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 operations software may be published in this column.

Contributions to the next issue should be sent to the editors before May 10, 1999.
1 Books

Projection Methods for Systems of Equations. C. Brezinski

The literature about iterative solution of systems of linear and nonlinear equations is very extensive, especially in the last few decades, there has been an explosion of papers and books related to the subject. In this book Claude Brezinski has written down his insights in this chaos of methods and approaches. He gives unifying frameworks to classify and understand the many different methods. The underlying idea is that in all these methods, the large problem at hand is somehow projected onto a smaller subspace and these projections are computed iteratively, so that the computations are fast. These projections can be orthogonal or oblique and often the relation with formal orthogonal or biorthogonal polynomials is obvious, but also the relation with several extrapolation (i.e., convergence accelerating) methods is explained. The emphasis is on methods for linear systems, but there is also an extensive chapter on the generalization of these methods to nonlinear systems. The book is intended for researchers in the field who will greatly appreciate it not only for providing this unifying framework but they will certainly make use of it as an excellent guide to the literature. There is a long list of 560 references and at many instances in the text, the reader is referred to them for further detail. Sometimes these references are of some historical interest, since they indicate where some idea was introduced for the first time. The book contains also several new ideas that at the present state of the art may not have been fully explored yet. For example, there is a chapter on hybrid procedures that combine several iterative methods to get the best out of several worlds. Also semi-iterative methods based on them are explored and the ideas around Richardsons projection are not generally known. In conclusion, the book is intended for researchers in the field, but can also be read by advanced students, for whom it may open opportunities for new directions of research. However, it can also be useful for practitioners who want to learn about the most recent evolutions.

A. Bultheel


Like in several other handbooks, the format taken in this volume is a compilation of many chapters on diverse subjects, written by specialists. The chapters are on average between 20 and 30 pages long. Each of the subjects is introduced and described for the non-specialist. A survey of modern methods, theory, techniques and algorithms is given so that the reader has a general idea of what the topic and even what current research about this topic is all about. The trailing sections of each chapter are always following the same pattern. There is a section entitled “Research issues and summary”. Here the reader is given an executive summary and an outline of more advanced current research and/or open problems is provided. The next section is called “Defining terms” and contains a dictionary of relevant terms with “one-liner” definitions. Using the extensive global index at the end of the volume, it is possible to find the chapter(s) related to the word or phrase that one is looking up. If the short definition is not sufficient, then the paper can be consulted to learn about the context. Of course, every chapter has a list of relevant references containing general works, but also specialized papers. The last section of every chapter is called “Further information”. Here the reader will find additional references to the literature for further reading (if this was not included before) but also references to web pages, recurrent conferences, and/or scientific journals where more information is available and where he/she can update his/her knowledge and be informed about new results that may become available in the future.

Compiling a handbook on such a broad field will always be a risky enterprise because there will always be critics who claim that such or such a subject should have been included. It is difficult to be complete, not being too elementary and yet remain readable for a broad readership, or being
up-to-date in a constantly changing landscape. The selection of topics and the depth of discussion will always reflect to some extent the opinion and interests of the editor and the authors. I do not think that it is relevant to comment on these matters. Given the choice that has been made, this compilation has resulted in a remarkable and surprisingly homogeneous volume, covering a broad and diverse field of theory and algorithms.

Instead of listing the titles of the 48 chapters, I will include some subjects that are discussed. Rather basic are: design and analysis of algorithms, searching and sorting, graphs and related combinatorial algorithms, statistical analysis of algorithms, computational algebra, data structures, computational geometry, computational complexity, cryptography, parallel and distributed computing. More applied are: text processing, applications of FFT, robot algorithms, vision and image processing, electronic cash and other applications of crypto systems. Some subjects are elaborated on a more advanced level: computational complexity (4 chapters), cryptography (6 chapters), and operations research (linear and integer programming, convex optimization, scheduling, AI search, simulated annealing). A book that deserves a place in any computer science library.

