The Adaptation and Optimization (ADO) project of the Systems and Decision Sciences program at the International Institute for Applied Systems Analysis is preparing a survey of the techniques currently employed to solve various problems in stochastic linear and nonlinear programming titled "Numerical Techniques for Stochastic Optimization Problems," edited by Yu. Ermoliev and R. Wets. In addition, the project has assembled a collection of experimental computer codes that implement several of the algorithms discussed in the survey. This collection will be made available on computer tape to researchers early in 1985. There is a high degree of variation in the quality of these codes; some are near production-level quality, whereas others have been built to test the potential of a proposed method or to solve a specific class of problems. In certain cases it is assumed that the distribution of the random variables (which model the uncertainty) is discrete or has been discretized. In other cases no assumptions are made concerning the distribution - the code itself performs the discretization or simply avoids multidimensional integration.

Ten authors have contributed nine programs to the ADO collection. These programs address a number of different problems and use a variety of techniques to solve them. The contributing authors are :

John Birge, A. Boehme and Kurt Marti, Alexei Gaivoronsky, Alan King, Larry Nazareth, Liqun Qi, Andrzej Ruszczynski, Tamas Szantai, and Stein W. Wallace.

The ADO tape contains the source code provided by each author and a User's Manual for each program. There are sample input and output files for most of the codes as well. The tape also includes a paper outlining a proposal for a standard input format for routines that solve stochastic programs with recourse and a library of utilities to facilitate the use of the standard format. The tape's contents total some 4.5 million bytes.

The codes in the collection are written in various dialects of FORTRAN and some use subroutines from the IMSL, MINOS, NAG, or QPSOL libraries. The User's Manuals and other papers provided on the tape are intended for use with the UNIX text processor, troff, although they can be read as is. Please note that the majority of the codes in the collection are still under development and that no warranty is granted, either expressed or implied.

The ADO collection may be obtained from:

Project Secretary
ADO/SDS
IIASA
A-2361 Laxenburg
Austria.

Persons who would like a copy of the collection should send a blank reel of 9-track computer tape to the above address and should include a note indicating their preferences for density and character set (IIASA's computer can generate unlabelled tapes at 1600 or 800 bits per inch using either the ASCII or EBCDIC Character codes.)

BOOK REVIEWS

Optimality and Stability in Mathematical Programming
Mathematical Programming Study 19
Edited by M. Guignard
North Holland, Amsterdam
1982
ISBN 0-444-86441-5

During the past 15 years we have seen a number of improvements and refinements regarding the theory of optimality in mathematical programming, especially concerning the characterization of optimal points for wide classes of optimization problems. Very sophisticated optimality conditions have been developed and the types of considered problems became more general: nonsmooth, nonconvex and nondifferentiable problems, to name only a few. This success became possible by a collection of new tools such as generalized gradients, subgradients, generalized equations, cones of constancy directions, normal subcones, etc.

At the same time considerable progress has been made in the study of the effects of small perturbations of the data involved in the nonlinear programming problems on the solution. Study Nr. 19, a collection of 11 papers by 17 authors (M.S. Bazaraa, A. Ben-Israel, A. Ben-Tal, J.M. Borwein, F. Dubeau, J. Gauvin, J.J. Goode, J.B. Hiriart-Urruty, P. Loridan, O.L. Mangasarian, V. Hien Nguyen, J.P. Penot, S.M. Robison, J.J. Strodiot, H. Wolkowicz, S. Zlobec, J. Zowe) written between 1979 and 1982, deals with various aspects of the contemporary theory of optimality and stability mentioned above. The volume, edited by Monique Guignard, is of invaluable help for the study of the modern nonlinear mathematical programming theory.

-B. Bank

Mathematics for the Analysis of Algorithms
by D.H. Greene and D.E. Knuth
Birkhauser, Basel
1982
ISBN 3-7643-3102-X

Presenting an algorithm for a particular problem usually comes in two steps. The first and happy part is the design of the algorithm A itself, and the proof that A actually works often provides for exhilarating moments in the researcher's life. But this joy of discovery is invariably followed up by the piercing and often uncomfortable question: How good is A? The o, and more ambitious O, analysis comes into play, familar to number-theorists and analysts, but not so well-liked in the computer world.

