# XI. INTERNATIONAL SYMPOSIUM

UNIVERSITÄT BONN

All members of the Mathematical Programming Society should have received (at least) one copy of a first call for papers for the XI. International Symposium on Mathematical Programming (for those who did not, there is a copy within this issue of Optima).

Registration: Members of the mathematical programming society and everybody who has returned a complete preregistration form will receive a second call for papers (containing the final registration form). The deadline for submitting titles of contributed papers is April 1, 1982, and the abstracts of the papers are due by June 1, 1982.

The exact amount of the registration fee will be announced in the second call for papers. It will be fixed at about the same level as for the last meeting in Montreal, but this time the fee will include (besides the abstract booklet and the usual conference material) a typeset hardcover book containing the state-of-the-art-tutorials given at the meeting. Moreover, there will be a special deduction for MPS members.

State-of-the-art-tutorials: The organizers of the XI. International Symposium on Mathematical Programming have the impression that the "mini-courses" given at the 1979 Montreal Symposium were very popular and that this concept should be developed further. We think that a combination of the usual plenary talks given at such meetings and the Montreal-type mini-courses should appeal to an even wider audience. We have coined the name "State-of-the-Art Tutorial" for what we have in mind.

These tutorials should be lectures on specific mathematical programming subjects which have developed rapidly in recent years and for which good textbooks or surveys are not yet available. We think that the Symposium is an ideal place to acquaint more researchers with new ideas and to give interesting results widespread recognition which will also initiate and facilitate new lines of research.
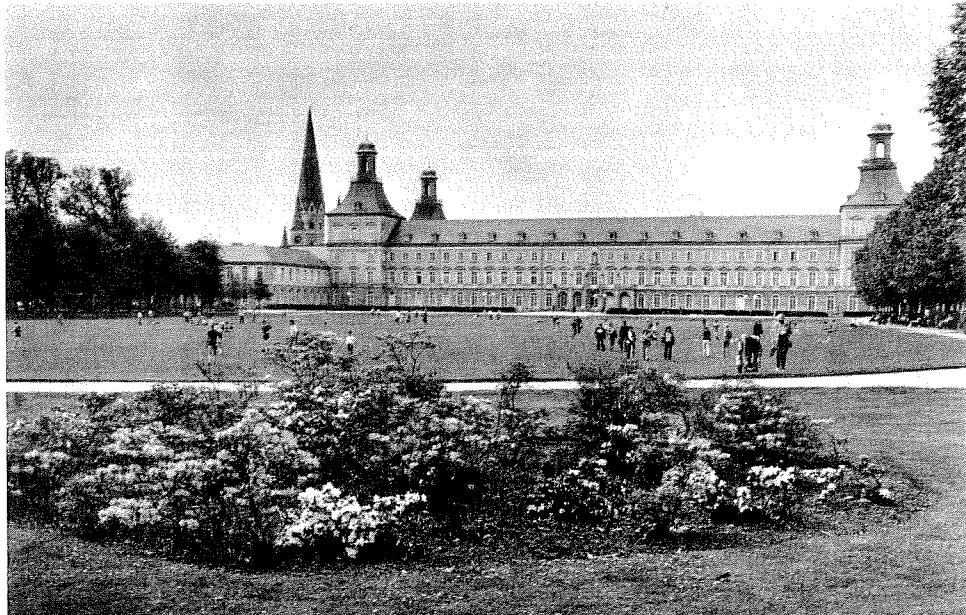
On October 18, 1818, the University of Bonn was named Rheinische Friedrich-Wilhelm-Universität for its founder, King Friedrich-Wilhelm III, of Prussia. Its home became the former presidential palace and the hunting lodge of the Archbishop of Cologne. The Symposium sessions will be held in this historic setting.

The tutorials should therefore have several aims. Firstly, they should start at a low level thoroughly introducing basic notions so that people unfamiliar with the subject may be able to follow the bulk of the presentation. They should include the presentation of examples as well as connections of topics under discussion with other fields. Secondly, a survey of the most recent and most interesting results in the field should be given. Of course, here the presentation might well be on a level not appropriate for the uninitiated.

Our idea is thus to combine a didactic tutorial and a review of pertinent applications into a survey of the state-of-the-art. In addition to the oral presentation of the state-of-the-art tutorials, a written version will also be available. These manuscripts will be issued as a typeset hardcover book by a reputable publisher. Every participant will receive a copy of this book which is intended to appear in spring 1983.

The oral presentation of the state-of-the-art tutorial will be given in special sessions and each lecture will have a duration of 60 minutes.

The Dantzig Prize and The Fulkerson Prize: The Mathematical Programming Society and the Society of Industrial and Applied Mathematics have established the George B. Dantzig Prize in honour of his contributions to mathematical programming. The prize will be awarded for the first time at the XI. Mathematical Programming Symposium in Bonn. The award is for original work in the field of mathematical programming, which by its breadth and scope constitutes an outstanding contribution to the field. The prize is scheduled for possible award every three years and every third award will take place at a SIAM national meeting. The first prize committee consists of Roger J.B. Wets (Chairman), Richard W. Cottle, Ellis L. Johnson and Richard M. van Slyke. They all are former students of George Dantzig and it was their efforts which made the Dantzig Prize possible.

