



OPTIMA

MATHEMATICAL PROGRAMMING SOCIETY NEWSLETTER

The Mathematical Programming Society

The Mathematical Programming Society is an international organization dedicated to the promotion and the maintenance of high professional standards in the subject of mathematical programming. It is incorporated as a non-profit tax exempt scientific organization in the United States. It publishes the journal *Mathematical Programming*, consisting of technical articles on all aspects of the subject; the journal-book series *Mathematical Programming Studies*, monographs or collections of papers on particular subfields; the general newsletter *Optima* and the *Newsletter* of the Society's Committee on Algorithms. Every three years the Society as a whole meets in its International Symposium on Mathematical Programming at some world center of research. The Society sponsors and supports other meetings and activities in mathematical programming throughout the world.

A History

The roots of mathematical programming can be found in the applied mathematics of the nineteenth century, but its emergence as a discipline in its own right awaited the great advances of the nineteen forties and fifties in the application of mathematical methods to important problems of business, industry, and technology. In the nineteen-sixties it became clear that there was a true international community of researchers and practitioners of mathematical programming. In 1970 a Founding Committee (A. Orden, chairman; J. Abadie, M.L. Balinski, A.W. Tucker, P. Wolfe, and G. Zoutendijk), proceeded to form a Society from this community, with the aims of ensuring the continuity of the International Symposia on Mathematical Programming (reviewed below), and establishing a journal to serve the community's interests. In 1970 the Committee selected an Editor-in-Chief and a publisher for the journal *Mathematical Programming*. In 1971 it set up a Secretariat for the Society, and in early 1972 enrolled 366 Charter Members, who adopted a Constitution and in 1973 elected the first officers. The Society became a 'Kindred Society' of the International Federation of Operational Research Societies in 1975. In 1981 the Society was incorporated in the United States (state of Delaware) as a non-profit tax exempt scientific organization.

The full list of elected officers is:

Chairmen: G. B. Dantzig (1973-74), E. M. L. Beale (1974-76), A. W. Tucker (1976-78), P. Wolfe (1978-80), J. Abadie (1980-83), A. Orden (1983-1986).

Treasurers: J. S. Folkers (1973-75), F. A. Lootsma (1975-1980), M. Padberg (1980-82), A. C. Williams (1982-1986).

Council Members-at-Large:

1973-75: B. Martos, A. Orden, M.J.D. Powell, P. Wolfe

1975-77: J. Abadie, R. Fletcher, D.R. Fulkerson (to 1976), G.P. McCormick (from 1976), R.T. Rockafellar

1977-79: R.W. Cottle, L. Lasdon, G.L. Nemhauser, L.A. Wolsey
1979-82: M. Avriel, M. Held, A. Land, A. Orden
1982-85: E. M. L. Beale, J. L. Goffin, D. Goldfarb, J. K. Lenstra

The Constitution provides for an Executive Committee to carry out the instructions of the Council. Its chairmen have been R.W. Cottle (1973-76), A.C. Williams (1976-83), and Michael Held (1983-present). An *ad hoc* committee (A.W. Tucker and A.C. Williams, cochairmen) drafted the first Constitution, adopted in 1972, and another (R.W. Cottle, chairman), drafted the revised Constitution adopted in 1978.

Seven standing committees, whose functions are described further below, were formed to meet specialized needs. Their dates of formation and present chairmen are:

Committee on Algorithms, 1974, K. Hoffman
Publications Committee, 1976, J. K. Lenstra
Symposium Advisory Committee, 1977, M. Grötschel
Fulkerson Prize Committee, 1978, R. Karp
Membership Committee, 1979, M. Grigoriadis
Dantzig Prize Committee, 1980, R. J.-B. Wets
Committee on Stochastic Programming, 1982, A. Prekopa
Tucker Prize Committee, 1985, R. G. Bland

The number of regular members of the Society has gradually risen to about 600. In 1982 a new class of membership, at half the regular dues, was established for qualified students. The countries represented by members are: Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czechoslovakia, Denmark, Finland, France, Germany (Federal Republic), Greece, Hong Kong, Hungary, Ireland, Israel, Italy, Japan, Korea, Malaysia, Mexico, The Netherlands, New Zealand, Nigeria, Norway, The Philippines, Poland, Portugal, Romania, Scotland, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States of America, Venezuela, Vietnam, and Yugoslavia. About one third the members reside in North America.