The book by Greene and Knuth under review addresses the problems arising in this second part in an admirable way. In no

more than 80 pages the authors introduce the reader to all the basic techniques in the analysis of algorithms currently in use – certainly no small achievement. Chapter I on binomial identities gives a summary of the combinatorics needed in the sequel. In chapter II the authors present a beautiful introduction to recurrence relations. They discuss a usually nontrivial example to point out the possible attacks, giving the reader the distinctive flavor of the subject. Chapter III, called operator methods, is not quite on the same level of generality. It concentrates more or less on the concept of an "eigenoperator" with applications to hashing schemes. The final chapter, on asymptotic analysis, is the heart of the book. It acquaints the reader with such widely used methods as Euler summation or the use of the residue calculus. The chapter is written at a brisk pace interspersed with very interesting examples that are far from easy. The authors close with a discussion of (on the average very hard) exam problems.

To be sure, the book makes for no easy reading. As mentioned in the introduction, the reader should have some knowledge of combinatorics and complex analysis. The format of the book is very condensed indeed, marking it a reference rather than an introductory or even advanced text. But as a reference it should prove (as has proved in the past) invaluable. What about that second messy step in the design of an algorithm? Armed with Greene and Knuth the reader will probably find it just as interesting and enjoyable as the first. What better could be said about a book?

-M. Aigner

Graph Theory
Annals of Discrete Mathematics, 13
Edited by B. Bollobas
North-Holland, Amsterdam
1982
ISBN 0-444-86449-0

This volume contains a collection of 19 papers presented at the Cambridge Graph Theory Conference, held at Trinity College from 11 to 13 March 1981. All contributions are invited and refereed papers. The authors represent a large variety of nationalities and interests. Each contributor presents one or two original research articles from a field in which he is an expert. Survey articles are not in this volume. Since the theme of the meeting was not restricted, the papers come from diverse areas of graph theory. Classical questions as well as recent developments are considered. The emphasis in this volume is on pure graph theory. However, a fair amount of the papers deals with applications of graph theory to related mathematical areas, and one of the papers (by J.L. Gross) is concerned with an application in social sciences. The papers cover a broad spectrum of the various branches of graph theory, including topics such as colouring, connectivity, cycles, Ramsey theory, line graphs, Hadwiger's number, random graphs and simplicial decompositions. Some other papers deal with directed graphs, flows, hypergraphs, latin rectangles, designs, strongly regular graphs, planarity algorithms, complexity and games.

Among the many interesting articles in this volume, I would like to mention the articles of A.J.W. Hilton, A.J.W. Hilton/C.A. Rodger and A.J. Mansfield/D.J.A. Welsh. The papers of Hilton and Rodger deal with applications of edgecolouring theorems to latin rectangles, thus increasing the great number of applications of graph colouring theorems to other branches of combinatorial theory. The paper of Mansfield and Welsh is on colouring problems and their complexity; in particular, the relationship between the complexity conjucture that coNP ≠ NP and a graph theorem of Hajós is discussed.

In my opinion, the present volume clearly demonstrates that graph theory deals with a variety of interesting problems and that it is still growing in many directions.

-T. Andreae

Combinatorial Mathematics
Annals of Discrete Mathematics, Vol. 17
Edited by C. Berge, D. Bresson, P. Camion,
J.F. Maurras and F. Sterboul
North-Holland, Amsterdam
1983
ISBN 0-444-86512-8

This volume of Annals of Discrete Mathematics contains most of the papers presented at the International Colloquium on Graph Theory and Combinatorics held in Marseille, France, in June 1981, under the auspices of the National Center for Scientific Research (C.N.R.S.). Different topics in combinatorics are covered: graph theory, hypergraphs, matroids, coding, and designs.

About half of the proceedings (almost 40 papers) deals with questions from graph theory and hypergraphs. Some examples are: construction of some classes of graphs and hypergraphs, decomposition of graphs into special subgraphs, on the existence of some structures in graphs, extension of classical theorems known for some class of graphs, coloring of the edges of a graph or a hypergraph, and embedding of a graph.