A. Bultheel

Linear Algebra, Rational Approximation and Orthogonal Polynomials. A. Bultheel and M. Van Barel

The relationship between rational approximation, orthogonal polynomials and iterative methods of numerical linear algebra is a well studied subject in a tremendous number of papers in the last 100 years. Moreover, similar relationships have been discovered and rediscovered over the years, like the relationship to realization theory, continued fractions, Toeplitz and Hankel matrices and in particular, all of the different versions of the Euclidean algorithm. Most researchers who work in this field have studied and contributed in different ways to these developments and this is an ongoing process.

It was recognized for a long time already that somehow all these relationships should be presented together in one monograph, a task which would have seemed to be an impossible task to me. But here it is. The authors have put it together in one book which links these concepts via the Euclidean algorithm.

The first chapter gives an abstract treatment of the euclidian algorithm via continued fractions. Chapter two then deals with Hankel matrices and the relation between Gram–Schmidt orthogonalization, Schur's algorithm and the Viscovatoff algorithm, a variation of the Euclidean algorithm. In Chapter three then the Lanczos tridiagonalization algorithm and its relationship to the Euclidean algorithm is studied. Chapter four deals with orthogonal polynomials and the relationship to Toeplitz and Hankel matrices, the Euclidean and the Lanczos algorithm. The next step is then Padé approximation in Chapter 5 and partial realizations in Chapter 6. The book concludes with chapters on rational interpolation and some remarks on wavelets.

As one can see, each of the presented topics itself is worth a monograph and hence it is quite amazing how the authors succeed in putting all this together in one.

The book will be a major reference book for people working in these areas and also mark a starting point for future research.

Due to the large amount of material in some parts the presentation is short and also the notation is sometimes a bit clumsy which decreases the reading pleasure, but on the other hand nobody probably could have done it much better.

The community should be really thankful to the authors for putting this material together and I strongly recommend this book for every researcher in this area although not necessarily as a text book for a graduate course.

V. Mehrmann

Markov Chain Monte Carlo: Stochastic Simulation for Bayesian Inference. Dani Gamerman
This book is based on lecture notes for a short course taught by Prof. D. Gamerman at the XII meeting of Brazilian Statisticians and Probabilists in Caxambu in August 1996. It is a book about statistical inference: techniques to perform Bayesian inference based on stochastic simulation are described. The title of the book refers to simulation through Markov chains. MCMC techniques embed a distribution as a limiting distribution of a Markov chain and simulate from the chain until it approaches equilibrium. Chapter 1 discusses stochastic simulation. A description of the generation of discrete and continuous random quantities, of random vectors and matrices is given, and some resampling methods are explained.

Chapter 2 deals with Bayesian inference. The Bayesian approach is characterized by the incorporation of unobserved information. In order to combine historic and data information Bayes' theorem is applied. Conjugate distributions are discussed for the exponential family. The obtained results are extended to normal regression and the role of conditional conjugacy is emphasized. The last sections of this chapter treat hierarchical and dynamic models.

'Approximate methods of inference' is Chapter 3's title. The analysis of asymptotic approximations consists of normal approximations, mode calculation, standard and exponential form Laplace approximations. Other techniques presented are approximations by Gaussian quadrature, Monte Carlo integration and methods based on stochastic simulation. Complex models, having highly-dimensional parameter spaces, such as hierarchical and dynamic models are difficult to approach for complete inference because of the increased complexity of the applied techniques. The subject of Chapter 4 is Markov chains. This chapter's purpose is to clarify the theory governing the iterative simulation techniques used in later chapters. The definition of Markov chains, illustrations of transition probabilities, decomposition of the state space and the importance of stationary distributions for simulation through Markov chains are discussed items. The chapter states limiting theorems for chains with established ergodicity, defines reversible chains, reviews definitions and theorems for the case where the state space is continuous and, finally, ends with a simulation of a Markov chain and an example of data augmentation.

Chapter 5 focuses on Gibbs sampling, one of the main MCMC methods used nowadays. This chapter defines Gibbs sampling, discusses its properties and explains how to form and use a sample and how to proceed for optimization. The empirical way to obtain convergence is explained and a more complete treatment of inference via Gibbs sampling is given for hierarchical and dynamic models. A short discussion of the appropriate software closes the chapter.

