

Newsletter on Computational and Applied Mathematics

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Aims and scope:

The CAM-newsletter is a newsletter intended for numerical analysts and applied mathematicians. Topics included are book reviews, announcements and reports of conferences outside the U.S.A., titles of institutional reports and available numerical software.

The contact persons will collect and pass the announcements of events taking place in their country. Institutions interested to insert in the newsletter the titles of their recent reports are kindly invited to send such information to the editors. Authors who are willing to distribute their numerical software for research purposes may use the column "available software". They should send a note to the editors containing a brief description of their programs and practical information for a potential user. Also bibliographies on special purpose software may be published in this column.

Contributions to the next issue should be sent to the editors before September 10, 1995.

1 Book reviews

Approximation and Computation

R.V.M. Zahar (ed.)

ISNM vol. 119, Birkhäuser, Boston, 1994, 46 + 591 pages

These are the proceedings of a conference held in honor of Walter Gautchi's sixty-fifth birthday at Purdue University, 1993. It contains a complete bibliography of Gautchi, which is commented upon by the author himself. In a sparkling text of about twenty pages, he reflects upon his youth and his career as a mathematician, explaining how, when and where these papers were conceived. This text is of invaluable interest to anybody caring about the modern history of computational mathematics.

W. Gautchi was mainly active in the domains of approximation, numerical quadrature and orthogonal polynomials. Thus, it is obvious that the thirty-eight refereed papers which were contributed to these proceedings are concentrating on these topics. Thirteen papers can be filed under approximation theory. The whole spectrum is represented: from polynomial interpolation to wavelets, real and complex approximation, in one and more variables. Six papers deal explicitly with computational aspects of orthogonal polynomials and their recurrence relations. Numerical quadrature is the main subject of nine papers and diverse aspects of special functions are discussed in the remaining nine papers. The majority of the leading mathematicians in these fields have contributed, making of these proceedings an exceptional collection of research papers presenting the latest results. There are no survey papers included though. Thus besides the historical interest of Gautchi's text, this book will be appealing mainly to researchers and Ph.D. students interested in current results in these aspects of computational mathematics.

A. Bultheel

Image Analysis, Random Fields and Dynamic Monte Carlo Methods

A Mathematical Introduction

Gerhard Winkler

Springer-Verlag Berlin Heidelberg New York ISBN 3-540-57069-1,

Springer-Verlag New York Berlin Heidelberg ISBN 0-387-57069-1,

1995, 324 pp., 59 illus., hard-cover. Price: US \$ 59.95

The book deals with the Bayesian analysis of images, which is a general framework in which various methods for digital image processing can be developed. The exploration of this area began in the 70's by researchers in applied mathematics and statistics, and soon led to the development of many applications. The Bayesian approach provides a solid theoretical basis for image processing and analysis. The resulting algorithms often perform significantly better than classic image processing algorithms.

The book contains 16 chapters with an average length of 17 pages, and includes an appendix, a list of 293 references and an index. The chapters are grouped into 6 parts, and are illustrated with drawings and images. The 3 chapters of Part 1 introduce the key concepts: the Bayesian paradigm, prior and posterior distributions and random fields. The 7 following chapters, that constitute Part 2 and 3, are devoted to the stochastic sampling and optimisation procedures that can be used to compute the resulting image, once the Bayesian model is specified. The 2 chapters of Part 4 generally discuss the application to texture analysis. Part 5 deals with the estimation of parameters. Part 6 comments on the link with neural networks and presents some more applications. The appendix briefly discusses additional theoretical topics and algorithms to generate pseudo-random variables for a number of distributions.

The book as a whole provides a quite good overview of basic Bayesian image analysis, with an emphasis on stochastic sampling and optimisation. The explanations are mathematically precise and the clear presentation makes the material well accessible. The book is certainly mathematically oriented. Although some examples are generally discussed, operational applications of

the approach, for instance in the segmentation of satellite images or in medical image processing, are hardly referred to. Some recent developments, such as multi-level random fields or coupled Markov Chain Monte Carlo methods, are not mentioned. There are also rather many spelling mistakes left in this edition. For instance, Chapter 14 is entitled "Spacial (*sic*) ML Estimation". It thus seems that the merits of the book are clarity, accessibility and a thorough mathematical introduction. These qualities largely compensate for the minor drawbacks. Concluding, the book can be recommended to readers who wish to learn about Bayesian image processing and particularly about stochastic sampling and optimisation.

M. Malfait

Lectures on Polytopes

Günter M. Ziegler

Eds.: J.H. Ewing, F.W. Gehring, P.R. Halmos, Volume 251, Springer-Verlag, 1995, Graduate Texts in Mathematics, ISBN 0-387-94329-3 (hard cover), ISBN 3-540-94329-3 (soft cover)

Polytopes are fundamental geometric objects. The following two definitions are commonly used as characterisations. A \mathcal{V} -polytope P is defined as the convex hull of a finite set of points $P = \text{conv}(V)$, $V \subset \mathbb{R}^d$. An \mathcal{H} -polytope is the intersection of finitely many half spaces $P = P(A, \mathbf{z})$, $A \in \mathbb{R}^{m \times d}$, $\mathbf{z} \in \mathbb{R}^m$.

The emphasis in the book is placed on the combinatorial aspects of polytope theory, with the methods (like Fourier-Motzkin, Gale diagrams, oriented matroids, etc.) that yield the results. It is the aim of the author to provide an introduction to polytope theory. Rather than being encyclopedic, the author wants to explain basic methods and modern tools in this interesting research field.