Coding theory also takes an important place. About 16 papers discuss the construction of some special codes, the extension of classical codes parameters associated with linear codes, the n-cube as well as the n-code, the application of codes to designs, etc.

The remaining papers are devoted to designs (at least five), matroids (five) and to some connections between groups or semigroups and graphs. The volume ends with 17 problems submitted during the Colloquium.

The papers of these proceedings represent valuable contributions and may be considered as an up-to-date reference book for research and teaching in the fields of graphs, matroids, coding and designs.

-J. Fonlupt and A. Zemirline

An Introduction to Convex Polytopes
Graduate Texts in Mathematics, Vol. 90
by A. Brondsted
Springer, Berlin
1983
ISBN 3-540-90722-X

This book treats the "combinatorial" theory of convex polytopes, in particular the relationships which exist between the numbers of faces of various dimensions. This book provides a careful and complete development of this topic leading to proofs of the Dehn-Sommerville relations, the Upper Bound Theorem and the Lower Bound Theorem.

There are three chapters plus three appendices which deal with preliminary material (lattices, graphs, combinatorial identities). In the first chapter the author develops much of the elementary theory of convex polytopes in the more general context of convex sets. Here such basic notions as convex hull, relative interior, supporting hyperplanes, faces and polars are defined and

their properties are developed. This treatment is careful, concise and thorough. Moreover, the author makes an obvious effort here and throughout the book to give the reader an appreciation of the importance of the various theorems.

The second chapter deals with convex polytopes and, to some degree, with polyhedral sets. However, this latter topic is developed only to the extent required for studying polarity of convex polytopes and so is treated much less extensively than other topics. For example, cones are not considered explicitly nor is the result that a general (unbounded) polyhedron is the sum of a polytope and a cone. Moreover, theorems establishing the correspondence between facets and essential defining innequalities are considered only in the full dimensional case. This causes no problems for the intended use in the book, i.e., the study of certain combinatorial properties of polytopes, but it does restrict its usefulness to a mathematical programmer. Finally, simple, simplicial and neighbourly polytopes as well as cyclic polytopes are introduced in this chapter and are the topics of study in the final chapter.

In Chapter 3 the author establishes the three main results mentioned in the first paragraph. This development is carried out for simple polytopes which, by polarity, is equivalent to the more common line of development for simplicial polytopes. It is not clear what advantage is gained by taking this "dual" approach. However, it is an advantage to have a unified treatment of these three main results.

In 1980 proofs of the sufficiency (L. Billera, C. Lee) and the necessity (R. Stanley) of the so-called McMullin conditions appeared. These provided a complete characterization of the number of faces of all dimensions of simple or simplicial polytopes and implied the results mentioned above. The author describes these general results in the last section and shows that they do indeed imply the Upper and Lower Bound Theorems but does not include the proofs of the necessity and sufficiency of the McMullin conditions. (The proofs appearing in the literature are all presented for simplicial polytopes.)

In conclusion, this book is very carefully and competently written. The author has prepared a useful introductory monograph (with exercises) on convexity in general and convex polytopes in particular. In the preface he stated that his intent was to make the book accessible to someone with a background in standard linear algebra and elementary point set topology. In this he has succeeded. However, some of the author's decisions regarding content and point of view may restrict the breadth of appeal of the book.

-W.R. Pulleyblank

Mathematical Programming and Games
by E.L. Kaplin
John Wiley, New York
1982
ISBN 0-471-03632

The topics considered in the book include various forms of the simplex method of linear programming, related topics in linear algebra games, shortest-path algorithms, dynamic programming and the transportation problem. A set of exercises with answers is provided for each of the 74 sections.

By suitably selecting and ordering the material, the book can be used for a variety of college or university courses of various lengths and levels. A checklist immediately preceding chapter 1 illustrates possible selection of topics for courses of one, two or three terms, and the indicated pages suggest a point after which the continued study of the topic becomes optional.

In the spirit of mathematical programming itself, one aim of this book is to try to minimize the effort required of the reader, subject to nontrivial lower bounds on the amount of information provided.