Chapter 6 studies Metropolis-Hastings algorithms, which are defined as being based on chains characterized by the expression for the transition kernel and the acceptance probability. The chapter considers several special cases, such as symmetric chains, random walk chains, independence chains, and shows some of the possibilities, especially in connection with componentwise transition and combinations of different transition schemes. Also a discussion about blocking and reparameterization is given. The Metropolis-Hastings methodology is applied to models commonly used in practice: generalized linear mixed models and dynamic generalized linear models.

The last chapter handles some further topics related to MCMC. A discussion of estimates and uses of the predictive likelihood is made in order to examine the model adequacy. The problem of choosing between models is viewed from two alternative approaches, the first one considers supermodels (all models in a formation), the second approach uses sophisticated simulation techniques consisting of Markov chains with jumps between the different models. In the last section some convergence acceleration techniques are described, namely, alterations to the chain, alterations to the equilibrium distribution and the introduction of auxiliary variables.

This book is a theoretical book. In a relevant way it explains the concepts involved with the simulation techniques, known as Markov Chain Monte Carlo. The chapters describing Gibbs sampling and Metropolis-Hastings algorithms are the core of the book. The author opens the way to further research by pointing out that the possibilities of expansion of MCMC methods are innumerable.
The book offers a sufficient number of examples to illustrate the discussed items. It contains 21 figures and quite a lot of exercises, which might be difficult to solve for an inexperienced reader because the author does not stress on solution techniques and no solutions are included. The great majority of the exercises are non-numerical. An extensive list of references is given, followed by a handy author index and a subject index. The book is best suited for statisticians. But also mathematicians, economists, engineers, who already are somewhat acquainted with the subject, having a preliminary or a practical knowledge of stochastic simulation, Bayesian inference, Markov chains, or at least of the basics of statistics, will find benefit from this up-to-date account.

P. Bruggen


The objective of this book is to offer a guidance to the reader to use efficiently the Mathematica package VisualDSolve. This package generates images of solutions to ordinary differential equations.

The book is divided into two parts. The multiple functions and options of the package are described in Part 1. Part 2 offers detailed examples and complicated case studies that show how to use VisualDSolve in practical situations. An in-depth analysis of some of the issues is presented. Only the first chapter of Part 2 is not involved with visualizing solutions, it explains basic Mathematica differentiation and integration commands.

The book expresses some unusual and original ideas: curvy fish shapes to represent the flow of a vector field, shaded nullcline regions that add structure to the phase plane view, and also, colours changing as time increases, vectors coloured according to their length, graphs in 3-space, with the projections shown on the three walls,...

Part 1 consists of the chapters 1-5. These chapters each discuss one of the four commands to plot solutions, respectively, VisualDSolve, SystemSolutionPlot, PhasePlot, SecondOrderPlot. The basic command VisualDSolve provides images of solutions to a single first-order ordinary differential equation. The solutions to systems of first-order differential equations are plotted with SystemSolution Plot and PhasePlot. SecondOrderPlot visualizes the solutions to a single second-order equation and to second-order systems.

The package provides a multitude of options to influence, to modify, to control the style of the orbits, to gain information about the equation without actually looking at the solutions, to obtain the information used in generating a plot. Chapter 2 concentrates on some auxiliary functions: to guess the curve of a solution on the basis of the direction field, to represent the 'flow of the solution' graphically with arrows, to plot the difference between the real and a generated solution,... Typical options to commands for systems of ordinary differential equations show the vector field associated to a system of two equations (length, thickness,... of the vectors can be controlled), allow to indicate the direction of orbits (with colours or otherwise) or to produce a three-dimensional image,...