Modus Operandi

The Society is governed by its Council, which meets in person on the occasion of each International Symposium. The Chairman, Vice-Chairman, Treasurer, and Council Members-at-Large are the voting members of the Council.

All terms of office begin and end an integral number of years from one of the International Symposia, generally late in August. The original Constitution provided for two-year terms for most offices; the present Constitution provides for three-year terms, with those of the Chairman and Treasurer overlapping those of the Council Members-at-Large. Elections are held every three years starting from Spring, 1979. Council Members-at-Large are installed in August; the Chairman is installed the next year, serving as Vice-Chairman until then and also the two years following his retiring as Chairman.

Between Symposia business is ordinarily transacted by mail by the Chairman of the Executive Committee, as directed by the Council. The members of the Executive Committee are the Chairman, Vice Chairman, and Treasurer of the Society, the Editor-in-Chief of the Journal, and such other members as are appointed. It is at times possible to have personal meetings of that Committee, which are scheduled to facilitate participation by other officers who may be in the area.

While face to face meetings of the officers with Society members are difficult outside the triennial Symposia, the Council keeps in touch with the membership through the newsletter *Optima*. In addition it solicits comment on Society affairs by mail votes and by a questionnaire appearing periodically in *Optima*, and undertakes to respond promptly to any correspondence from its members.

The *Secretariat* of the Society handles its routine secretarial and financial affairs. It is operated by the International Statistical Institute (428 Prinses Beatrixlaan, 2270 AZ Voorburg, Netherlands). Its functions are to: maintain the membership roster of the Society and mail to all members of the Society an annual directory; transmit a mailing list to the publishers of the Society's journal; prepare and issue ballots for all elections, and count the votes; collect the membership dues; answer queries regarding the Society and conduct the correspondence necessary for of these tasks; transact the financial operations of the Society, including the issuance of checks as authorized by the Treasurer, maintenance of the bank accounts, and the preparation of annual reports.

The International Symposia and Other Meetings

The International Symposia on Mathematical Programming have been the principal occasions on which large groups of the world's researchers in that subject have assembled. The list below uses the numbering that was adopted in 1970, and gives the number of papers presented. The pattern established after the London Symposium reflects the view that successive International Symposia should be held at widely separated places at approximately three-year intervals.

0. Chicago, U.S.A., 1949; 34 papers
1. Washington, D.C., U.S.A., 1951; 19 papers
2. Washington, D.C., U.S.A., 1955; 33 papers
3. Santa Monica, U.S.A., 1959; 57 papers
4. Chicago, U.S.A., 1962; 43 papers
5. London, U.K., 1964; 83 papers
6. Princeton, U.S.A., 1967; 91 papers
7. The Hague, Netherlands, 1970; about 150 papers
8. Stanford, U.S.A., 1973; about 250 papers
9. Budapest, Hungary, 1976; 327 papers
10. Montreal, Canada, 1979; about 450 papers
11. Bonn, Fed. Rep. Germany, 1982; about 600 papers
12. Boston, U.S.A., 1985

The Symposium Advisory Committee has the responsibilities of encouraging proposals for sites for the International Symposia, advising the Council on the choice of site, and assisting their hosts where possible. The committee members are all organizers of previous Symposia.

The Society's practice with regard to Symposia is to give the host committee charge of the whole affair, within the framework of certain formal guidelines. The Symposium is expected, through its registration fee and institutional subsidies, to be self-supporting. The Society can lend 'seed money' to the Symposium or, to a limited extent, guarantee it against loss. The host may organize Proceedings of the Symposium as one or more *Mathematical Programming Studies*. (Proceedings have not been compiled for all Symposia.)