The titles of the lectures are the following:

0. Introduction and examples
1. Polytopes, Polyhedra, and Cones
2. Faces of Polytopes
3. Graphs of Polytopes
4. Steinitz' Theorem for 3-Polytopes
5. Schlegel Diagrams for 4-Polytopes
6. Duality, Gale Diagrams, and Applications
7. Fans, Arrangements, Zonotopes and Tilings

8. Shellability and the Upper Bound Theorem

9. Fiber Polytopes, and Beyond.

The book grew out of a graduate course taught at the Technische Universität Berlin. Basic linear algebra is the only prerequisite, though the reader is quickly confronted with current research methods. Each lecture contains a short introduction, which discusses the point of the treated material and which motivates reading. At the end of each lecture, notes are provided. These notes give more background information, pointers to the literature, and mention the current status of the open research problems. There are 38 pages of references to the literature and for each reference it is indicated on which page in the book it is cited. At the end of the book, a subject index can be found.

Pointers to existing software are mentioned and throughout the book some examples are given how to perform computations with it. The author succeeds in combining a narrative style with the presentation of mathematically sophisticated concepts. The accessibility of the material is also greatly enlarged by the fact that figures are preferred above an elaborated formal description. I have counted about 230 drawings, so the author nearly achieved his goal to present a picture at every page.

I have enjoyed reading the book very much and would like to recommend it to anyone interested in polytope theory.

J. Verschelde

Lattice methods for multiple integration

Ian H. Sloan and Stephen Joe

Oxford University Press, New York and Oxford 1994, ISBN 0-19-853472-8, xi+239 pages, 60 figures, Price: 55 US \$

It was a long time ago since a good book completely devoted to numerical methods for the evaluation of multiple integrals appeared. This book is about a recently developed method suited for integrals with many variables: the so-called lattice methods. Integrals with many variables arise e.g. in quantum physics and chemistry, statistical mechanics, Bayesian statistics.

The book is self-contained, which makes it very suitable for everyone who is not familiar with this

topic. In addition, the authors provided a guide for those who wish to skip the theory to move as quickly as possible to the applicable methods. The contents of the book is very well up-to-date, which is not a surprise if one knows the research activity of the authors in this area.

In the first chapter, a review of existing numerical methods for multiple integration is given.

In the following 8 chapters, lattice rules are introduced and analysed in all thinkable ways. The aspects of group theory and number theory that are needed, are nicely included. The text contains many examples and illustrations.

In chapter 10 the practical implementation of lattice rules is covered. An algorithm is presented along with tables, not available elsewhere, allowing the practical evaluation of multiple integrals in up to at least 12 variables.

In the final chapter lattice methods are compared with the Monte Carlo method and the global sub-region adaptive method. Plenty of numerical evidence is given to proof their usefulness.

In short: a book worth to buy and to read.

R. Cools

Finite Elements Analysis in Heat Transfer: Basic Formulation and Linear Problems
Series in Computational and Physical Processes in Mechanics and Thermal Sciences
 Gianni Comini, Stefano Del Giudice and Carlo Nonino

Taylor and Francis Ltd., 4 John Street, London WC1N 2ET, ISBN 1-56032-354-X, 1994, Price: 55 Pounds Sterling (hardback)

This book illustrates how the finite element methods can be applied to the analysis of conduction and convection problems. It is an introductory text suitable for undergraduate level engineering students with a basic knowledge of linear algebra, calculus and FORTRAN programming. The book deals with linear problems only and, consequently, the solution of problems involving heat transfer and fluid flow are only outlined. A FORTRAN program accompanies the book and is used extensively in problem solving.

The 463 pages in the book cover: Chapter 1: Discrete Physical Systems; introduces the finite element method through historical references and

simple examples. The computer implementation of matrix methods is also discussed. Chapter 2: Continuum Problems; discusses piecewise approximation and the method of weighted residuals for 2-D problems and their extension to simple 3-D axisymmetric problems. Chapter 3: Finite Element Discretization; extends the discussion to shape functions, 1-D elements, 2-D rectangular and triangular elements, and isoparametric transformations. Chapter 4: Numerical Techniques; illustrates numerical integration and the assembly of global matrices. Chapter 5: Implementation of the Finite Element Method; describes the computer program and provides listings of the subroutines used. Chapter 6: Conduction-Type Problems; presents a variety of problems involving heat and mass diffusion, laminar heat transfer and flow in ducts. Chapter 7: Convection-Type Problems; investigates areas such as thermally developing flow and transient forced convection. The book concludes with two appendices relating to the computer program accompanying the book, namely: Appendix A: Automatic Mesh Generation; describes the preprocessing of input data. Appendix B: Mesh and Contour Plots; looks at the plotting of 2-D meshes and contours. The results are device independent but require the user to write a program for graphical display. Finally, Appendix C: Nomenclature; concludes this informative and well presented book.

D.R. Emerson

Seventh SIAM Conference on Parallel Processing for Scientific Computing

David H. Bailey, Petter E. Bjorstad, John R. Gilbert, Michael D. Mascagni, Robert Schreiber, Horst D. Simon, Virginia J. Torczon and Layne T. Watson (eds.)

Society for Industrial and Applied Mathematics, 3600 University City Science Center, Philadelphia, PA 19104-2688, United States of America, ISBN 0-89871-344-7, February 1995, Price: \$ 105:00 (nonmember), \$ 84:00 (SIAM member),

This well established conference, which is held every two years, was recently held in San Francisco during February 15th and 17th, 1995. It forms

one of the main activities of the SIAM Activity Group on Supercomputing and provides one of the main forums for the applied mathematics community to disseminate recent work on parallel algorithms, parallel scientific applications, and tools for parallel processing. The continuing success of this conference is clearly demonstrated with the 189 papers contained within the proceedings. These papers range from full length contributed papers to short 2-page summaries of poster presentations. As indicated below, the scope of the meeting is extremely broad and illustrates the significant interest in all aspects of parallel processing.