Chapters 7 to 17 demonstrate the use of the VisualDSolve commands to model real-world problems. Chapter 7 treats the downward flight of a parachutist. The importance of autonomous linear differential systems is stressed in Chapter 8; a physical application for the two-dimensional case and a four-dimensional example are solved. Chapter 9 visualizes problems concerning population growth for one and for two populations. Examples of Hamiltonian systems and a simple looking second-order equation that causes serious difficulties for numerical algorithms are treated in Chapters 10 and 11 respectively. Chapter 12 invests whether the lead in the human body will settle down to an equilibrium and seeks an answer to the question what the efficiency of a drug would have to be. Throwing a discus in various wind conditions is the topic of chapter 13. In Chapter 14 the swinging of a double pendulum is discussed, some movies are made, for example to show the progression to the apparently chaotic behaviour of a more energetic system, or
to show the effect of larger amplitudes. In chapter 15 some Duffing orbits are exhibited. These are orbits arising from the Duffing equation, a differential equation that characterizes a forced system. Movies show extreme sensitivity to initial conditions. The title of Chapter 16 is The Tetrapods of Wada. It bends over the question of how many times a damped pendulum subject to a periodic external force will rotate before falling into the terminal loop. Chapter 17 examines the rotational motion of a rigid body, in particular the apparent instability when a book is flipped in the air.

The Appendix lists the usage messages, each of which is explained briefly, but completely. The References are followed by an Index of VisualDSolve functions, an Index of Mathematica Objects and a Subject Index. In addition to this there is an abundance of figures (almost 2 or more on every page) and 16 supplementary pages with impressive colour plates. The book is accompanied by a 3.5" DOS-formatted diskette that contains the package VisualDSolve and supplemental lab notebooks.

On the whole, this is an excellent work, meant for students and teachers. Its longer than standard pages allow comfortable handling. The interested reader will be pleased to find lucid explanation of how to produce with a wide variety of tools images of differential equations that are eventually spectacular, made possible thanks to Mathematica’s great power. As the authors state the book and package can be used as a supplement in either a first course in differential equations or a modeling course.

P. Bruggen

2 Conferences

HPCFIN Conference on HIGH-PERFORMANCE COMPUTING FOR FINANCIAL PLANNING

Date: 11–13 April, 1999.
Location: Ischia - Naples, Italy.
Organizers: Marina Marino (Un. of Naples, Italy), Francesca Perla (Un. of Rome, Italy).

Topics:
- Monte Carlo simulations for princible complex derivative securities.
- modeling market behaviour using high-frequency data
- risk management using novel optimization techniques
- asset and liability management for insurance and pension fund in the global markets
- novel computational techniques using artificial neural networks, genetic algorithms and parallel computations.

Other information: Selected papers will be published into a special issue of the Journal of Economic Dynamics and Control.

Contact address:
Marina Marino
Center for Res. on Parallel and Supercomp.
Via Cintia, Monte S. Angelo
I-80126 Naples, Italy
Fax: +39-81-7662106
email: hpcfin@matna2.dma.unina.it
http://pixel.dma.unina.it/EVENTS/HPCFIN.ws.html

WORKSHOP ON HIGH PERFORMANCE NUMERICAL COMPUTATIONS WITH APPLICATIONS

Date: 12–14 April, 1999.
Location: Amsterdam, The Netherlands.

Topics:
- Development of advanced parallel and distributed numerical, combinatorial and global optimization methods, with applications in CFD, computational mechanics, material sciences, and electronic circuits, etc.
- Practical experience of applying parallel and distributed technology to solve large scale engineering problems.

Other information: The workshop will be organized in the 7th International Conference on High Performance Computing and Networking Europe (HPCN-99).
Contact address:
Dr. H.X. Lin
Dept. of Techn. Maths and Comp. Science
Delft University of Technology
P.O. Box 358, 2600 AJ Delft, The Netherlands
email: h.x.lin@twi.tudelft.nl
http://www.wins.uva.nl/events/HPCN99

Second International Conference on
MULTIVARIATE SCATTERED DATA
FITTING

Date: 15–20 April, 1999.
Location: Puerto Vallarta, Jalisco, Mexico.
Other information: CAM Newsletter 14, nr. 2.
Contact address:
L. L. Schumaker
Tel.: 615-322-6652
Fax: 615-343-0215
email: s@mars.cas.vanderbilt.edu
http://www.math.vanderbilt.edu/~schumake/pv.shtml

