

MATHEMATICAL PROGRAMMING SOCIETY

Nominations for 1997 Elections

The Constitution of the Mathematical Programming Society sets the term of office for all officers of the Society at three years. Elections for all offices (Chairman, Treasurer, and four at-large members of the Council) are to be held four months prior to each triennial International Symposium. The sixteenth symposium will be held in Ann Arbor, August 24-29, 1997, so the next election will be held in April 1997. The new members-at-large of the Council will take office at the time of the symposium, while the Chairman-elect and Treasurer-elect will take office one year later.

The Constitution makes the following provisions: Candidates must be members of the Society. They may be proposed either by Council or by any six members of the Society. No proper nomination may be refused, provided the candidate agrees to stand. The Chairman decides the form of the ballot. By-laws are passed by the Council to promote international representation on the Council.

Accordingly, the following procedure will be followed:

- (1) Nomination to any office is to be submitted to the Chairman by April 4, 1997. Such nomination is to be supported in writing by the nominator and at least five other members of the Society.
- (2) In keeping with what seems to have become a tradition, the next Chairman preferably should NOT be a North American resident. The membership is asked to consider only residents from other continents as candidates for Chairman.
- (3) When the ballots are counted, the four at-large candidates for Council receiving the highest number of votes will be elected, except that not more than two members having permanent residence in the same country may be elected.

John Dennis, Chairman
 Computational Applied Mathematics
 Rice University
 6100 South Main
 Houston, TX 77005

16th International Symposium on Mathematical Programming

Lausanne, Switzerland
 August 24-29, 1997

General Information

As we approach several deadlines, this is the perfect time to tell you how the planning is proceeding and to remind everyone of abstract submission and registration deadlines.

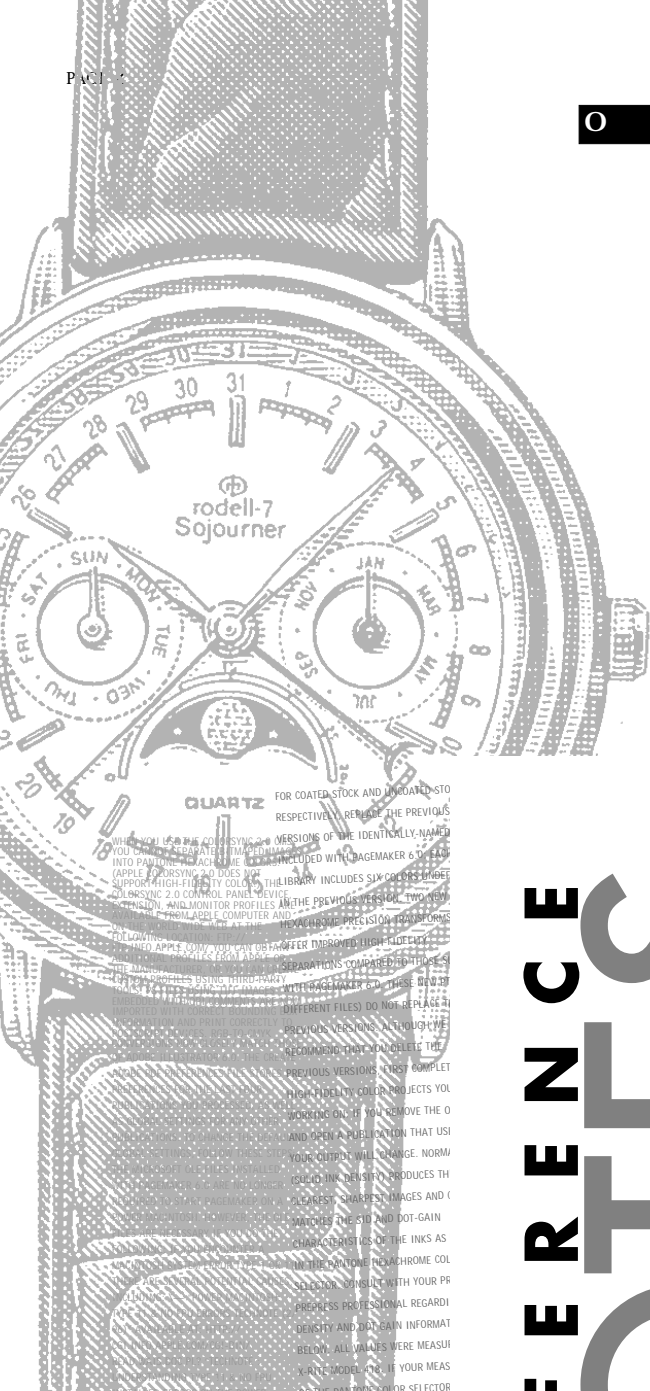
Recently, registration forms were mailed to all people who have preregistered. Everyone who registers *before April 30* will enjoy a lower registration fee. If you have not received the *registration form*, you can find it in this issue of OPTIMA and on the home page of the Symposium at URL <http://dmawwww.epfl.ch/roso.mosaic/ism97/welcome.html>.