The Fulkerson Prize was proposed by Lloyd Shapley several years ago and is sponsored jointly by the Mathematical

XI. INTERNATIONAL SYMPOSIUM ON
MATHEMATICAL PROGRAMMING
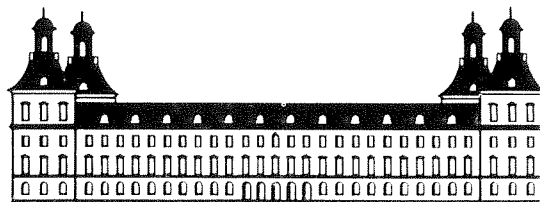
UNIVERSITÄT BONN   **AUGUST 23–27, 1982**

Pre-Registration and First Call for Papers

The International Symposium on Mathematical Programming is the triennial scientific meeting of the Mathematical Programming Society. The XI. Symposium will be held at the University of Bonn, August 23–27, 1982. It will be organized by the Institut für Ökonometrie und Operations Research and the Sonderforschungsbereich 21 (DFG) of the Rheinische Friedrich-Wilhelms-Universität Bonn.

International Program Committee

B. Korte (W. Germany) Chairman
J. Abadie (France)
A. Auslender (France)
M. Avriel (Israel)
E. Balas (USA)
M. L. Balinski (France)
E. M. L. Beale (England)
J. F. Benders (Netherlands)
B. Bereanu (Romania)
C. Berge (France)
R. Burkard (Austria)
A. Charnes (USA)

V. Chvátal (Canada)
R. W. Cottle (USA)
G. B. Dantzig (USA)
M. A. H. Dempster (England)
L. C. W. Dixon (England)
S. Erlander (Sweden)
R. Fletcher (Scotland)
A. Geoffrion (USA)
F. Giannessi (Italy)
J.-L. Goffin (Canada)
E. Golstein (USSR)
R. L. Graham (USA)
P. L. Hammer (Canada)

M. Held (USA)
P. Huard (France)
T. Ibaraki (Japan)
M. Iri (Japan)
R. G. Jeroslow (USA)
E. L. Johnson (USA)
P. Kall (Switzerland)
L. Kantorovich (USSR)
R. M. Karp (USA)
V. Klee (USA)
A. Korbut (USSR)
K. O. Kortanek (USA)
J. Krarup (Denmark)
H. W. Kuhn (USA)

A. Land (England)
E. L. Lawler (USA)
C. Lemarechal (France)
F. Lootsma (Netherlands)
L. Lovász (Hungary)
G. P. McCormick (USA)
O. L. Mangasarian (USA)
B. Mond (Australia)
G. L. Nemhauser (USA)
F. Nozicka (CSSR)
W. Oettli (W. Germany)
A. Orden (USA)
M. W. Padberg (USA)
B. T. Poljak (USSR)

M. J. D. Powell (England)
A. Prékopa (Hungary)
W. R. Pulleyblank (Canada)
M. R. Rao (India)
K. Ritter (W. Germany)
S. M. Robinson (USA)
R. T. Rockafellar (USA)
J. B. Rosen (USA)
H. E. Scarf (USA)
J. Stoer (W. Germany)
A. W. Tucker (USA)
S. Walukiewicz (Poland)
R. Wets (USA)

A. Wierzbicki (Poland)
P. Wolfe (USA)
L. Wolsey (Belgium)

ex officio
A. Bachem (W. Germany)
M. Grötschel (W. Germany)
Co-Chairmen of the Organizing Committee

(Acceptance of invitation received by July 1, 1981)

Call for papers:

Papers on all theoretical, computational and applied aspects of mathematical programming are welcome. The presentation of very recent results is encouraged. For this reason a particulary late deadline for the submission of abstracts has been set.

Dates and Deadlines:

We kindly ask you to return the pre-registration form at your earliest convenience, but not later than October 1, 1981. This will be a great help for the organizers.
Deadline for contributed papers: April 1, 1982, the abstracts of the papers are due by June 1, 1982.

Topics:

Sessions on the following topics will be organized. Suggestions for further areas to be included in the program are welcome.
— Linear, Integer, Mixed Integer Programming
— Nonlinear, Nonconvex, Nondifferentiable Optimization
— Combinatorial Optimization, Networks, Graph Theory
— Dynamic Programming, Stochastic Programming, Optimal Control Theory
— Complementarity and Fixed Point Theory
— Game Theory and Multicriterion Optimization
— Computational Complexity, Approximative Methods, Heuristics
— Implementation and Evaluation of Algorithms and Software
— Teaching of Mathematical Programming
— Applications of Mathematical Programming in Economics, Management, Engineering, Industry, Government, Traffic and Transportation, Natural and Human Sciences, Energy and Agriculture

Mailing Address:

Math. Progr. Secretariat
c/o Institut für Operations Research
Nassestrasse 2
D-5300 Bonn 1
W. Germany
Telefon: (02 28) 73 92 03, Telex: 8 86 657 unibo d

Structure of the Meeting:

The meeting will offer contributed as well as invited papers. In addition, state-of-the-art tutorials are planned. These will be lectures of one hour's duration on subjects of mathematical programming which have developed rapidly in recent years and for which there is little information for the nonspecialist. These tutorials are intended to introduce the nonspecialist to the subject and to guide him toward the most interesting results and areas of further research.