ICTCA '99
FOURTH INTERNATIONAL CONFERENCE ON
THEORETICAL AND COMPUTATIONAL
ACOUSTICS

Date: 10–14 May, 1999.
Location: Trieste, Italy.
Other information: CAM Newsletter 14, nr. 2.
Contact address:
Angela Marchetto
Conference Secretariat, ICTCA'99
Osservatorio Geofisico Sperimentale
P.O. Box 2011 - Opicina
34016 Trieste, Italy
Tel.: (+39 40) 2140339
Fax: (+39 40) 327307
email: ictca99@ogs.trieste.it
http://www.ogs.trieste.it/ictca99

EMMNA’99 INTERNATIONAL CONFERENCE ON
ENVIRONMENTAL MODELING AND
NUMERICAL ANALYSIS

Date: 24–31 May, 1999.
Location: Rostov-on-Don, Russia.
Organizers: The Inst. of Mathematical Modeling,
Russian Ac. of Sciences and Rostov State Un.
Topics:
1. Mathematical modeling of hydrophysical processes in a water basin and transport contaminant
2. Groundwater pollution
3. Mathematical modeling of hydrophysical processes in air and air pollution
5. Numerical methods for the solution of non stationary PDE problems
6. Iterative methods and preconditioners in environmental modeling
7. Efficient time stepping for stiff ODEs in environmental modeling
8. High performance computing in environmental modeling

Contact address:
EMMNA’99, Prof. L.A. Krukier
Computing Center of Rostov State Un.
Stachki St., 200/1 Bl.2
344090 Rostov-on-Don, Russia
Tel.: +7 (8632) 28 09 77
Fax: +7 (8632) 28 57 94
email: emmna99@ui.rnd.runnet.ru
http://www.uic.rnd.runnet.ru/emmna99/

SCCE II - INTERNATIONAL WORKSHOP ON
SCIENTIFIC COMPUTING IN
CHEMICAL ENGINEERING

Date: 26–28 May, 1999.
Location: Un. Hamburg-Harburg, Germany.
Other information: CAM Newsletter 14, nr. 2.
Contact address:
SCCE, Arbeitsbereich Mathematik
Techn. Un. Hamburg-Harburg
Kasernenstr. 12
D–21073 Hamburg, Germany
Fax: +49 40 7718 2696
email: scce@tu-harburg.de
http://www.tu-harburg.de/mat/scce/scce.html
SECOND WORKSHOP ON
LARGE-SCALE SCIENTIFIC
COMPUTATION

Date: 2–6 June, 1999.
Location: Sosopol, Bulgaria.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
P.Y. Yalamov
University of Rousse
7017 Rousse, Bulgaria
Fax: (+359 82) 455 145
email: yalamov@ami.ru.acad.bg

MMA-99 INTERNATIONAL CONFERENCE ON
MATHEMATICAL MODELLING AND
ANALYSIS

Date: 3–4 June, 1999.
Location: Vilnius, Lithuania.

Organizers:
• Institute of Mathematics and Informatics, Vilnius
• Vilnius Gediminas Technical University
• Vilnius University.

Topics:
• Analysis of numerical methods for solving problems of 
mathematical physics
• Parallel algorithms and parallel computing
• Application of difference methods to engineering problems
• Analysis of ODE and PDE problems and applications
• Statistical modelling
• Mathematical modelling for financial analysis

Other information: The selected papers of the Conference will be published in the vol.4 of
"Mathematical Modelling and Analysis", Technika, Vilnius.

Contact address:
Inst. Maths and Informatics
Akademijos 4, LT-2600
Vilnius, Lithuanian
Tel.: (+370) 2 72 94 19
Fax: (+370) 2 72 92 09
email: mma99@fm.vtu.lt
http://www.aldono.mii.lt/mma99/

SECOND IMACS SEMINAR ON
MONTE CARLO METHODS

Date: 7–11 June, 1999.
Location: Varna, Bulgaria.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
Second IMACS Seminar on Monte Carlo Methods
CLPP - Bulgarian Academy of Sciences
Acad. G. Bonchev Str. 25 A
Sofia, 1113, Bulgaria Tel.: +359-2-70-84-94
Fax: +359-2- 70 72 73
email: imacs99@copern.bas.bg
http://copern.bas.bg/mcm99