Another useful form that can be found on this Web site is the *abstract submission form*. The abstract submission deadline is also *April 30*. Electronic submission is encouraged. If you present a paper in an invited session, please send a *copy of your abstract to the session organizer*.

Since Lausanne will be fully booked this summer, it is recommended that you reserve a hotel room as quickly as possible. Information about hotels in various price categories can be found on the Symposium home page. The price range is quite wide; one bed in a dorm costs 20-25 Swiss Francs, whereas a single room in a luxury hotel costs about 135 Swiss Francs per night. The *hotel reservation form*, which is also in this

SEE PAGE FIVE ►

O P T I M I M A



CONFERENCE

- ▶ **Third Workshop on Models and Algorithms for Planning and Scheduling Problems**
Cambridge, England
April 7-11, 1997
- ▶ **OPTIMIZATION DAYS 1997**
Montreal, Canada, H3T 2A7
May 12-14, 1997
- ▶ **5th Twente Workshop on Graphs and Combinatorial Optimization**
University of Twente
Enschede, The Netherlands
20 - 22 May 1997
- ▶ **MPDP-19 Nineteenth Symposium on Mathematical Programming with Data Perturbations**
The George Washington University, Washington, DC
May 22-23, 1997
- ▶ **HPSNO 97 High Performance Software for Nonlinear Optimization: Status and Perspectives**
Ischia, Italy
June 4-6, 1997
- ▶ **MPS at EURO/INFORMS**
Barcelona, Spain
July 14-17, 1997
- ▶ **ICM98**
Berlin, Germany
August 18-27, 1998
- ▶ **XVI International Symposium on Mathematical Programming, Lausanne**
Switzerland, Aug. 24-29 1997

O P T I M A

2ND
C O N F E R E N C E
F O R P A P E R S**OPTIMIZATION DAYS
1997**

GERAD - Ecole des HEC
3000, chemin de la Cote-Sainte-Catherine
Montreal, Canada, H3T 2A7
May 12-14, 1997

Co-sponsored by:
 Groupe d'Etudes et de Recherche en Analyse des Decisions (GERAD)
 Joint research center of:
 Ecole des Hautes Etudes Commerciales
 Ecole Polytechnique de Montreal
 McGill University
 Universite du Quebec a Montreal
 Centre de recherche sur les transports (C.R.T.)
 Joint research center of:
 Universite de Montreal
 Ecole des Hautes Etudes Commerciales
 Ecole Polytechnique de Montreal

The scientific meeting "Optimization Days" is organized each year jointly by the above research centers of the Montreal region. The aim of the 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
 Global optimization
 Optimal control theory
 Numerical methods of optimization
 Systems theory, including large scale systems
 Statistical methods
 Estimation and identification
 Applications to engineering, transportation, economics, management sciences, urban and environmental problems, resource management, biology, telecommunications, networks
 Robotics
 Expert systems
 Energy modelling, 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 methods of optimization and their applications.

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

Plenary speakers will be:
 JOHN E. DENNIS, Rice University
 JERZY A. FILAR, University of South Australia
 PIERRE HANSEN, Ecole des Hautes Etudes Commerciales
 CLAUDE LEMARECHAL, INRIA
 STAVROS ZENIOS, University of Cyprus

For further information contact:
 GERAD - Optimization Days 1997
 3000, chemin de la Cote-Sainte-Catherine
 Montreal, Canada, H3T 2A7
 Telephone: (514) 340-6043
 Fax: (514) 340-5665

E-mail: jopt97@crt.umontreal.ca
 WWW: <http://www.crt.umontreal.ca/GERAD>

HPSNO 97

Center for Research on Parallel Computing and Supercomputers (CPS)

High Performance Software for Nonlinear Optimization: Status and Perspectives

Ischia, Italy

June 4-6, 1997

The Research Center for Parallel Computing and Supercomputers (CPS), a joint research center of the CNR (National Research Council of Italy), and the University of Naples "Federico II" will host a short conference entitled "High Performance Software for Nonlinear Optimization" on 4-6 June 1997 in Ischia (which is one of the islands in the bay of Naples), Italy. The Conference will be organized biennially.