The Dantzig Prize and the Fulkerson Prize will be awarded during the symposium.

Site:

The symposium will take place in the main building of the University of Bonn, a former residential palace. Bonn is attractively located on the river Rhine and is easily accessible by air, train or car.

Further Announcements:

Further information regarding the symposium will be sent in due course to all those who have pre-registered. This will include additional information about the program, registration fees, social events, travel and hotel information, etc.

Achim Bachem
Martin Grötschel
Co-Chairmen
Organizing Committee

Bernhard Korte
Chairman
Program Committee

BONN

Programming Society and the American Mathematical Society in honour of the late Delbert Ray Fulkerson. Up to three awards of $150 each will be made for outstanding papers in the area of discrete mathematics. The rules are as follows: "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 Selection Committee for the awards will have two members appointed by the chairman of the Mathematical Programming Society and one member appointed by the president of the American Mathematical Society.

The first awards were presented at the X. Mathematical Programming meeting in 1979 in Montreal to K.I. Appel, W. Haken, R.M. Karp and P.D. Seymour.

Site: The symposium will take place at the Rheinische Friedrich-Wilhelm-Universitat, Bonn. The foundation of this university dates back to the early nineteenth century. Shortly after the Congress of Vienna in 1815, when the Rhineland was attached to Prussia, the Prussian King decided to establish a new university at Bonn instead of reopening the University of Cologne, which was closed in 1794 by the French revolutionary army. Thus, on October 18, 1818, the University of Bonn was founded and named Rheinische Friedrich-Wilhelm-Universitat after its founder King Friedrich-Wilhelm III of Prussia.

Since all archiepistopal castles had fallen to the state, the new Bonn university could move into the former presidential palace and the hunting lodge of the archbishop of Cologne. The meeting itself will take place in these historical buildings. As the university grew rapidly from its 47 students in 1819 to its 35,000 students today - which makes it one of the largest universities of West Germany - many other buildings scattered all over Bonn were added and are now used as part of the university.

Bonn itself was founded in 69 A.D. as the Roman legionary camp "castra Bonnensia." In 1949 Bonn became the capital of the Federal Republic of Germany. Many ancient buildings survived the changeful history of Bonn and today give rise to the pleasant atmosphere. Some of the most remarkable buildings are the former archiepiscopal palace, the Poppelsdorf Castle, Beethoven's house (the birthplace of Beethoven) and the Godesburg. The Bonn area also offers many additional tourist attractions, for instance, the beautiful national park Siebengebirge, the scenic nearby Eifel and of course the steamboat trip on the river Rhine (up to the Loreley).

Achim Bachem

1982 Society Dues

The Council has set the 1982 membership dues for the Society at $40 U.S.This is a reduction of approximately 5% from the 1981 amount. In view of the strength of the U.S. dollar the Council has agreed to a further 10% reduction in dues for 1982 for those members paying in other acceptable currencies, thus making the dues of such members the equivalent of $36 U.S. The exact amount of the dues in non-U.S. currency will, of course, depend on the exchange rate in effect later this year. However, they should be approximately: Dfl. 93; Sw. Fr. 71; FF 200; DM 84; UK 20.

The following table shows how successful our Society has been in keeping dues relatively stable despite continuing inflation and fluctuating exchange rates.

DUES

Year	U.S.	Dfl.	Sw.F	FF	DM	UK
1977	36	92	88	178	88	21.5
1978	36	92	88	178	88	21.5
1979	40	92	70	185	85	22
1980	42	84	68	178	76	20
1981	42	82	69	176	76	17.5
1982	40	93	71	200	84	20

Members are reminded that in 1982 they will be entitled to a reduced registration fee at the XI International Symposium and that they will receive three volumes of the JOURNAL, instead of the usual two.

—Mike Held

OPTIMIZATION DAYS
May 13 - 14, 1982
Montreal, Canada

The tenth Optimization Days meeting will be held on the campus of the University of Montreal. The conference is sponsored by the IEEE Control Systems Society, SIAM and the Mathematical Programming Society. The aim of this meeting is to survey current trends of research in optimization methods and their applications, and to provide a good opportunity for interaction between various research groups. Topics of interest include (but are not restricted to):

Mathematical programming; optimal control theory; numerical methods of optimization; systems theory, including large scale systems; statistical methods; estimation and identification; applications to engineering, management sciences, transportation, economics, urban and environmental problems, resource management, biology, telecommunications networks, etc.

All those interested in optimization methods and their present or potential applications are kindly invited to participate. We appeal especially to those who can give talks on new mathematical or numerical methods of optimization.

Sessions will consist of invited and contributed talks. Papers presenting original developments as well as those of an expository nature will be considered. The languages of the conference will be French and English.