There are no fixed criteria for the selection of a site. The more important considerations are technical qualification and enthusiasm of the local staff, adequacy of the meeting facilities, availability of nearby lodging, and reasonable travel and local costs -- in short, those factors that will lead to a productive conference that will appeal to a wide range of participants. The Symposium Advisory Committee welcomes all suggestions about possible sites for future meetings.

While polls of the membership have shown that the traditional three year interval between International Symposia is generally satisfactory, mathematical programmers naturally get together much more frequently than that. Meetings of some other Societies devote a great deal of their time to the subject, and every year there are several important meetings around the world dedicated to mathematical programming. The Society recognizes the value of these meetings for the subject and feels that supporting them is important. For any properly constituted conference related to mathematical programming or one of its subfields, the

Society can provide mailing lists and labels of the Society membership, space in Society publications for an announcement, facilities for publicity at other meetings, the loan of some money, and the sponsorship of the Society.

Publications

The journal *Mathematical Programming* began publication with the issue of October, 1971. The founding Editor-in-Chief was Michel Balinski, succeeded by the present Editor-In-Chief, Richard Cottle. There are three Co-Editors, L.C.W. Dixon, B. Korte, and M.J. Todd. The journal is served by a board of over twenty associate editors, all well-known scientists. It rapidly became the foremost outlet for research in our subject. Its statement of policy is:

'Mathematical Programming publishes original articles dealing with every theoretical, computational, and applicational aspect of mathematical programming; that is, everything of direct or indirect use for questions surrounding the problem of finding the extreme values of functions of many variables. Included, along with the conventional topics of linear, nonlinear, integer and stochastic programming, are computer experimentation, techniques for formulating and applying mathematical programming models, computer programming devices of special interest to the subject, unconstrained optimization, convexity, polytopes, and control and game theory done in the spirit of mathematical programming.'

It is published nine times yearly in issues of about 120 pages. Each member of the Society (regular and student) receives the journal.

The series *Mathematical Programming Studies*, created to supplement the journal and serve as the vehicle for monographs or collections of papers on special subjects, was founded by Balinski in 1974. Its contents are reviewed editorially in the same way that submissions to the journal are. The twenty Studies that have so far appeared are:

- Pivoting and Extensions
- Approaches to Integer Programming
- Nondifferentiable Optimization
- Computational Practice in Mathematical Programming
- Stochastic Systems, Modeling, Identification and Optimization, I and II
- Complementarity and Fixed Point Problems
- Polyhedral Combinatorics
- Mathematical Programming in Use
- Point to Set Maps and Mathematical Programming
- Engineering Optimization
- Combinatorial Optimization I, II
- Mathematical Programming at Oberwolfach
- Network Models and Associated Applications
- Algorithms for Constrained Minimization of Smooth Nonlinear Functions
- Nondifferential Techniques in Optimization
- Algorithms and Theory in Filtering and Control
- Optimality and Stability in Mathematical Programming
- Applications

They are offered to subscribers in Volumes of three consecutive issues each. Members of the Society may subscribe at greatly reduced rates.

In 1980 the Society established the newsletter *Optima*, edited by Donald Hearn. It provides information about current research in mathematical programming, a worldwide calendar of meetings on the subject, lists of recent technical reports, summaries of conferences, book reviews, news about members, etc., and features at least one article of broad interest in each issue. *Optima* is published three times yearly and distributed to all members.

The Publications Committee monitors and gives advice on the Society's publications, both present and proposed, and on the structure and personnel of the Editorial Board.

Committee on Algorithms

The Committee on Algorithms has as its major objective the improvement of the art of computational mathematical programming. Areas of research of concern to the Committee include the development of methodology for testing mathematical programming software, procedures for improving the efficiency and accuracy of existing algorithms, new computational methods together with experimental evidence of their effectiveness, and procedures for analyzing large-scale mathematical programming models. To foster these objectives the Committee disseminates information on the availability of software and test-problem packages, and has produced guidelines which encourage those who distribute mathematical programming software to meet certain standards of portability, testing, ease of use, and documentation.