The contents of this year's proceedings are divided into three distinct parts, namely: Part I - Applications; Part II - Algorithms; and Part III - Systems. Each section contains four chapters covering: Chapter 1 - Image, Signal and Information Processing; Chapter 2 - Optimization and Control; Chapter 3 - Computational Physics, which is further subdivided into Section A Fluid Dynamics, Section B Cellular Automata, and Section C Electrical, Structural, and Materials Engineering; Chapter 4 - Mathematical Applications; Chapter 5 - N-body Simulation; Chapter 6 - Partial Differential Equations; Chapter 7 - Sparse Linear Systems; Chapter 8 - Eigenvalues; Chapter 9 - Mesh Partitioning and Load Balancing; Chapter 10 - Languages and Compilers; Chapter 11 - Libraries and Runtime Systems; Chapter 12 - Visualization and Performance. In conclusion, Chapter 13 presents some short position papers resulting from a panel discussion on the topic "Is Scalable Parallel Computing A Myth?", a subject that has caused considerable debate over the past decade and will, no doubt, continue to do so over the next decade whilst the term "scalability" is (ab)used. The book is clearly a must for any library wishing to remain informed on state-of-the-art issues in parallel computing.

D.R. Emerson

2 Conferences

ICIAM'95

THE THIRD INTERNATIONAL CONGRESS ON
INDUSTRIAL AND APPLIED
MATHEMATICS

Date: 3-7 July, 1995.

Location: Hamburg, Germany.

Other information: CAM-Newsletter 10, nr.1.

Contact address:

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Univ. Regensburg, NWF I - Mathematik

D-93053 Regensburg, Germany

Tel.: +49-941-943-4918

Fax: +49-941-943-4005

MANNA 1995

INTERNATIONAL CONFERENCE ON
MATHEMATICS OF NEURAL
NETWORKS AND APPLICATIONS

Date: 3-7 July, 1995.

Location: Lady Margaret Hall, Oxford, U.K.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

Mrs R. Hawkins, School of Comp. and Maths
University of Huddersfield

Queensgate, Huddersfield HD1 3DH, U.K.

Tel.: 44+(0)484 472150

email: R.Hawkins@hud.ac.uk

CTAC95

SEVENTH BIENNIAL CONFERENCE ON
COMPUTATIONAL TECHNIQUES AND
APPLICATIONS

Date: 3-7 July, 1995.

Location: Swinburne Un. of Technology, Melbourne, Australia.

Organizers:

The Computational Mathematics Group of Australian and New Zealand Industrial and Applied Mathematics (ANZIAM)

Topics:

Computational methods applied to problems in engineering and science.

Invited Speakers:

- F. de Hoog (CSIRO, DMS) "Industrial applications"
- C. Micchelli (IBM, NY) "Neural networks"
- T. Murty (Nat. Tidal Facility, Flinders Un.) "Long gravity waves"
- M. Powell (Cambridge Un., UK) "Linear algebra and approximation"
- B. Spalding (CHAM, UK) "Computational fluid dynamics"

Other information:

The first three days will consist of standard conference presentations. It is intended that at least one session will be devoted to industrial applications. The conference will be followed by two days of workshops which will provide in-depth treatment of important recent developments in five particular areas of computational mathematics and computing technology:

- W1 Computational fluid dynamics and the use of packages such as Fastflo, CFDSFlow3d, Phoenix, Fidap.
- W2 Finite element methods and the use of packages such as STRAND, NASTRAN, ABAQUS, Dyna3D, Pafec.
- W3 Particle methods.
- W4 Surface fitting techniques and mesh generation.
- W5 Computational mathematics in the classroom.

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INTERNATIONAL IMACS-GAMM SYMPOSIUM
 ON
 NUMERICAL METHODS AND
 ERROR-BOUNDS

Date: 9–12 July, 1995.

Location: Un. Oldenburg, Germany.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

Prof. Dr. J. Herzberger
 Fachbereich Mathematik
 Universität Oldenburg 26111 Oldenburg
 Germany

CONFERENCE ON
 LINEAR ALGEBRA AND ITS
 APPLICATIONS

Date: 10–12 July, 1995.

Location: The University of Manchester, England.

Other information: CAM-Newsletter 10, nr. 2.

Contact address:

Miss Pamela Irving, The Conference Officer
 The Inst. of Mathematics and Its Applications
 Catherine Richards House
 16 Nelson Street
 Southend-on-Sea, Essex, SS1 1EF, UK
 Tel.: 0702 354020
 Fax: 0702 354111

SANUM '95
 SOUTH AFRICAN SYMPOSIUM ON
 NUMERICAL MATHEMATICS

Date: 10–12 July, 1995.

Location: Cutty Sark Hotel, Scottburgh, South Africa.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

Dr. Lucas Venter
 Department of Mathematics
 Potchefstroom University for Christian Higher
 Education
 2520 Potchefstroom
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INTERNATIONAL RESEARCH INSTITUTE ON NONLINEAR WAVES

Date: 10–21 July, 1995.

Location: Sapporo, Japan.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

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MODELLING AND OPTIMIZATION OF DISTRIBUTED PARAMETER SYSTEMS WITH APPLICATIONS TO ENGINEERING

Date: 17–21 July, 1995.