The focus of the conference is to cover the latest results in optimization software and, in particular, optimization software for high performance computers. The conference will provide an overview of the nonlinear optimization field including algorithms, software evaluation, implementation issues, applications and future areas of research through authoritative lectures given by some of the most active researchers in the field. The Conference aims to promote research activities and cooperation among scientists in the field and, therefore, it will provide ample opportunity for informal exchange of ideas among researchers.

The Conference will include lectures given by guest speakers and by authors of selected contributed papers. Topics of interest include, but are not limited to: (Parallel) Computational Experiments, Large-Scale Constrained and Unconstrained Problems, Global Optimization, Quadratic Programming, Automatic Differentiation, Linear and Nonlinear Least Squares, Numerical Linear Algebra problems arising in Optimization, Solution of Large Nonlinear Systems, Nonsmooth Optimization, Semidefinite Optimization, Combinatorial Optimization, Complexity, Applications in Sciences, Management and Engineering.

Contributed abstracts, limited to 70, must reach the conference organizers by 5 April. Authors will be notified of acceptance or rejection by the end of April. The selected talks will last 15 minutes with an additional 5 minutes for discussion and questions.

There are special conference hotel prices for a limited number of rooms. Forms for registration for both the conference and the hotel are available from the Organizing Committee, as listed below.

Organizing Committee Coordinates:
 For information or for registration, send an e-mail message to hpsno@matna2.dma.unina.it or send a fax to +39-81-7662106 (Prof. A. Murli) or send a letter to Prof. Almerico Murli or to Prof. Gerardo Toraldo CPS - CNR, Complesso Monte S. Angelo, ed. T, Via Cintia 80126, Napoli - ITALY.

www page: <http://pixel.dma.unina.it/Events/HPSNO97.html> <http://www.netlib.org/confdb/confsearch.html>

O P T I M A

MPS at EURO/INFORMS**Barcelona, Spain****July 14-17, 1997**

The Mathematical Programming Society has sponsored a stream at the Joint International Meeting of EURO and INFORMS, July 14-17, 1997 in Barcelona. The stream organizers are Karen Aardal and Jan Karel Lenstra, and the stream consists of the following sessions:

Numerical Optimization

Organizer: Anders Forsgren, Stockholm
Speakers: Ulf Ringertz, Walter Murray, Anders Forsgren

Stochastic Programming

Organizers: Rüdiger Schultz, Berlin, and Leen Stougie, Amsterdam
Speakers: Michael A.H. Dempster, Laureano F. Escudero, Hercules Vladimirov

Stochastic Integer Programming

Organizers: Rüdiger Schultz, Berlin, and Leen Stougie, Amsterdam
Speakers: Francois Louveaux, Asgeir Tomasgard, Rüdiger Schultz

Algebraic Methods in Optimization

Organizer: Winfried Hochstättler, Köln
Speakers: Regina Urbaniak, Markus Wiegmann, Matthias Hayer, Winfried Hochstättler

Local Search

Organizer: Martin Zachariassen, Copenhagen
Speakers: Andreas Fin, Eric Taillard, Cees Duin, Martin Zachariassen

Optimization in Industry

Organizer: Petra Bauer, München
Speakers: Ruediger Schultz, Roland Wessaely, Ulrich Lauther, George L. Nemhauser

Optimization in Telecommunication

Organizers: Stan van Hoesel, Maastricht, and Karen Aardal, Utrecht
Speakers: Cor Hurkens, Robert van de Leensel, Stan van Hoesel

Optimization in Statistical Disclosure Control

Organizers: Matteo Fischetti, Udine, and Juan Jose Salazar, Tenerife
Speakers: Leon Willenborg, Cor Hurkens, Matteo Fischetti

Vehicle Routing and Loading

Organizers: Goos Kant, Utrecht, and Karen Aardal, Utrecht
Speakers: Stefan Tschoeke, Bram Verweij, Goos Kant

INFORMS**Institute for Operations Research and the Management Sciences (formerly ORSA & TIMS)****1997 George B. Dantzig Dissertation Award**

The George B. Dantzig Dissertation Award Committee is now accepting entries for the 1997 award. The award for the best OR/MS dissertation serves to promote greater interaction between academia and industry by encouraging researchers to conduct innovative research that is relevant to practice in any area of operations research and management science. The first and second place winners will receive awards of \$800 and \$400, respectively. Additional finalists will receive honorable mentions with \$100 awards. Prizes will be awarded at the INFORMS National Fall Meeting in Dallas, Texas, Oct. 26-29, 1997.