Two copies of a 200-700 word summary (either in English or in French) which clearly defines the content of the paper should be forwarded by January 31, 1982 to:

Jacques Ferland or Jean-Marc Rousseau
Centre de recherche sur les transports
Université de Montréal
P.O. Box 6128, Station "A"
Montreal, Quebec, Canada H3C 3J7
Tel.: (514) 343-7575

Authors will be notified of the acceptance of their talks by March 15, 1982. For more information, please contact the above.

Optimization Days 1982 immediately follows the Canadian Operational Research Society Meeting in Montreal on May 10, 11, 12.

MPS

CALENDAR

1982

January 12-15: International Symposium celebrating the 25th anniversary of the Econometric Institute. Contact: Dr. B.S. van de Laan, Econometric Institute, Erasmus University, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands; Telephone 010-525511.

April 9-13: Meeting of the TIMS Special Interest Group on Multiple Criteria Decision Making, Mons. Contact: Pierr Hansen, Faculté des Sciences Économiques, Faculté Universitaire Cahtolique de Mons, Chaussée de Binche, 151, B-7000 Mons, Belgium.

April 26-29: SIAM Special Conference on Applied Linear Algebra, Raleigh, N.C., U.S.A. The Conference is devoted to five areas of applied linear algebra, one of which is "Operations Research and Optimization". Abstract deadline 30 November, 1981. Contact: Hugh B. Hair, Society for Industrial and Applied Mathematics, 1405 Architects Building, 117 South 17th Street, Philadelphia, PA 19103, U.S.A.; telephone 215-564-2929.

May 13-14: "Optimization Days", Campus of the University of Montreal. Contact: Professor Jacques Ferland, Centre de recherche sur les transports, Université de Montréal, C.P. 6128, Succ. "A", Montréal, Québec, Canada H3C 3J7; telephone 514-343-7575. Deadline for abstract, January 31, 1982. Sponsored by IEEE, ACFAS, SIAM, SCMA, and the MPS.

May 17-19: "Fourth Symposium on Mathematical Programming with Data Perturbations", The George Washington University, Washington, D.C., U.S.A. Contact: Professor Anthony V. Fiacco, Department of Operations Research, Deadline for abstracts, 1 March 1982. School of Engineering and Applied Science, The George Washington University, Washington, D.C. 20052, U.S.A.; telephone 202-676-7511.

August 23-28: Eleventh International Symposium on Mathematical Programming in Bonn, Federal Republic of Germany. Contact: Institut für Ökonometrie und Operations Research Universität Bonn, Nassestraße 2, 5300 Bonn 1, Federal Republic of Germany; Telex 886657 unibo b, Telephone (02221) 739285. Official triennial meeting of the MPS. (Note: The International Congress of Mathematicians will be held August 11-19 in Warsaw, Poland.)

Journals & Studies

Volume 22 No. 1

R. Giles, *"Optimum Matching Forests I: Special Weights."*

R. Giles, *"Optimum Matching Forests II: General Weights."*

R. Giles, *"Optimum Matching Forests III: Facets of Matching Forest Polyhedra."*

D.J. Naddef, *"Rank of Maximum Matchings in a Graph."*

J. Tind and L.A. Wolsey, *"On the Use of Penumbras in Blocking and Antiblocking Theory."*

J. Spingarn, *"On Optimality Conditions for Structured Families of Nonlinear Programming Problems."*

J.L. Goffin, *"On the Nonpolynomiality of the Relaxation Method for Systems of Linear Inequalities."*

A. Zilinskas, *"Axiomatic Approach to Statistical Models and Their Use in Multimodal Optimization Theory."*

M. Nakamura, *"Boolean Sublattices Connected with Minimization Problems on Matroids."*

Z. Drezner, *"On Minimax Optimization Problems."*

Volume 22 No. 2

C.G.E. Boender, A.H.G. Rinnooy Kan, G.T. Timmer and L. Stougie, *"A Stochastic Method for Global Optimization."*

S. Baum and L.E. Trotter, Jr., *"Finite Checkability for Integer Rounding Properties in Combinatorial Programming Problems."*

D. Hochbaum, *"Heuristics for the Fixed Cost Median Problem."*

J.E. Fattler, Y.T. Sin, R.R. Root, K.M. Ragsdell and G.V. Reklaitis, *"On the Computational Utility of Posynomial Geometric Programming Methods."*

R.W. Chaney, *"A Method of Centers for Certain Minimax Problems."*

A. Dax, *"Partial Pivoting Strategies for Symmetric Gaussian Elimination."*

Volume 21 No. 3
(Correction)

E. Rosenberg, *"On Solving a Primal Geometric Program by Partial Dual Optimization."*

POST CONFERENCE NOTES

AUSTIN

An International Symposium on Semi-Infinite Programming and Applications was held September 8-10, 1981 at the University of Texas at Austin. At this symposium 70 papers were presented by participants from 15 countries. Seventeen countries were represented in a book of 87 abstracts which was distributed to participants at the symposium.

The symposium received financial support from the Office of Naval Research (Mathematical and Information Sciences Division), National Science Foundation (Systems Theory and Operations Research Program together with the Mathematics Section), and The University of Texas at Austin, Office of the President and the College of Business Administration Foundation.