Examples and exercises with answers are included in substantial numbers, section by section. Each example is carefully chosen and organized in a form suitable for the student's own use in doing exercises. A majority of the exercises are routine applications of the material in the text; the others permit the student to exercise his or her general mathematical background. A very few exercises, which are starred, are included for the purpose of supplementing the theory in the text.

New material and recent developments not available in other textbooks include the all-integer pivot procedure, new methods for solving small systems of linear equations, the classification of bimatrix games, the analysis and generalization of the Shapley and Bauzhag values for games, and the treatment of mutiple objective linear programming which brings together several streams of research that have developed rather independently. One of these is concerned with sheer enumeration of extreme points, another the conditions for efficiency.

-C. Fabian

Computer Methods for the Range of Functions
by H. Ratschek and J. Rockne
Ellis Horwood, Chichester
1984
ISBN 0-85312-703-4

The calculation of the range of a given function is of great interest in many areas of numerical analysis, e.g. for finding the global minimum of a function or for determining Lipschitzian constants. The aim of the book is to summarize the present state-of-the-art of known formulas and methods that could be implemented numerically to approximate the range of functions. The authors start with an introduction into interval arithmetic and provide the tools used in the subsequent chapters. Some of the most important concepts to understand the methodology are the standard centred forms, which are described in detail for rational functions and which allow development of explicit inclusion formulas. Extensions to higher order formulas, functions in several variables or recursively defined forms are also discussed. A general definition of centred forms allows the treatment of non-rational functions and the development of a quadratic convergence theorem. It is furthermore shown that these methods can be combined with a subdivision method, and that standard centred forms for rational functions lead to an optimal approximation of the range. Finally, the authors discuss several other inclusion methods for the range of a function, e.g. methods based on circular complex centred forms, Bernstein functions or global optimization.

The book represents an excellent introduction into theory and methodology of the subject and can be recommended for those people who want to get a comprehensive survey on methods for the range of functions. A lot of examples illustrate definitions, formulas and methods. Only the term 'computer methods' in the title might be criticized, since computer programs, algorithmic flow charts or extensive computational tests are not presented.

-K. Schittkowski

JOURNALS & STUDIES

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Y. Yuan, *"On the Superlinear Convergence of a Trust Region Algorithm for Nonsmooth Optimization."*

J.Wang, *"Distribution Sensitivity Analysis for Stochastic Programs with Complete Recourse."*

A. Tamir, *"A Finite Algorithm for the Continuous P-Center Location Problem on a Graph."*

A. Reinoza, *"Solving Generalized Equations via Homotopies."*

M. Preissmann and D. de Werra, *"A Note on Strong Perfectness of Graphs."*

C.D. Ha, *"Stability of the Linear Complementarity Problem at a Solution Point."*

S.J. Grotzinger, *"Supports and Convex Envelopes."*

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O.L. Mangasarian and L. McLinden, *"Simple Bounds for Solutions of Monotone Complementarity Problems and Convex Programs."*

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R. Lazimy, *"Improved Algorithm for Mixed-Integer Quadratic Programs and a Computational Study.*

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Technical Reports & Working Papers

Econometric Institute
Erasmus University Rotterdam
P.O. Box 1738
3000 DR Rotterdam
The Netherlands

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J.R. de Wit, *"A Note on the Behaviour of the Dirichlet Prior Distribution in the Absence of Information,"* 8437/0.

CHR. Michelsen Institute
N-5036 Fantoft
Bergen, Norway

S.W. Wallace, *"Decomposing the Requirement Space of a Transportation Problem into Polyhedral Cones,"* CMI-report no. 832555-8.

S.W. Wallace, *"A Two-Stage Stochastic Facility-Location Problem with Time-Dependent Supply,"* CMI-report no. 832555-10.

S.W. Wallace, *"Pivoting Rules and Redundancy Schemes in Extreme Point Enumeration,"* CMI-report no. 832555-13.

S.W. Wallace, *"On Network Structured Stochastic Optimization Problem,"* CMI-report no. 842555-8.

S.D. Flåm and R.J-B. Wets, *"Existence Results and Finite Horizon Approximates for Infinite Horizon Optimization Problems,"* CMI-report no. 842555-13.