Each entry must:

- 1) Consist of a doctoral dissertation written primarily by the entrant and completed between Jan. 1, 1996, and July 1, 1997.
- 2) Present original ideas obtained predominantly by the entrant.
- 3) Clearly illustrate and demonstrate the relevance of the work in practice and the potential impact in industry.

Entrants should submit six copies of the following items before July 15, 1997:

- 1) A summary of the dissertation (less than 5 double-spaced pages) highlighting the significance of the problem, the novelty of the methodology approach, the contribution of the research to industry, and the scope of the dissertation.
- 2) A self-contained paper (less than 25 double-spaced pages) based on the thesis so that the award committee can evaluate the contribution of the work.
- 3) A letter of recommendation from the entrant's thesis advisor that describes the significance of the research and comments on the originality of the work.

4) A letter of recommendation from an industry associate that describes the relevance and the potential benefits of the research in their organization. This letter must be written by a manager familiar with the research who has served as an advisor to the research or as a coordinator to the on-site research project. The manager should be informed that they may be contacted by the committee members asking questions regarding the entrant's search.

The entries in the first round will be judged, and five finalists will be selected by an awards committee comprised of experts from industry and academia. All submissions should be postmarked before July 15, 1997, and sent to the Chair of the George B. Dantzig Dissertation Award Committee:

Professor David Simchi-Levi
Northwestern University
Department of Industrial Engineering and Management Sciences,
2225 N. Campus Drive
Evanston, IL 60208-3119
Phone: (847) 491-5399
Fax: (847) 491-8005
E-mail: levi@iems.nwu.edu

WWW: <http://primal.iems.nwu.edu/~levi/>

Each finalist will be notified by September 1, 1997, and requested to submit the entire dissertation to the chair of the committee. All finalists will give a presentation of their work in a special session at the Dallas, Texas, meeting.

Susan L. Albin, Professor & Graduate Director
Department of Industrial Engineering
Rutgers University
PO Box 909
Piscataway, NJ 08855-0909
salbin@rci.rutgers.edu
fax: 908-445-5467
tel: 908-445-2238

O P T I M A

16th International Symposium on Mathematical Programming

issue of OPTIMA, should be sent directly to the Lausanne Tourist Office (address and fax number on the form).

Almost everything you need to know about the Symposium can be found on the home page given above, so please have a look!

Program

The program is developing nicely. Over 200 invited sessions have been organized so far. All invited sessions, including the name of the speakers, are listed on the Web.

The following speakers have agreed to give featured lectures:

Pierre Auslender, Paris
Egon Balas, Pittsburgh
Alexander Barvinok, Ann Arbor
Rainer Burkard, Graz
Andreas Dress, Bielefeld
Arne Drud, Bagsvaerd
Matteo Fischetti, Udine
Michel Goemans, Cambridge (USA)

R. Gumerlock, Zurich
Peter Hammer, New Brunswick
Pierre Hansen, Montreal
Gil Kalai, Jerusalem
Masakazu Kojima, Tokyo
Monique Laurent, Paris
Jan Karel Lenstra, Eindhoven
Juri Nesterov, Brussels
Manfred Padberg, New York
Jong-Shi Pang, Baltimore
Andrzej Ruszcynski, Warsaw
Herbert Scarf, New Haven
Eva Tardos, Ithaca
Tamas Terlaky, Delft
Philippe Toint, Namour
Uwe Zimmermann, Braunschweig
Jochem Zowe, Erlangen

Several special sessions are being organized, such as sessions celebrating Phil Wolfe's and Anthony Fiacco's 70th birthdays and a session where Tucker Prize Finalists present their work.

On Sunday, August 24, there will be an informal get-together with drinks and refreshments offered by the City of Lausanne and the Canton de Vaud. On Monday, August 25, in the morning there will be an opening Plenary Session, and on Tuesday, August 26, in the evening a Simplex Method Birthday Party Dinner will be organized featuring keynote talks. All participants are invited. On Wednesday evening, August 27, there will be a boat banquet on the Leman Lake. Please note that all participants must buy tickets for this event.