The committee has a large and active membership, operating like a 'special interest group' within the Society, and has pursued its goals in a number of ways. It organized the NATO Advanced Study Institutes 'Design and Implementation of Optimization Software' in Boulder, Colorado in 1981, and 'Computational Mathematical Programming' in August, 1984 in Bad Windsheim, F.R.G. It has held sessions at many international conferences, including the Ninth International Symposium on Mathematical Programming in Budapest, 1976; the Bicentennial Conference on Mathematical Programming in Washington, D.C., 1976; the XXIV International TIMS meeting in Hawaii, 1979; the Tenth International Symposium on Mathematical Programming, Montreal, 1979; the XI International Symposium on Mathematical Programming, Bonn, F.R.G., 1982; and the EURO IV Meeting, Cambridge, U.K., 1981. The Committee has also sponsored a variety of sessions at almost every ORSA/TIMS meeting since the Committee's inception in 1975.

The Committee has conducted two surveys of mathematical programming software users: one surveyed the availability of mathematical programming software and the other questioned which code performance indicators were most preferred by users of M.P. software.

The Committee publishes its own *Newsletter*, edited by Jan Telgen (Rabobank Nederland, Laan van Eikenstein 9, 3705 AR Zeist, Netherlands) and Robert Meyer (Computer Science Department, University of Wisconsin, 1210 West Dayton Street, Madison, Wisconsin 53706, U.S.A.) which is sent free to all members of the Society and to several hundred others for a small fee.

Prizes

Rewards for outstanding work in a field promote its quality as well as bring it deserving publicity.

The *Fulkerson Prize* came into being through the efforts of Lloyd Shapley, supported by many of the late Ray Fulkerson's friends. The description of the Prize runs: Its specifications: 'The Fulkerson prize for outstanding papers in the area of discrete mathematics is sponsored jointly by the Mathematical Programming Society and the American Mathematical Society. Beginning in 1979, up to three awards of \$750 each will be presented at each (triennial) International Symposium of the Mathematical Programming Society; they will be paid out of a memorial fund administered by the American Mathematical Society that was established by friends of the late Delbert Ray Fulkerson to encourage mathematical excellence in the fields of research exemplified by his work. Papers to be eligible should have been published in a recognized journal during the *six* calendar years preceding the year of the Congress. This extended period is in recognition of the fact that the value of fundamental work cannot always be immediately assessed. The prizes will be given for single papers, not series of papers or books, and in the event of joint authorship the prize will be divided. The term 'discrete mathematics' is intended to include graph theory, networks, mathematical programming, applied combinatorics, and related subjects. While research work in these areas is usually not far removed from practical applications, the judging of papers will be based on their mathematical quality and significance.'

The first awards of the Prize were made at the Tenth International Symposium on Mathematical Programming in 1979: to Richard M. Appel and Wolfgang Haken (proof of the four color theorem); to Richard M. Karp (computational complexity of combinatorial problems); and to Paul D. Seymour (matroids and the max-flow min-cut property).

The next awards, at the Eleventh Symposium in 1982, were to: to D.B. Judin, L.G. Khachian, and A.S. Nemirovski (the ellipsoid algorithm); to M. Grötschel, L. Lovasz and A. Schrijver (consequences of the ellipsoid algorithm), and to G.P. Egorychev and D.I. Falikman (proof of the van der Waerden conjecture).

The *Dantzig Prize* was founded by a group of George B. Dantzig's former students (R.W. Cottle, E.L. Johnson, R.M. van Slyke, and R.J-B. Wets). It is awarded jointly by this Society and the Society for Industrial and Applied Mathematics. 'The prize is awarded for original work which, by its breadth and scope, constitutes an outstanding contribution to the field of mathematical programming... The contribution(s) for which the award is made must be publicly available and may belong to any aspect of mathematical programming in its broadest sense. 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 prize will be awarded every three years. The award will be presented at each International Symposium of MPS except every third time at a national meeting of SIAM, either the National (spring) or Fall meeting of SIAM in the year of the award.