The symposium was a Centennial Event of The College of Business Administration in celebration of the 100th Anniversary of the University of Texas at Austin.

Semi-infinite programming is a next level of extension of elementary linear programming where now finitely many variables appear in infinitely many constraints. Initiated in the 60's, its first international meeting occurred in Bad Honnef, Germany in 1978 where the computational advances of the early 70's were presented. The Conference Proceedings were published in 1979 by Springer-Verlag entitled, "Semi-Infinite Programming", edited by Rainer Hettich of the University of Trier, Germany.

The presentations of the 1981 Symposium represented active current research on problems in at least the following areas: engineering design; planning and control; numerical analysis of semi-infinite programs; algorithms, computer codes, and numerical experiments; saddle value problems; variational inequalities; perturbation and stability analysis; approximation theory and systems of inequalities; moment problems and optimal experimental design; nonlinear parabolic and bang-bang control; continuous linear programming; fuzzy set theory; games and uncertainty; and duality theory.

Each presentation was 30 minutes in length, except for the 6 plenary talks which were 45 minutes each. The plenary speakers and the titles of their talks were: Richard J. Duffin (Carnegie-Mellon), "Numerical Esti-mation of Optima by Use of Duality Inequalities"; Avner Friedman (Northwestern), "Variational Inequalities"; E. Polak (Berkeley), "Semi-Infinite Optimization Problems in Engineering Design"; R. Hettich (Trier), "A Review of Numerical Methods for Semi-Infinite Optimization"; J.H.B. Kemperman (Rochester), "On the Use of Duality in the Theory of Moments"; A. Charnes (Texas at Austin), S. -Å. Gustafson (Royal Institute of Technology), K.O. Kortanek (speaker) (Carnegie-Mellon), "Semi-Infinite Programming -- A Look at Some Trends of Development".

Many persons have contributed to the formation of the technical program. We were encouraged by our initial phone survey in the summer of 1979 which led to the formation of a distinguished international symposium committee representing 14 nations. The program was formed by generous efforts of committee members who wrote to speakers of their choice with the understanding that the Program Chairman, Sanjo Zlobec, would endorse their selection.

Finally, a Symposium Volume consisting of about 25 to 30 papers is being planned under the co-editorship of A.V. Fiacco and K.O. Kortanek.

–K.O. Kortanek
General Chairman

DURHAM

Seventy-five participants and twenty lecturers gathered in Durham from July 6 to July 17 to attend an Advanced Study and Research Institute on Theoretical Approaches to Scheduling Problems, sponsored by NATO, the Institute for Mathematics and Its Applications and the Mathematisch Centrum, Amsterdam.

The first ten days of the Institute were devoted to lectures surveying known results on deterministic and stochastic scheduling models. During the last two days, recent results in the interface between these two models were presented and discussed.

The proceedings of the Institute will be published by D. Reidel and appear in the NATO ASI and Conference Series.

–A.H.G. Rinnooy Kan

CAMBRIDGE

A NATO Advanced Research Institute on Nonlinear Optimization was held at Trinity Hall College in Cambridge, England July 13-24 under the direction of Professor Michael J.D. Powell of Cambridge University.

The core of the meeting was seven "Discussion sessions" on the topics: unconstrained optimization, algorithms for nonlinear fitting, algorithms for linearly constrained problems, algorithms for linear constraints, algorithms for very large nonlinear optimization problems, the current state of optimization software, and future software development and testing methodology. Thirty-one papers were read in these sessions. They drew a great deal of comment from the participants, most of which, thanks to Powell's prodigious efforts, has been set down in writing. The discussion papers and comment will constitute the text of "Nonlinear Optimization 1981", edited by Powell, which will run to about 500 pages when published by Academic Press next Spring. Nine further sessions were devoted to 44 "Research Papers" (which will not appear in the book), a list of which is available from myself in the U.S. or from Powell at DAMTP, University of Cambridge, Silver Street, Cambridge CB3 9EW, England.

Planning for this remarkably good meeting began more than two years ago, with the Mathematical Programming Society playing a small role as a sponsor. The 62 attendees, (most of whom were housed and well fed at stately Trinity Hall) constituted the majority of the western world's active workers on algorithms for nonlinear optimization, and the material presented must cover just about everything that is worth knowing about the subject today.

–Philip Wolfe

STIRLING

CO81, the third in a series of biannual conferences on Combinatorial Optimization was held August 24-28, 1981 at Stirling University, Scotland. Invited papers were given by E.M.L. Beale, V. Klee, J.K. Lenstra, A.H.G. Rinnooy Kan, and D.J.A. Welsh. Thirty-two additional papers were given. The social program included a trip to the Scottish Highlands.

–L.B. Wilson

Technical Reports & Working Papers

CORNELL UNIVERSITY
School of Operations Research
and
Industrial Engineering
Upson Hall
Ithaca, NY 14853

T. Boucher, "*A Mixed-Integer Programming Planning Model for Optimal Investment and Financing in Segmented International Capital Markets,*" TR 467.

M. Todd, "*Minimum Value Ellipsoids Containing Part of a Given Ellipsoid,*" TR 468.

L.J. Billera and C.W. Lee, "*A Proof of the Sufficiency of McMullen's Conditions for f-Vectors of Simplicial Convex Polytopes,*" TR 469.