Financial Support

People who want to apply for financial support toward covering their expenses are asked to write or e-mail the Chairman of the Organizing committee Th. M. Liebling at the following address:

Th. M. Liebling
Chair Organizing Committee
ISMP97
EPFL
CH-1015 Lausanne, Switzerland
E-mail: liebling@dma.epfl.ch

Please explain why you need the support and include a curriculum vitae and an abstract of the talk you wish to present at the meeting. Applicants will be notified by May 15, 1997, about the decision. Please note that there are limited funds available.

The members of the organizing committee welcome everyone to Lausanne and express their hope that, with the help and contributions of the participants, the Symposium will be a great success.

*On behalf of the Symposium Organizers,
Karen Aardal*

(aardal@cs.ruu.nl)

International Congress of Mathematicians 1998 in Berlin Gets Special Stamp

Here is good news for the philatelists among the mathematicians. About two years ago the ICM98 Organizing Committee contacted the German Ministry of Postal Affairs and Telecommunication to issue a special stamp on the occasion of the International Congress of Mathematicians in Berlin in August 1998. A few days ago we received a positive reply. The "selection committee for special stamps" proposed ICM98 as one of the themes for a special stamp. The Minister of Postal Affairs agreed.

The Ministry will ask several artists for design proposals. The artists are supposed to contact the ICM98 organizing committee for ideas. Another committee will make the selection.

Stamp collectors will have the opportunity to buy first-day covers during the opening day, August 18, 1998, of ICM98 in Berlin. This occasion may be another good reason to attend the International Congress in Berlin.

-MARTIN GRÖETSCHTEL President, ICM98 Organizing Committee

More information about ICM98 can be found in the ICM98 WWW-server (URL: <http://elib.zib.de/ICM98>). This WWW-server also offers an electronic preregistration form. If you do not have access to the World Wide Web and would like to subscribe to the ICM98 circular letters, just send an e-mail to icm98@zib.de, writing "PRELIMINARY PREREGISTRATION" into the SUBJECT line.

ZIB's NEW ADDRESS:

Please note that the Konrad-Zuse-Zentrum (ZIB) has moved and that all mail, e-mail and internet domain addresses, and all phone and fax numbers have changed! ZIB's new internet domain address is "zib.de". The old ZIB domain address "zib-berlin.de" remains valid until December 31, 1998. Here are some new coordinates:

Electronic Information on ICM98 at URL: <http://elib.zib.de/ICM98> (with form for preliminary preregistration)

ICM98 General E-mail Address: icm98@zib.de

President of the ICM98 Organizing Committee:

Prof. Dr. M. Gröetschel
Konrad-Zuse-Zentrum fuer Informationstechnik (ZIB)
Takustrasse 7 D-14195 Berlin-Dahlem
Germany

E-mail: groetschel@zib.de
Phone: +49/30/84185-210
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Secretary: Sybille Matrisch
Phone: +49/30/84185-208
ZIB-URL: <http://www.zib.de>

Reviews

Nonlinear Programming

Dimitri P. Bertsekas
 Athena Scientific, PO Box 391
 Belmont, MA 02178-9998, 1995
 ISBN:1-886529-14-0

This is a beautifully written book by a prolific author (10 books in the last 20 years) who has taken painstaking care in making the presentation extremely lucid. As such, the book can be used either as a text for an upper level undergraduate course or as a beginning graduate level course. It can also serve as a research reference book inasmuch as it contains some of the latest research on many topics of nonlinear programming. The style is unhurried and intuitive yet mathematically rigorous. The book contains six chapters and four appendices as follows:

Unconstrained Optimization [pp. 1-172]
 Optimization Over a Convex Set [pp. 173-252]
 Lagrange Multiplier Theory [pp. 253-310]
 Lagrange Multiplier Algorithms [pp. 311-414]
 Duality and Convex Programming [pp. 415-486]
 Dual Methods [pp. 487-532]
 Appendix A Mathematical Background [pp. 533-556]
 Appendix B Convex Analysis [pp. 557-601]
 Appendix C Line Search Methods [pp. 602-606]
 Appendix D Implementation of Newton's Method [pp. 607-612]
 References [pp. 613-642]

Besides the ordinary material covered by the above chapter headings, the book contains some interesting non-standard topics not usually found in nonlinear programming books such as: Incremental Gradient Methods (as those used in Backpropagation Algorithms of Neural Networks which take one term of the objective function at a time), the Kalman and Extended Kalman Filter (which incrementally solve linear and nonlinear systems of equations), and Two Metric Projection Methods (one metric for direction finding and another for projection).