Location: Warsaw, Poland.

Other information: CAM-Newsletter 10, nr. 3.

Contact address:

Dr. Malgorzata Peszynska

IFIP Conference

Systems Research Institute

Polish Academy of Sciences

Newelska 6, PL-01-447 Warsaw

POLAND

Tel: (4822) 364414, 370521

Fax: (4822) 372772

email: ifip@ibspan.waw.pl

CONFERENCE ON OPTIMIZATION

Date: 17–19 July, 1995.

Location: Braga, Portugal.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

Conference on Optimization '95

Departamento de Producao e Sistemas

Escola de Engenharia

Universidade do Minho

4700 Braga, Portugal

Tel.: + 351-53-604455

Fax: + 351-53-604456

email:copt95@ci.uminho.pt

THIRD INTERNATIONAL CONFERENCE ON COMPUTER METHODS IN WATER RESOURCES

Date: 2–4 August, 1995.

Location: Beirut, Lebanon.

Other information: CAM-Newsletter 11, nr. 1.

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INTERNATIONAL CONFERENCE ON NUMERICAL APPROXIMATION AND APPLICATIONS

Date: 14–18 August, 1995.

Location: Dalian, P.R. China.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

Prof. Ren-Hong Wang

Institute of Mathematical Sciences

Dalian University of Technology

Dalian 116024, P.R. China

Tel.: 86-411-4709359

Fax: 86-411-4671009

email: Chenggd@bepc2.ihep.ac.cn

SIXT INTERNATIONAL COLLOQUIUM ON DIFFERENTIAL EQUATIONS

Date: 18-23 August, 1995.

Location: Plovdiv, Bulgaria.

Other information: CAM-Newsletter 10, nr. 3.

Contact address:

Stoyan Zlatev

Mathematical Faculty of the Plovdiv Un.

Tsar Assen Str. 24

Plovdiv 4000

Bulgaria

SECOND INTERNATIONAL CONFERENCE ON
THEORETICAL AND COMPUTATIONAL
ACOUSTICS

Date: 21–25 August, 1995.

Location: Waikiki Beach, Hawaii.

Other information: CAM-Newsletter 10, nr. 2.

Contact address:

Dr. Ding Lee (Code 3122)
Naval Undersea Warfare Center
Detachment New London
New London, CT 06320, U.S.A.
Tel.: 203-440-4438
Fax: 203-440-6228

BIOMATH-95
MATHEMATICAL MODELLING AND
INFORMATION SYSTEMS
IN BIOLOGY, ECOLOGY AND MEDICINE

Date: 23–27 August, 1995.

Location: Sofia, Bulgaria.

Organizers:

Bulgarian Academy of Science, Institut for Informatics, University of Basel IMACS/Bulgaria, The Biomathematical Society.

Topics:

- biomathematics, bioinformatics, biostatistics, biomechanics, bioautomatics;
- mathematical problems from biophysics, biochemistry, biotechnology, bioengineering;
- mathematical modelling in biology, ecology and medicine;
- information systems, knowledge based systems, knowledge engineering and intelligent data processing, program packages and problem solving environments supporting biological and medical applications;
- mathematical immunology, mathematical neurophysiology, mathematical ecology, population dynamics, enzyme kinetics;
- mathematical models, involving uncertain (set-valued, interval-valued, fuzzy set-valued etc.) input data, validated numerics, enclosure methods involving automatic result verification and the use of parallel architectures (especially for solving typical biomathematical problems);

- particular modelling situations and case studies underlying the above aspects.

Contact address:

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CDE ' V
DIFFERENTIAL EQUATIONS AND
APPLICATIONS

Date : 24–29 August, 1995.

Location: Rousse, Bulgaria.

Sponsors:

Technical Un. Rousse, Bulgaria Centre of Mathematics and Informatics, Union of Bulgarian Mathematicians.

Topics:

The Conference aims to bring together mathematicians, physicists and engineers with common interests in the field of Differential Equations and to discuss the theory and applications of the various techniques in the broad sense. The purpose of the Conference is to make available new methods and applications of Differential Equations in the following topics:

1. Ordinary Differential Equations
2. Partial Differential Equations
3. Numerical Methods for Differential Equations
4. Applications of Differential Equations

Invited lecturers:

Ovide Arino (France), Sergej Bolotin (Russia), Myron Grammatikopoulos (Greece), Alois Kufner (Czech Republic), Yurii A. Kuznetsov (Russia), Stanislav Pohozaev (Russia), Edward H. Twizell (U.K.), Peter Vabishchevich (Russia), Pietro Zecca (Italy), Zahari Zlatev (Denmark).

Other information:

The scientific programme will consist of invited lectures (45 min). and contributed communications (20 and 30 min).

The Registration fee is \$ 180.

Contact address:

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 Centre of Mathematics and Informatics
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 7017 Rousse, Bulgaria
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ECCTD 95

EUROPEAN CONFERENCE ON
CIRCUIT THEORY AND DESIGN

Date: 27-31 August, 1995.

Location: Istanbul, Turkey.

Other information: CAM-Newsletter 10, nr. 3.

Contact address:

ITU-ETA Vakfi
 P.K. 34, Ataturk Havalimani
 34831, Istanbul, Turkey
 Tel: (90-212) 246 60 47 ext. 12
 Fax: (90-212) 240 13 49

IMACS EUROPEAN SIMULATION MEETING ON
SIMULATION TOOLS AND
APPLICATIONS

Date: 28-30 August, 1995.