R. Kannan, "*The Size of Numbers in the Analysis of Certain Algorithms,*" TR 470.

W.F. Lucas and M. Rabie, "*Existence Theorems in Game Theory,*" TR 473.

W.F. Lucas and M.Rabie, "*Games With No Solutions and Empty Cores,*" TR 474.

A. Vardi, "*Trust Region Strategies for Unconstrained and Constrained Minimization,*" TR 475.

R.G. Bland, D. Goldfarb and M.J. Todd, "*The Ellipsoid Method: A Survey,*" TR 476.

J.A. Bloom, "*Solving an Electricity Generating Capacity Expansion Planning Problem by Generalized Benders' Decomposition,*" TR 479.

R. Giles, L.E. Trotter and A. Tucker, "*The Strong Perfect Graph Theorem for a Class of Partitionable Graphs,*" TR 481.

M. Rabie, "*A Simple Game with No Symmetric Solution,*" TR 484.

J.A. Bloom, "*Long-Range Generation Planning with Limited Energy and Storage Plants. Part I - Thermal Plants and Limited Energy Plants,*" TR 486.

J.A. Bloom, "*Long-Range Generation Planning with Limited Energy and Storage Plants. Part II - Storage Plants and the Master Problem,*" TR 487.

L.E. Trotter and S. Baum, "*Finite Checkability for Integer Rounding Properties in Combinatorial Programming Problems,*" TR 488.

M. Rabie, "*On the Region of Solutions for n-Person Games,*" TR 490.

M. Rabie, "*No Solution with a Gap for Veto Game,*" TR 491.

Y. Ikura and G.L. Nemhauser, "*An Efficient Primal Simplex Algorithm for Maximum Weighted Vertex Packing on Bipartite Graphs,*" TR 494.

E. Gattass and G.L. Nemhauser, "*An Application of Vertex Packing to Data Analysis in the Evaluation of Pavement Deterioration,*" TR 499.

G. Chang, "*Binary Triangles,*" TR 500.

W.F. Lucas and D. Hausman, "*The Apportionment Problem,*" TR 501.

W.F. Lucas, "*The Multiperson Cooperative Games,*" TR 502.

W.F. Lucas, "*Applications of Cooperative Games to Equitable Allocation,*" TR 503.

P. Domich, "*Optimization Library (OPTLIB),*" TR 507.

UNIVERSITÉ De MONTRÉAL
Département D'Informatique Et De Recherche Opérationnelle
Montreal, Canada

J.P. Crouzeix, J.A. Ferland and S. Schaible, "*Duality in Generalized Linear Fractional Programming,*" TR 399.

THE JOHNS HOPKINS UNIVERSITY
Department of Electrical Engineering
Baltimore, Maryland 21218

J. O'Rourke, "*Computing the Relative Neighborhood Graph in the L_1 and L_∞ Metrics,*" TR 80-3.

A.J. David and G.G.L. Meyer, "*Boundedness and Convergence Properties of Unstructured Mean Iterative Processes in E^n,*" TR 80-4.

G.G.L. Meyer, "*Synthesis of Optimization Algorithms by Concatenation,*" TR 80-5.

J. O'Rourke, "*Dynamically Quantized Spaces Applied to Motion Analysis,*" TR 81-1.

A.J. David and G.G.L. Meyer, "*Synthesis of a Class of Fixed Point Algorithms: The Deterministic Case,*" TR 81-2.

J. O'Rourke, "*Polygon Decomposition and Switching Function Minimization,*" TR 81-3.

U.B. Desai, H.L. Weinert and G.J. Yusypchuk, "*Discrete-Time Complementary Models and Smoothing Algorithms,*" TR 81-4.

V. Kantabutra, "*Traveling Salesman Cycles are not always Subgraphs of Voronoi Duals,*" TR 81-5.

M.J. Atallah, "*Finding the Cyclic Index of an Irreducible Nonnegative Matrix,*" TR 81-6.

W.J. Rugh, "*On the Construction of Minimal Linear Analytic Realizations for Homogeneous Systems,*" TR 81-7.

J. O'Rourke, C.-B. Chien, D. Naddor and T. Olson, "*A New Linear Algorithm for Intersecting Convex Polygons,*" TR 81-8.

A.J. David and G.G.L. Meyer, "*Unstructured Mean Iterative Processes in Reflexive Banach Spaces,*" 81-9.

Z. Wang, "*The Detection of Signals in Gaussian and Nearly Gaussian Noise,*" TR 81-10.

H.L. Weinert, "*On Adjoint and Complementary Systems,*" TR 81-11.

H.L. Weinert and U.B. Desai, "*Updating Quadratic Regulator Solutions,*" TR 81-12.

J. O'Rourke, "*Some NP-hard Polygon Decomposition Problems,*" TR 81-13.

M.J. Atallah and S.R. Kosaraju, "*New Results on Minimal Graphs,*" TR 81-14.

B.L. Havlicsek and G.G.L. Meyer, "*Morphic Properties of Deterministic and Nondeterministic Fault Models,*" TR 81-15.