S.D. Flåm and R.J-B. Wets, *"Infinite Horizon Discrete Time Stochastic Bolza Type Problems: Existence Results,"* CMI-report no. 842650-1.

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S. Storøy, *"On the Relative Ranking of Computer Systems,"* CMI-no. 1984:17.

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R. Mifflin, *"A Computational Algorithm for Univariate Minimization and a Nested Application."*

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C. ReVelle, J. Cohon and D. Shobrys, *"Multiple Objectives in Facility Location: A Review,"* 81-01.

A.J. Goldman, *"Reflections on Modeling and Model Assessment,"* 81-03.

J.A. Filar, *"Semi-Antagonistic Equilibrium Points and Action Costs,"* 82-01.

J. Current, C. ReVelle, and J. Cohon, *"Multiobjective Design of Transportation Networks,"* 82-02.

R.H. Byrd, A.J. Goldman and M. Heller, *"Recognizing Unbounded Integer Programs,"* 82-03.

S.S. Ting, *"A Linear-Time Algorithm for Maxisum Facility Location on Tree Networks,"* 83-01.

J. Wright, C. ReVelle and J. Cohon, *"A Multiobjective Integer Programming Model for the Land Acquisition Problem,"* 83-02.

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K. Darby-Dowman and G. Mitra, *"An Investigation of Algorithms Used in the Restructuring of Linear Programming Basis Matrices Prior to Inversion,"* STR/33.

J.J. Judice and G. Mitra, *"Reformulation of Mathematical Programming Problems and Linear Complementarity Problems,"* STR/38.

J.J. Judice and G. Mitra, *"An Enumerative Method for the Solution of Linear Complementarity Problems,"* TR/04/83.

C. Lucas and G. Mitra, *"Modelling of Mathematical Programs. An Analysis of Strategy and Proposal for a Computer Assisted System,"* TR/09/83.

K. Darby-Dowman and G. Mitra, *"An Extension of Set Partitioning with Application to Scheduling Problems,"* TR/12/83.

G. Mitra, K. Darby-Dowman and C. Lucas, *"Computer Assisted Modelling of Linear, Integer and Separable Programming Problems,"* TR/08/84.

Gallimaufry

We note with sadness the death of **T.C. Koopmans** (Yale), a pioneer in the field and a Senior Editor of the Journal.

The MPS Council has approved a proposal by M. Iri, K. Toné, and H. Konno that the next Symposium be held in Tokyo in 1988. Specific dates and a site have yet to be established, but Chuo University is the likely location....**Romesh Saigal** reports the founding of **SCI Computing**, a consulting firm which also offers mathematical programming software....Publicity for the upcoming Symposium at MIT emphasizes new results in areas such as the integration of artificial intelligence, parallel computation for mathematical programming, and modeling techniques for spreadsheets on personal computers.

The new **Orchard-Hays Prize** for Excellence in Computational Mathematical Programming is being funded by contributions from **CAA, Inc., Ketron, Inc., ARC, Inc., Optimal Systems, Linus Schrage, Scicon, Ltd., Linear Programming, Inc.** and **Haverly Systems, Inc.**

Deadline for the next OPTIMA is October 15, 1985.

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

Journal contents are subject to change by the publisher.

MPS Dues Increase Proposed

At the last Executive Committee meeting the treasurer, A.C. Williams, reported that the Society will run a deficit in 1985, for the second year in a row. This reverses the trend established in the mid 1970's toward surpluses in each year. During that time dues were cut from US$45.00 to a low of US$32.50, and proportionately even larger cuts were made for dues payable in the weaker European currencies. At the same time, the number of issues per year of the Journal were increased. The Optima Newsletter was established, and the COAL Newsletter was established as well.

While the Society's treasury is projected to stand at a healthy $60,000.00 at the end of 1985, it is down from a high of $72,000.00 in 1983, and projected expenses will exceed income if nothing is done. Therefore, the Executive Committee will recommend to Council that the dues for 1986 be increased and that COAL begin charging non-members for its Newsletter.

-A.C. Williams

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