The first awards of the Prize were made at the Eleventh International Symposium on Mathematical Programming in 1982 to M.J.D. Powell, for his pioneering work in the optimization of nonlinear functions, and to R.T. Rockafellar for his key contributions to the theory of nonlinear optimization.

The *Orchard-Hays Prize* is administered by the Society's Committee on Algorithms, which expects to make the first award at the Twelfth Symposium in Boston in 1985. Entitled 'The Orchard-Hays Prize for Excellence in Computational Mathematical Programming', it will be awarded on this occasion for a paper published within the years 1980 through 1984, and thereafter for publication within the three year period prior to the Symposium at which it will be awarded. 'Computational mathematical programming' includes experimental evaluation of mathematical programming algorithms, the development of high-quality mathematical programming software, the development of new computational methods together with experimental evidence of their effectiveness, and the development of new methods for the empirical testing of mathematical programming techniques.

The *A. W. Tucker Prize* was established by the Society early in 1985, and will first be awarded at the Thirteenth Symposium in 1988, and at every Symposium thereafter. It will be awarded for an outstanding paper solely authored by a student, graduate or undergraduate. The paper may concern any aspect of Mathematical Programming; it may be original research, an exposition or survey, a report on computer programs and computing experiments, or a new and ingenious application. The nominations will be screened and at most three finalists chosen. The finalists will be invited to give oral presentations at a special session of the Symposium, at which time the winner will be selected. The Society will pay partial travel expenses for each finalist to attend the Symposium.

Members of the Society are encouraged to contact the Chairmen of the respective Prize committees for further information or to submit nominations to the committees.

Philip Wolfe

C A L E N D A R

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'.) Any one 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, U.S.A.; 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.

1985

June 11-14: 5th IFAC Workshop on Control Applications of Nonlinear Programming and Optimization, Capri, Italy. Contact: Professor G. Di Pillo, Dipartimento di Informatica e Sistemistica, Università degli Studi di Roma 'La Sapienza', Via Eudossiana 18, 00184 Roma, Italy. Telephone (39) 6-484441.

July 8-19: School on Combinatorial Optimization, Rio de Janeiro, Brazil. Contact: Prof. Nelson Maculan, COPPE, Federal University of Rio de Janeiro, P.O. Box 68501, 21944 Rio de Janeiro RJ, Brazil. Telephone (021)280 8832, Ext. 404.

August 5-9: Twelfth International Symposium on Mathematical Programming in Cambridge, Massachusetts, U.S.A. Contact: Professor Jeremy Shapiro, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA 02139, U.S.A. Telephone 617-253-7165. Official triennial meeting of the MPS.

September 2-6: Twelfth International Federation for Information Processing Conference on System Modeling and Optimization, Budapest, Hungary. Contact: Professor Andras Prekopa, IFIP Conference, John von Neumann Society for Computer Science, H-1368 Budapest, P.O.Box 240, Hungary. Telephone 329-349, Telex 22-5369.

November 7-9: Sixth Mathematical Programming Symposium Japan, Tokyo, Japan. Recent Topics in Mathematical Programming, Polynomial Algorithms, and Applications. Contact: Professor Masao Iri (General Chairman), Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo 113, or Professor Hiroshi Konno (Program Chairman), Institute of Social and Human Sciences, Tokyo Institute of Technology, Meguro-Ku, Tokyo 152, Japan. Telephone 03-726-1111, Extension 2371.

1986

June 16-19: The International Conference on Numerical Optimization and Applications, Xi'an, Shaanxi, China. Contact: Professor You Zhao-Yong, Department of Mathematics, Xi'an Jiaotong University, Xi'an, Shaanxi, China. Telex 70123 XJTU CN.

Application for membership

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