WASHINGTON STATE UNIVERSITY
Department of Pure and Applied Mathematics
Pullman, Washington 99164

C. Lemarechal and R. Mifflin, "*A Globally and Superlinearly Convergent Algorithm for One-dimensional Minimization of Convex Functions,*" TR 81-3.

R. Mifflin, "*A Superlinearly Convergent Algorithm for One-dimensional Constrained Minimization Problems with Convex Functions,*" TR 81-4.

COLUMBIA UNIVERSITY
Columbia Business School
810 Uris Hall
New York, N.Y. 10027

P.H. Zipkin, "*Transportation Problems with Aggregated Destinations When Demands are Uncertain,*" revised April 1980.

A. Federgruen and P.H. Zipkin, "*Solution Techniques for Some Allocation Problems,*" May 1980.

A. Federgruen and P.H. Zipkin, "*A Combined Vehicle Routing and Inventory Allocation Problem,*" June 1980.

TECHNICAL REPORTS &
WORKING PAPERS. . . .

UNIVERSITY OF COLOGNE
Department of Mathematics
Weyertal 86-90
D-5000 Cologne, West Germany

U. Zimmermann, *"Minimization of some Nonlinear Functions over Polymatroidal Flows"*, 81-5.

R. Euler, *"Regular (2,2)-Systems"*, 81-6.

H. Friesdorf and H. Hamacher, *"Weighted Min Cost Flows"*, 81-7.

H.P. Pasch, *"Nonlinear One-Parametric Minimal Cost Network Flow Problems"*, 81-11.

E. Balas, *"Integer and Fractional Covers: A Best Possible Bound on Their Ratio"*, 81-13.

R.E. Burkard and T. Bönninger, *"A Heuristic for Quadratic Boolean Programs with Applications to Quadratic Assignment Program"*, 81-14.

U. Zimmermann, *"Minimization of Submodular Flows"*, 81-15.

R.E. Burkard, *"Some Recent Advances in Quadratic Assignment Problems"*, 81-16.

UNIVERSITY OF BONN
Department of Operations Research
Nassestr. 2
D-5300 Bonn, West Germany

D.A. Holton, B.D. McKay, M.D. Plummer and C. Thomassen, *"A Nine Point Theorem for 3-Connected Graphs"*, WP 81188.

B. Korte and L. Lovász, *"Mathematical Structures Underlying Greedy Algorithms"*, WP 81189.

M. Grötschel, *"Kombinatorische Optimierung"*, WP 81191.

M.D. Plummer and W.R. Pulleyblank, *"On Proximity to Paths and Cycles in 3-Connected Graphs"*, WP 81192.

B. Korte, *"Zur Geschichte des Mashinellen Rechnens"*, WP 81193.

M. Grötschel and W.R. Pulleyblank, *"Weakly Bipartite Graphs and the Max-Cut Problem"*, WP 81194.

B. Korte, *"Von Abakus bis Zuse - ein Abriss der Geschichte des Rechnens"*, WP 81195.

M. Grötschel and W.R. Pulleyblank, *"Clique Trees and the Traveling Salesman Problem"*, WP 81196.

A. Bachem, E.L. Johnson and R. Schrader, *"A Characterization of Minimal Inequalities for Mixed Integer Programs"*, WP 81197.

G. Cornuejols and W.R. Pulleyblank, *"Critical Graphs, Matchings and Tours - a Hierarchy of Relaxations for the Travelling Salesman Problem"*, WP 81198.

E. Balas and W.R. Pulleyblank, *"A Linear Characterization of the Perfectly Matchable Subgraph Polyhedron"*, WP 81199.

STANFORD UNIVERSITY
Systems Optimization Laboratory
Department of Operations Research
Stanford, CA 94305

P.E. Gill, W. Murray, M.A. Saunders and M.H. Wright, *"QP-Based Methods for Large-Scale Nonlinearly Constrained Optimization,"* SOL 81-1.

Z.F. Lansdowne, *"Simplified Algorithms for Computing Dynamic Solutions to Multi-Regional Planning Models,"* SOL 81-2.

J.-L. Goffin, *"Convergence Rates of the Ellipsoid Method on General Convex Functions,"* SOL 81-3.

G.B. Dantzig and A. Iusem, *"Analyzing Labor Productivity Growth with the Pilot Model,"* SOL 81-4.

G.B. Dantzig, *"Reminiscences about the Origins of Linear Programming,"* SOL 81-5.

R.E. Stone, *"Geometric Aspects of the Linear Complementarity Problem,"* SOL 81-6.

P.H. McAllister and W.D. Winkler, *"1981 EPRI Overview Planning Scenario Results from the Pilot Process Integrated Model,"* SOL 81-7.

B. Avi-Itzhak and A. Iusem, *"The Industrial Energy Services Model,"* SOL 81-8.

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332

F.A. Al-Khayyal and J.E. Falk, *"Jointly Constrained Biconvex Programming,"* J-81-11, School of Industrial and Systems Engineering.

C.E. Blair and R.G. Jeroslow, *"Constructive Characterizations of the Value Function of a Mixed Integer Program,"* College of Management.