The numerous figures in the book are especially well thought out and are used in a very effective way to elucidate the text. The detailed and self-explanatory long captions accompanying each figure are extremely helpful.

The 80 pages constituting the four appendices serve as a masterfully written introduction to the field of nonlinear programming that can be used as a self-contained monograph. Teachers using this book could easily assign these appendices as introductory or remedial material.

In conclusion, this is a highly recommended book that is well worth acquiring and using either as a textbook or reference.

-OLVI MANGASARIAN



Numerical Solution of Initial-Value Problems in Differential-Algebraic Equations 2nd Edition

K.E. Brenan, S.L. Campbell
and L.R. Petzold
Siam, 1996

ISBN 0-89871-353-6

In the last 20 years a lot of work has been performed to develop numerical methods for the solution of Differential Algebraic Equations (DAE). The most general form of DAE systems is the full *implicit form*

$$F(t, y, \dot{y}) = 0,$$

where F and y are vector valued and \dot{y} denotes the derivative of y with respect to the time t . Such DAE systems occur in a wide variety of applications, for example, in optimal control problems, mechanics, in discretization of PDEs and in electric and circuit problems. If the system can be algebraically transformed to the form

$$\dot{y} = f(t, y)$$

then it is referred to as a system of implicit ODEs. The book is focused on problems for which this is impossible or less desirable. The book is on initial-value problems in DAE systems, that is, we also have an initial condition $y(t_0) = y_0$. There also exist boundary value problems in DAEs; however, they are only briefly mentioned in the book. When the first edition of the book appeared in 1989, it was the first really good summary of the work that had been done on DAEs. The first six chapters of the second edition are identical to the first edition of the book.

Chapter 1 gives an introduction to DAEs. It presents some of the most basic types of DAEs and gives some applications. Chapter 2 presents some basic theory of DAEs. In this chapter important concepts like differentiation index, local index, standard canonical form, Hessenberg form and consistent initial values are defined. The index is an especially important property that determines the properties of the system. One difference between implicit ODEs and DAEs is that ODEs are solvable for all initial values, whereas DAEs are only solvable for consistent initial values. In Chapter 2 we also find solvability theorems for different kinds of DAEs. Chapter 3 deals with multistep methods for DAEs. It is illustrated that multistep methods applied to DAEs may have some properties ODEs do not have. One example is that multistep methods applied to DAEs may have a boundary layer of instability. Some convergence theorems are also given.

Chapter 4 deals with implicit Runge-Kutta methods on DAEs. As one of the results we note that implicit Runge-Kutta methods do not always have the same order of con-

vergence as when they are applied to ODEs. Chapter 5 is on Linda Petzold's code DASSL. It is a FORTRAN code for the solution of DAEs of index 0 or 1. DASSL is based on variable step size backward differential formulas. This code should be recommended to anyone who wants to solve such problems. The code DASSL won the first Wilkinson Prize for Numerical Software in 1991. Chapter 6 is on applications.

The last chapter, Chapter 7, of the second edition deals with results obtained since the first edition was published in 1989. Here concepts like perturbation index, uniform differentiation index, uniform solvability, and impasse points are presented. Some recent results and codes for Runge-Kutta methods on DAEs are also mentioned. Several pages are spent on new codes which can be considered as further developments of DASSL. The code DASPK is constructed for large-scale systems of DAEs. The main ideas in the code are described. To solve sparse large systems of linear equations, it uses the Krylov subspace projection method, GMRES. The user has to provide a preconditioner, which is explained by the fact that any nontrivial DAE needs a preconditioner. Two parallel versions DASPKF90 and DASPKSO and the strategies they use for sensitivity analysis of a DAE are described as well as how consistent initial conditions can be obtained in DASPK. At the end of the book there is information on obtaining the different codes in the DASSL family by electronic mail.

The authors tend to focus on their own research, while the research of others can be found sometimes only in the bibliography. For instance, there is very little in the book on the research by the Berlin group, among others, of R. März, E. Gripenberg, S. Reich. For anyone who wants to test different methods, it is a bit irritating that some details, like values of parameters, are left out of the examples. To get the values, it is necessary to go to the original references. The book does not present any open research problems. Probably one of the most important open problems is if there exist any simple conditions that guarantee that a numerical DAE method is convergent, like consistency and zero stability imply convergence for ODEs.

However, there are many more positive than negative things to say about the book. It is *indisputably the best existing book on DAEs*. It has structured the most important results on solvability properties, numerical methods and software for DAEs. It is well written and describes difficulties with DAEs in a comprehensible way. It does not require any prior knowledge of the subject by the reader. The book is recommended to anyone who wants an introduction to DAEs. It is also a book that everyone who performs research on DAEs should have.