Location: Győr, Hungary.

Other information: CAM-Newsletter 10, nr. 3.

Contact address:

IMACS European Simulation Meeting
 c/o Prof. Dr. A. Jávör
 Scientific Soc. of Measurement and Automation
 H-1372 Budapest, P.O. Box 451, Hungary
 Fax: +36 1 1531406
 email: h7024vig@ella.hu

XVIII CNMAC- CONFERENCE ON
COMPUTATIONAL AND APPLIED
MATHEMATICS

Date: 28 August-1 September, 1995.

Location: Un. of Parana at Curitiba, Brazil.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

SECRETARIA EXECUTIVA DA SBMAC - RJ
 Rua Lauro Muller, 455, Botafogo
 CEP 22290-160, Rio de Janeiro, RJ, BRASIL
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EUROSIM SIMULATION CONGRESS

Date: 11-15 September, 1995.

Location: Vienna, Austria.

Other information: CAM-Newsletter 10, nr. 3

Contact address:

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 Tech. Un. of Vienna, Wiedner Haupstr. 8-10
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 email: eurosim95@email.tuwien.ac.at

INTERNATIONAL EUROCONFERENCE
ADVANCED MATHEMATICAL TOOLS IN
METROLOGY

Date: 27-30 September, 1995.

Location: Lady Margaret Hall, Oxford, UK.

Other information: CAM-Newsletter 11, nr. 1.

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CUBATURE FORMULAE AND THEIR
APPLICATIONS

Date: 9-15 October, 1995.

Location: Krasnoyarsk, Russia.

Organizers:

Mikhail V. Noskov, Ronald Cools, Marat D. Ramazanov, Iakov M. Zhileikin, Anatolii M. Fedotov.

Topics:

Quadrature and cubature formulae; theory, constructions and applications.

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INTERNATIONAL CONFERENCE ON
PARALLEL ALGORITHMS

Date: 15–19 October, 1995.

Location: Wuhan Un., Wuhan, China.

Other information: CAM-Newsletter 11, nr. 1.

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ESS 95
7TH EUROPEAN SIMULATION
SYMPOSIUM

Date: 26–28 October, 1995.

Location: Erlangen-Nuremberg, Germany.

Topics:

- Simulation Methodology and Applications
- Computer and Telecommunication Systems
- Dependability Evaluation
- Analytical and Numerical Modelling Techniques
- Simulation in Automation
- Simulation in Business
- Symposium: Mission Earth.

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ICPAM95
INTERNATIONAL CONFERENCE ON
PURE AND APPLIED MATHEMATICS

Date: 19–22 November, 1995.

Location: University of Bahrain, Bahrain.

Other information: CAM-Newsletter 10, nr. 3.

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THIRD WORKSHOP ON
GLOBAL OPTIMIZATION

Many technical, environmental and economic problems have challenging optimizational aspects which require reliable and efficient solution methods. A substantial part of such problems belongs to the class of nonlinear and nonconvex optimization problems where standard optimization methods fail since local optima different from the global ones (which we aim to find) exists (global optimization).

Date: 10–14 December, 1995.

Location: Szeged, Hungary.

Topics:

The workshop focuses on theoretical, modelling and algorithmic issues of global optimization problems with special emphasis to their real-life applications. The workshop aims to discuss and develop furthestmost recent results in the wide

range of the many diverse approaches to global optimization problems.

Contact address:

Tibor Csendes
Jozsef Attila Un., Institute of Informatics
H-6701 Szeged, P.O. Box 652, Hungary
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Fax: +36 62 312 292
email: globopt@inf.u-szeged.hu

WINTER SCHOOL ON
ITERATIVE METHODS

Date: 14–20 December, 1995.

Location: The Chinese Un. of Hong Kong.

Objectives:

To provide an intensive one week training course in state-of-the-art iterative methods in scientific computing for senior graduate students, post-doctoral researchers and lecturers in universities and practitioners in industry. It is hoped that after the course, the attendees will be familiar with the basic theories and algorithms, as well as potential application areas and the vast and fast developing literature.

Invited Lecturers:

Tony Chan (USA), Jack Dongarra (USA), Howard Elman (USA), Gene Golub (USA), Franklin Luk (USA), David Silvester (UK), Gilbert Strang (USA), Henk van der Vorst (The Netherlands), Andy Wathen (UK), Jinchao Xu (USA),

Other Information:

Each main speaker will give three 40-min lectures. There will also be several other lectures given by speakers from the Asian region. There will be 5-6 lectures per day except for the fourth day which will be reserved for excursion or social activities. Demonstration and exercise sessions will be at the end of each day. Topics to be covered include: Basic theory, parallel algorithms and applications. Lecture notes of the School will be distributed to attendees. Polished version of the lecture notes will be published later for general international distribution. The registration fee is US\$100 which includes all lecture notes.

Contact address:

Dr. K.M. Yeung, Department of Mathematics
Chinese University of Hong Kong
Shatin, Hong Kong
Fax: +(852) 2603-5154
email: kmyeung@cuhk.hk

CONFERENCE ON
STATE OF THE ART IN
NUMERICAL ANALYSIS

Date: 1–4 April, 1996.

Location: University of York, U.K.

Sponsor:

IMA: the Institute of Mathematics and its Applications.

Other information:

Highly successful IMA meetings on the subject have previously taken place, most recently in Birmingham in 1986, and in York in 1976. As before, all speakers will be invited, and attention will be given to a wide range of important subjects in numerical analysis.