C.E. Blair and R.G. Jeroslow, *"Extensions of Balas' Theorem on Facial Constraints,"* College of Management.

R.J. Duffin, R.G. Jeroslow and L.A. Karlovitz, *"Duality in Semi-infinite Linear Programming,"* College of Management.

W.F. Griffeth, Jr., *"Polynomial Interpolation in Predictor-Corrector Methods for Following Homotopy Paths,"* MS 80-13, College of Management.

R.G. Jeroslow, *"Uniform Duality in Semi-infinite Convex Optimization,"* College of Management.

D.F. Karney, *"Asymptotic Convex Programming,"* College of Management.

R.A. DeMillo and A.L. Rosenberg, *"Graph Separators,"* Information and Computer Science.

R.A. DeMillo, K. Lieberharr and R.J. Lipton, *"The Polynomial Time Complexity of Complex Root-Finding,"* Information and Computer Science.

R.A. DeMillo, R.J. Lipton and R.W. Sedgewick, *"Upper Bound Procedures for VLSI,"* Information and Computer Science.

R.A. DeMillo, D. Hocking and M. Merritt, *"A Comparison of Some Reliable Test Data Generation Strategies,"* Information and Computer Science.

R.A. DeMillo and R.J. Lipton, *"The Consistency of 'P=NP' and Related Problems with Fragments of Number Theory,"* Information and Computer Science.

R.A. DeMillo, *"Applied Cryptography, Cryptographic Protocols, and Computer Security,"* Information and Computer Science.

L. Platzman, *"A Feasible Computational Approach to Infinite-Horizon Partially-Observed Markov Decision Problems,"* J-81-2, School of Industrial and Systems Engineering.

J.E. Spingarn, *"Submonotone Mappings and the Proximal Point Algorithm,"* School of Mathematics.

D.W. Tedder, *"The Computer-Aided Design of an Optimal Deethanizer Sequence,"* Chemical Engineering.

UNIVERSITY OF FLORIDA
Center for Econometrics and Decision Sciences
College of Business Administration
University of Florida
Gainesville, Florida 32611

Harold Benson, *"On the Convergence of Two Branch and Bound Algorithms for Non-Convex Programming Problems,"* Dec. 1979.

Gary J. Koehler, *"Bounds and Elimination in Generalized Markovian Decisions,"* Feb. 1980.

Gary J. Koehler, *"Relationships Between Various Markovian Decisions Problem Classes,"* Feb. 1980.

Harold Benson, *"Algorithms for Parametric Non-Convex Programming,"* August 1980.

H. Theil, *"Maximum Entropy Distribution - A Progress Report,"* December 1980.

A. Majthay, *"Spaces of Linear Programs,"* February 1981.

Gallimaufry

Dr. Ellis Johnson (IBM Research) is spending the 1981-82 academic year at the University of Pisa...Proceedings of the 1980 Conference, *Generalized Concavity in Optimization and Economics*, edited by Siegfried Schaible (Alberta) and W.T. Ziemba (Vancouver) will be published by Academic Press in November 1981... Professor R.E. Burkard, formerly of the University of Cologne, has accepted a professorship at the Institute für Mathematik, Technische Universität, Graz/Australia...J.-B. Hiriart-Urruty, formerly at the University of Clermont-Ferrand II, has been appointed at a position of professorship at the University Paul Sabatier (Toulouse III)...Dr. Edward H. McCall (Sperry Univac Research) and Professor J.B. Rosen (Minnesota) have been awarded a three year NSF grant entitled, "Global Optimization Methods for Linearly Constrained Large-Scale Problems"...Among 15 mathematical scientists who have received Guggenheim fellowships for 1981-82 are David Gale (Berkeley) for work in economic applications of optimization theory, and Roger. J.-B. Wets (Kentucky) for work in decision making under uncertainty...Dr. Philip Wolfe (IBM Research) was keynote speaker at the Second Mathematical Programming Symposium in Japan October 19 and 20, 1981...The SIAM 30th Anniversary Meeting is being held at Stanford University July 19-23, 1982. The program consists of six symposia including one in *Control and Optimization*. The abstract deadline is March 1, 1982...Academic Press has just published *Practical Optimization* by Philip E. Gill, Walter Murray and Margaret H. Wright of Stanford University...*Large-Scale Linear Programming*, Proceedings of the IIASA Workshop, June 2-6, 1980, edited by George B. Dantzig, M.A.H. Dempster and M.J. Kallio has been published by IIASA...A one day symposium, "The Matching Problem: Theory, Algorithms and Applications" was held October 16, 1981, at the National Bureau of Standards. For further information, contact the organizers, Michael Ball (Maryland) Lawrence Bodin (Maryland) or Karla Hoffman (NBS).

Errata: OPTIMA #4 contained a typographical error in the name of Professor Herbert Scarf (Yale) and an error in the title of a forthcoming journal paper by E. Rosenberg (see page 4 in this issue). We regret the errors.

The deadline for the next OPTIMA is January 31, 1982.

OPTIMA
303 Weil Hall
College of Engineering
University of Florida
Gainesville, Florida 32611