ANDERS BARRLUND

Mathematical Programming Glossary on the World Wide Web

by Harvey J. Greenberg

The amount of information placed - and then to be found - on the World Wide Web (WWW) is growing at a frantic pace every day. Even relatively optimistic and computer-literate individuals (like this reviewer tends to think of himself) may look at this progress with some scepticism. Being massively inundated by information does not necessarily contribute to our general well-being or even to a better understanding and improved knowledge. Of course, the validity of such a general statement greatly depends on the information offered (or pushed), as well as on the purposes and circumstances of the person seeking that information. Sometimes one would like to possess the vision of Leonard Cohen's legendary Suzanne who could show "... where to look among the garbage and the flowers ..." - but, probably, that belongs to a different essay.

In the diverse scientific fields, quite a few people have put a noble - and most typically, voluntary - effort into collecting and disseminating useful information, primarily for the benefit of their colleagues: professors, researchers and students. Harvey Greenberg is one of these devoted scholars, as some of his other work - e.g., Greenberg (1993, 1995) - can also attest. His expanding Mathematical Programming Glossary (MPG) on the Web can be regarded as a remarkable effort to provide concise and, at the same time, sufficiently precise information related to mathematical programming terms, concepts, and methodology. The MPG Morality Code actively encourages the educational use of the Glossary; prospective on-line users - probably in the middle of writing or reading an assignment, a report, an article, or a book - can also profit from the information collected in the Glossary.

The MPG is organized into an alphabetical index; notations, basic MP information and supplements are also provided, with links to several bibliographies. The total length of the Glossary index is about 12 printed pages (as of January 1997, when printed in a font of size 12). This corresponds to a somewhat above-average length index, typically attached to a university textbook or even to a scientific research monograph. However, it certainly does not have (yet) the comprehensive scope and depth of a science dictionary or an encyclopedia. For illustration, the terms discussed under the letter "A" are listed below:

Abstract program; Active constraint; Active set method; Activity analysis; Acyclic; Adjacency matrix; Adjacent basis; Adjoint; Admissible; Affine combination; Affine function; Affine hull; Affine independence; Affine scaling; Affine set; Aggregation; AIMMS; Algorithm; Almost complementary; Alternative systems; AMPL; Analytic center; Ant colony optimization; Artificial variable; Assignment polytope; Assignment problem; Asymptotic stability; Auction algorithm; Augmented Lagrangian; Augmenting path; Automatic differentiation.

As this list indicates, the topics covered include classical as well as more recent MP related information. Its content is relevant and useful; probably most of us would find a few items to read or double-check, before saying or writing a paragraph or a page about the subject in question.

Looking more closely at several MPG items, for illustration I chose the letter "N" which had, at the time of writing this review, about 20 entries. All of these are described on some four pages, leaving on average one fifth of a page (approximately 10-12 lines) per entry. Of course, some items - e.g., the concept of a negative semi-definite matrix - can be described by a single line; others - e.g., a summary of the heuristic search method of Nelder and Mead - may occupy about one-third of a page. The glossary items are quite carefully interwoven by HTML (HyperText Markup Language) connections. That is, by applying a pointing device to (clicking by a mouse at) certain designated (underlined and blue-coloured) sets of words in the item description, the reader can be led directly to the corresponding related concepts. This HTML feature - used extensively, e.g., in MS Windows style help facilities - is, of course, a great asset: it nicely complements the reading of most professional materials which best accommodate a (default) linear reading style. Again for illustration, from the Nelder-Mead algorithm description one could directly jump to the following Glossary entries: Heuristic search, Unconstrained optimization, and Simplex.

The Glossary is, definitely, *in statu nascendi*: to my knowledge, it has only been developed (posted) since 1996. This explains that minor errors and misprints can undoubtedly be found; I am also convinced that it could - and will - be extended in many directions and also in depth. However, even in its present evolutionary phase (which most probably will last for a long - ideally, "infinite" - time), it represents a distinguished addendum to the Web, helping mathematical programmers to stay on top of a rapidly changing discipline and ever-expanding body of scientific knowledge.