Contact address:

Mrs. Pamela Bye, Conference Officer
The Inst. of Mathematics and its Applications
Catherine Richards House
16 Nelson Street
Southend-on-Sea
Essex, SS1 1EF
Tel: (01702) 354020
Fax: (01702) 354111
email: IMACRH@V-E.ANGLIA.AC.UK

BETECH 96
BOUNDARY ELEMENT TECHNOLOGY

Date: 24–26 April, 1996.

Location: Hawaii, USA .

Topics:

- Aerodynamics
- Fluid Flow
- Heat Transfer
- Inverse Problems
- Stress Analysis
- Acoustics

- Structure-Fluid Interaction
- Vibrations and Dynamics, etc.

Contact address:

Liz Kerr
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Ashurst Lodge, Ashurst
Southampton SO40 7AA, UK
Tel: +44 1703 293223
Fax: +44 1703 292853
email: CMI@ib.rl.ac.uk

THIRD INTERNATIONAL CONFERENCE
ELECTROSOFT 96
SOFTWARE FOR ELECTRICAL ENGINEERING
ANALYSIS AND DESIGN

Date: 28–30 May, 1996.

Location: San Miniato, Italy.

Organizer: Wessex Institute of Technology, UK.

Topics:

- Interfaces
- Package Design
- Packages
- Software Engineering
- Numerical
 - circuit numerical analysis
 - expert system software
 - modelling semiconductor devices
- Symbolic Computation
- Parallel Computation
 - parallelism, circuit analysis
 - parallelism, finite and boundary elements
 - data structures for parallel computing
 - parallel software architecture.

Contact address:

Paula Doughty-Young, Conference Secretariat
Wessex Institute of Technology
Ashurst Lodge
Ashurst, Southampton, SO40 7AA, UK
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Fax: 44 (0) 1703 292853
email: CMI@ib.rl.ac.uk

FOURTH INTERNATIONAL CONFERENCE
LOCALISED DAMAGE 96
COMPUTER AIDED ASSESSMENT AND CONTROL

Date: 3–5 June, 1996.

Location: Fukuoka, Japan.

Organizers:

- Wessex Inst. of Technology, Southampton, UK
- Kyushu University, Fukuoka, Japan.

Topics:

- Fracture Mechanics and Fracture Criteria
- Crack Propagation and Control
- Fatigue
- Failure Analysis
- Creep and High Temperature Problems
- Plasticity and Viscoplasticity
- Environmental Effects
- Residual Stress
- Damage Mechanics
- Composite Materials
- Dynamic Fracture
- Design Consideration and Industrial Applications
- Knowledge Base System
- Microstructural and Micromechanical Modelling
- Finite Elements, Boundary Elements and other Advanced Numerical Techniques.

Contact Address:

Jane Evans
Conference Secretariat LD96
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton SO40 7AA, UK
Tel: 44 (0) 703 293223
Fax: 44 (0) 703 292853
email: CMI@ib.rl.ac.uk

ALGEBRAIC MULTILEVEL ITERATION METHODS WITH APPLICATIONS

MAFELAP 1996

Date: 13–15 June, 1996.

Location: Un. of Nijmegen, The Netherlands.

Topics: The purpose of the conference is to provide a forum for the presentation and the discussion of recent progress in the analysis, implementation and applications in various fields of algebraic multilevel iteration methods in a broad sense. This includes their implementation on massively parallel computers. Topics covered include Algebraic Multilevel Iteration methods for

- second and fourth order elliptic scalar equations and systems of equations,
- mixed variable variational problems,
- nonselfadjoint problems and indefinite matrix problems,
- inner-outer iteration methods,
- parallel implementations, efficiency measures, scalability,
- robust implementations, i.e. convergence uniform with respect to meshsize parameter and singular perturbation parameters,
- applications for Navier's equations and Stokes problem,
- applications outside partial differential equation problems,
- applications for nonlinear problems, such as electromagnetic field, plastic flow, Navier-Stokes, and Miscible displacement problems.

Other information: Papers intended for presentation at the conference should be submitted to Owe Axelsson before August 31, 1995. The papers accepted for presentation at the conference are planned to appear in a proceedings volume ready for the conference. Some selected papers of original content will be considered for publication in a special issue of Numerical Linear Algebra with Applications. All papers will be refereed according to the editorial policy of this journal.

Contact address:

Prof. Owe Axelsson, Fac. of Math. & Inform.
Toernooiveld 1, NL-6525 ED Nijmegen
The Netherlands
Fax: 31(0)80652140
email: axelsson@sci.kun.nl

Date: 25–28 June, 1996.

Location: Brunel Un., Uxbridge, Middlesex, U.K.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

The Secretary, MAFELAP 1996, BICOM
The Brunel Inst. of Computational Maths
Brunel University, Uxbridge UB8 3PH, U.K.
email: mafelap@brunel.ac.uk

PRAGUE MATHEMATICAL CONFERENCE 1996

Date: 8–12 July, 1996.

Location: Prague, Czech Republic.

Organizers: The Math. Inst. of the Ac. of Sciences, the Fac. of Maths and Physics of the Charles Un., the Inst. of Computer Science of the Ac. of Sciences and the Union of Czech Mathematicians and Physicists, in cooperation with the Patriae Foundation

Topics: The aim of the conference is to bring together people from different disciplines who work in the fields of ordinary and partial differential equations, linear algebra, and functional analysis and people who are interested in the numerical treatment of problems from these fields and their applications.

Other information: Invited lectures will be given in honor of Ivo Babuska, Miroslav Fiedler, Jaroslav Kurzweil, and Vlastimil Ptak, who laid the foundations of several branches of modern mathematics, on the occasion of their 70th birthdays.

The five-day program will consist of invited lectures, short communications in parallel sessions, and poster sessions.

Contact address:

Prague Mathematical Conference 1996
Math. Inst. of the Academy of Sciences
Žitná 25, CZ-115 67 Praha 1
Czech Republic
Tel: (+42 2) 2421 3973
Fax: (+42 2) 2422 7633
email: pmc96@earn.cvut.cz

NUMERICAL METHODS AND
COMPUTATIONAL MECHANICS
IN SCIENCE AND ENGINEERING

The aim of the conference is to bring together numerical analysts, specialists of computational mechanics and numerical software developers. The conference will focus on numerical methods used in mechanical and other engineering applications. Special attention will be paid to the finite element method and related techniques.

Date: 15–19 July, 1996.

Location: Miskolc, Hungary.

Organizers:

Janos Bolyai Mathematical Society, University of Miskolc, Hungarian Academy of Sciences.

Topics:

- Numerical algebra (sparse and dense linear systems, eigenvalue problems, nonlinear systems, parallel algorithms, etc.)
- Numerical solution of differential equations (FEM, BEM, multigrid, difference methods, spectral methods, parallel algorithms, etc.)
- Computational mechanics (FEM, BEM, parallel algorithms).

Contact address:

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Fax: 36-46-365174
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CONFERENCE ON
NUMERICAL MATHEMATICS
(CELEBRATING THE 60TH BIRTHDAY OF
M.J.D. POWELL)

Date: 27–30 July, 1996.

Location: University of Cambridge, England.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

A. Iserles
Dept. of Appl. Maths and Theor. Physics
Silver Street, Cambridge CB3 9EW, U.K.
email: ai@amtp.cam.ac.uk

INTERNATIONAL CONFERENCE ON
NONLINEAR PROGRAMMING

Date: 2–5 September, 1996.

Location: Beijing, China.

Organizers:

The Chinese Academy of Sciences and the Chinese Natural Science Foundation.

Invited Speakers:

J. Burke, R. Byrd, A.R. Conn, J. More, J. Nocedal, M.J.D. Powell, R.B. Schnabel, K. Tanabe, R. Tapia, Ph. Toint, H. Wolkowitz, M.H. Wright.

Other information:

A limited number of short (20 minutes) papers will be accepted for presentation. Papers on theoretical, computational and practical aspects of nonlinear programming are welcome.

There will be no parallel sessions. Apart from the invited lectures and submitted short talks, there will be also discussion sessions. The conference proceedings will be published by an international publisher, and all the papers will be reviewed.

Contact address:

Prof. Ya-xiang Yuan
State Lab. of Scientific and Eng. Computing
ICMSEC, Chinese Academy of Sciences
P.O. Box 2719, Beijing 100080, China
Tel: +86-10-255-9001, +86-10-254-5820
Fax: +86-10-254-2285
email: yyx@lsec.cc.ac.cn

ECCOMAS 96
NUMERICAL METHODS IN
ENGINEERING
COMPUTATIONAL FLUID DYNAMICS

Date: 9–13 September, 1996.

Location: Paris, France.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:

ECCOMAS 96, Université de Paris VI
Laboratoire d'Analyse Numérique
4, Place Jussieu
75252 Paris Cedex 05, France
email: eccomas96@ann.jussieu.fr

3 Institutional reports and doctoral theses

DEPARTEMENT OF COMPUTER SCIENCE
K.U.LEUVEN
CELESTIJNENLAAN 200A
B-3001 HEVERLEE (LEUVEN), BELGIUM

Reports:

- TW-216 R. Van Driessche and D. Roose: A spectral algorithm for constrained graph partitioning I: the bisection case.
- TW-217 P. Verlinden: p-adic Euler-Maclaurin expansions.
- TW-218 K. Lust, D. Roose, A. Spence and A.R. Champneys: An adaptive Newton-Picard algorithm with subspace iteration for computing periodic solutions.
- TW-219 K. Meerbergen and A. Spence: A spectral transformation for finding complex eigenvalues of large sparse non symmetric matrices.
- TW-220 R. Cools, D. Laurie and L. Pluym: Cubpack++: a C++ package for automatic two-dimensional cubature.
- TW-221 R. Cools, D. Laurie and L. Pluym: A user manual for Cubpack++.
- TW-222 J. Verschelde, K. Gatermann and R. Cools: Mixed volume computation by dynamic lifting applied to polynomial system solving.
- TW-223 R. Cools and A. Reztsov: Different quality indexes for lattice rules.
- TW-224 M. Van Barel and A. Bultheel: A look-ahead algorithm for the solution of block Toeplitz systems.
- TW-225 K. Meerbergen and A. Spence: Implicitly restarted Arnoldi with purification for the shift-invert transformation.
- TW-226 P. Verlinden: A real zero diminishing homotopy for an exponential or trigonometric polynomial.
- TW-227 K. Willemans and P. Dierckx: Smoothing scattered data with a monotone Powell-Sabin spline surface.
- TW-228 M. Malfait and D. Roose: Wavelet based image denoising II: Wavelet based image denoising using a Markov Random Field a priori model.