Additional Notes

1. Harvey Greenberg encourages his MPG visitors to provide feedback and asks for contribution proposals. Corrections, substantive additions and supplements are all solicited.
2. The WWW (URL) address of the Mathematical Programming Glossary is <http://www-math.cudenver.edu/~hgreenbe/glossary/glossary.html>.
3. The MPG is written in HTML such that no special browser is needed to view its essential contents. The commonly used browsers - for instance, Lynx, Mosaic, or Netscape - are adequate though, of course, graphical information needs graphics browser capabilities.

References

- Greenberg, H.J. (1993) A bibliography for the development of an intelligent mathematical programming system. Technical Report, Department of Mathematics, University of Colorado, Denver, Colorado. (Also available in updated form on the WWW; <http://www-math.cudenver.edu/~hgreenbe/consortium/biblios.html>.)
- Greenberg, H.J. (1995) Mathematical programming models for environmental control. *Operations Research* 43, 578-622.

-JÁNOS D. PINTÉR

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Vol. 76, No. 2

- R. Polyak, *Nonlinear rescaling and proximal-like methods in convex optimization.*
 W. Kaplan, *Duality theorem for a generalized Fermat-Weber problem.*
 S. Iwata, *A capacity scaling algorithm for convex cost submodular flows.*
 C. C. Gonzaga, *The largest step path following algorithm for monotone linear complementarity problems.*
 K. Kilakos, *Fractional and integral colourings.*

Vol. 76, No. 3

- L. Qi, A. Ruszczyński and R. Womersley, *Computational Nonsmooth Optimization.*
 Yu.M. Ermoliev, A.V. Kryazhinskii and A. Ruszczyński, *Constraint aggregation principle in convex optimization.*
 E.A. Nurminski, *Separating plane algorithms for convex optimization.*
 C. Lemaréchal and C. Sagastizábal, *Variable metric bundle methods: From conceptual to implementable forms.*
 L. Qi and X. Chen, *A preconditioning proximal Newton method for nondifferentiable convex optimization.*
 J.M. Martínez and A.C. Moretti, *A trust region method for minimization of nonsmooth functions with linear constraints.*
 J. Sun, *On piecewise quadratic Newton and trust region problems.*
 N. Yamashita and M. Fukushima, *Modified Newton methods for solving a semismooth reformulation of monotone complementarity problem.*
 F. Facchinei and C. Kanzow, *A nonsmooth inexact Newton method for the solution of large-scale nonlinear complementarity problems.*
 A. Fischer, *Solution of monotone complementarity problems with locally Lipschitzian functions.*
 S.C. Billups and M.C. Ferris, *QPCOMP: A quadratic programming based solver for mixed complementarity problems.*
 H. Sellami and S.M. Robinson, *Implementation of a continuation method for normal maps.*
 B. Kummer, *Parametrizations of Kojima's system and relations to penalty and barrier functions.*
 D. Ralph and S. Scholtes, *Sensitivity analysis of composite piecewise smooth equations.*

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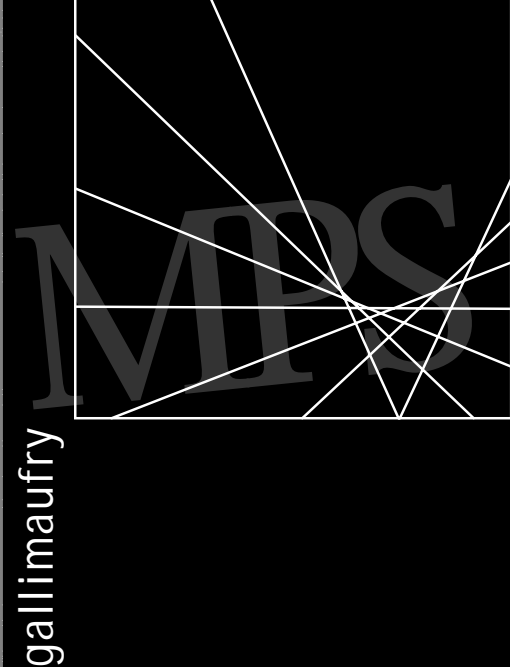
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■ Fall 1996 awards of INFORMS went to several mathematical programmers known for their texts as well as their research: **Harvey M. Wagner** won the first Expository Writing Award and **Frederick S. Hiller** and **Gerald J. Lieberman** received Honorable Mention for the Lanchester Prize which **Robert J. Aumann** and **Michael B. Mascheler** shared with **Martin L. Puterman**. ■ **Richard Tapia** has received a Presidential Award for Excellence in Science, Mathematics and Engineering Monitoring, and he has also been named to the National Science Board.
■ Deadline for the next OPTIMA is May 15, 1997.

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