INSTITUT FÜR ANGEWANDTE MATHEMATIK
DER UNIVERSITÄT BONN
SONDERFORSCHUNGSBEREICH 256
WEGELERSTR. 6
D - 53115 BONN

Reports:

- 370. Vladimir I. Bogachev and Michel Röckner: Regularity of Invariant Measures on Finite and Infinite Dimensional Spaces and Applications.
- 371. Vladimir I. Bogachev, Michel Röckner and Byron Schmuland: Generalized Mehler Semigroups and Applications.
- 372. Frank Duzaar and Joseph F. Grotowski: A Mixed Boundary Value Problem for Energy Minimizing Harmonic Maps. To be published in: Math. Z.
- 373. Eberhard Bänsch: Anisotropic Interpolation Estimates.
- 374. Catherine Bandle and Martin Flucher: Harmonic Radius and Concentration of Energy, Hyperbolic Radius and Liouville's Equations $\Delta u = e^u$ and $\Delta u = u^{\frac{n+2}{n-2}}$.
- 375. Vladimir I. Bogachev, Giuseppe Da Prato and Michael Röckner: Regularity of Invariant Measures for a Class of Perturbed Ornstein-Uhlenbeck Operators.
- 376. Martin Fuchs: Lipschitz Regularity for Certain Problems from Relaxation.
- 377. Martin Fuchs and Jürgen Reuling: Non-Linear Elliptic Systems Involving Measure Data.
- 378. Song Jiang: Exponential Stability of Spherically Symmetric Solutions to the Equations of a Viscous Polytopic Ideal Gas.
- 379. Alain Bensoussan and Jens Frehse: Papers on Ergodic Bellmann Equations and Systems.
- 380. Hans Wilhem Alt Cornelius J. van Duijn: A Free Boundary Problem Involving a Cusp. Part II: Local Analysis.
- 381. Richard B. Dickinson and Robert I. Tranquillo: Transport Equations and Indices for Random and Biased Cell Migration Based on Single Cell Properties. To be published in: SIAM J. Appl. Math.
- 382. Song Jiang: Global Spherically Symmetric Solutions to the Equations of a Vis-

- cous Polytropic Ideal Gas in an Exterior Domain.
383. Reinhard Farwig and Hermann Sohr: Weighted Energy Inequalities for the Navier-Stokes Equations in Exterior Domains.
 384. Robert T. Tranquillo and Wolfgang Alt: Stochastic Model of Receptor-Mediated Cytomechanics and Dynamic Morphology of Leukocytes.
 385. Jaime E. Muñoz Rivera and Reinhard Racke: Large Solutions and Smoothing Properties for Nonlinear Thermoelastic Systems.
 386. Alain Bensoussan and Jens Frehse: Papers on Elastic Problems and H^1 -Regularity.
 387. Thomas Strobel: The Burgers Equation as Hydrodynamic Limit of the Exclusion Process with Boundary Condition.
 388. Sergio Albeverio, Zhi-Ming Ma and Michael Röckner: Potential Theory of Quasi-Regular Dirichlet Forms without Capacity. To be published in: Proceedings to "International Conference on Dirichlet Forms and Statistic Processes", Beijing 1993.
 389. Sergio Albeverio, Ru-Zong Fan, Michael Röckner and Wilhem Stannat: A Remark on Coercive Forms and Associated Semigroups. To be published in: Proceedings zur Tagung "Partial Differential Equations" Holzgau 1994.
 390. Honggang Yang and Qing-Ming Cheng: Chern's Conjecture on Minimal Hypersurfaces.
 391. Vladimir I. Bogachevimir, M. Röckner and Byron Schmulad: Generalized Mehler Semigroups and Applications.
 392. Meinhard Wohlgemuth: Higher Genus Minimal Surfaces of Finite Total Curvature.
 393. Monika Wierse: Higher Order Upwind Schemes on Unstructured Grids for the Compressible Euler Equations in Timedependent Geometries in 3D. To be published in: Proceedings of 10th GAMM-Seminar. Fast Solvers for Flow Problems. Proceedings der 5. Internationalen Konferenz on Hyperbolic Problems, Stony Brook, 1994.
 394. Jörg-Uwe Löbus: Closability of Positive Symmetric Bilinear Forms under Non-Regularity Assumptions and its Probabilistic Counterpart.
 395. Alberto Arosio: Averaged Evolution Equations. The Kirchhoff String and its Treatment in Scales of Banach Spaces.
 396. Vicente Cortés: Alekseevskian Spaces.
 397. Felix Otto: L^1 -Contraction and Uniqueness for Quasilinear Elliptic-Parabolic Equations.
 398. Reinhard Farwig and Hermann Sohr: Weighted L_q -Theory of the Stokes Resolvent in Exterior Domains.
 399. Ursula Hamenstädt: Harmonic Measures for Compact Negatively Curved Manifolds.
 400. Sebastian Noelle: A Note on Entropy Inequalities and Error Estimates for Higher Order Accurate Finite Volume Schemes on Irregular Families of Grids.
 401. Leonardi Salvatore Wenge Hao and Mark Steinhauer: Examples of Discontinuous, Divergence-Free Solutions to Elliptic Variational Problems.
 402. Gregory Seregin: Continuity for the Strain Velocity Tensor in Two-Dimensional Variational Problems from the Theory of the Bingham Fluid.
 403. Markus Stoth: Variable Coefficients for the Wave Equation as Short Range Perturbations.
 404. Robert Pilz: On the Thread Problem for Minimal Surfaces.
 405. Karsten Große-Brauckmann: Stable Constant Mean Curvature Surfaces Minimize Area. To be published in: Pacific Journal.
 406. Ursula Hamenstädt: Harmonic Measures Realized as Hausdorff Measures.
 407. Felix Otto: A Regularizing Effect of Nonlinear Transport Equations.

NEWSLETTER ON COMPUTATIONAL AND APPLIED MATHEMATICS

Vol. 11., no. 2, July 1995

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