ICRA99
INTERNATIONAL CONFERENCE ON
RATIONAL APPROXIMATION

Date: 6–11 June, 1999.
Location: University of Antwerp (UIA), Belgium.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
Prof. A. Cuyt
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Tel.: +32 3 820 24 01
Fax: +32 3 820 24 21
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IPCO’99
SEVENTH CONFERENCE ON
INTEGER PROGRAMMING AND
COMBINATORIAL OPTIMIZATION

Date: 9–11 June, 1999.
Location: TU Graz, Austria.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
G.J. Woeginger, Dept. of Mathematics, TU Graz,
Steyrergasse 30, A-8010 Graz, Austria
Fax: (0043) 316 873 5369
email: ipco99@opt.math.tu-graz.ac.at
http://www.opt.math.tu-graz.ac.at/ipco99
MATHTOOLS'99
2ND INTERNATIONAL CONFERENCE ON TOOLS FOR MATHEMATICAL MODELLING

Date: June 14–19, 1999.
Location: Saint-Petersburg, Russia.
Organizers: G.S. Osipenko, Yuri Ivanov.

Aim and Scope:
MATHTOOLS'99 is a multidisciplinary conference on the latest advances in the theory of mathematical modelling and the role of the theory for explanation of some nonlinear effects arising in real systems, as well as on the demonstration of up-to-date efficient methods for solving applied technical problems. As such it will provide an ideal forum for researchers to disseminate knowledge, research results and applications in many sectors of activity.

Topics:
- Mathematical modelling
- Computer algebra
- Design techniques
- Numerical methods
- Parallel and distributed algorithms
- Computer modeling in dynamical systems
- Mathematical models in biology, medicine, ecology etc.
- Applications to physics, electrotechniques, and electronics
- Dynamic economic models
- General macro-economic models
- Market models

Other information:
Abstracts of contributed papers are due by April 30.

Contact address:
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St.Petersburg 195251, Russia
Fax: +7+812+5343314
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WORKSHOP ON CONTINUOUS OPTIMIZATION

Date: 21–26 June, 1999.
Location: Rio de Janeiro, Brazil.

Invited speakers: A. Auslender (Un. of Paris), D. Butnariu (Un. of Haifa), J. Eckstein (Rutgers Un.), M. Fukushima (Kyoto Un.), J. Judice (Un. of Coimbra), C. Gonzaga (Un. of Santa Catarina), C. Humes (Sao Paulo Un.), A. Iusem (IMPA), C. Kanzow (Un. of Hamburg), J.M. Martinez (Campinas Un.), Y. Nesterov (Un. of Louvain), F. Potra (Un. of Iowa), M. Raydan (Un. Central de Venezuela), T.R. Rockafellar (Un. of Washington), M. Solodov (IMPA), B. Svaiter (IMPA), M. Teboulle (Tel Aviv Un.), P. Tseng (Un. of Washington).

Topics: Linear and Nonlinear Programming.

Other information: On June 28–30, 1999, a workshop on Interior Point Methods for Optimization will take place in Florianopolis, at the University of Santa Catarina (South of Brazil). Some of the plenary speakers attending the IMPA workshop will also participate in the Florianopolis meeting. Participants interested in attending this meeting too, should contact Dr. Clovis Gonzaga at clovis@mtm.ufsc.br.

Contact address:
IMPA Workshop on Continuous Optimization
Estrada Dona Castorina 110
Jardim Botanico
Rio de Janeiro CEP 22460-320, Brazil
Fax: (55)-(21)529-5129
email: optim@impa.br
http://www.impa.br

CIME INTERNATIONAL MATHEMATICAL SUMMER SCHOOL ON COMPUTATIONAL MATHEMATICS DRIVEN BY INDUSTRIAL APPLICATIONS

Location: Martina Franca, Apulia, Italy.
Organizers:
V. Capasso (Milano), H.W. Engl (Linz), J. Periaux (Paris).

Invited speakers:
- R. Burkard (Graz): "Path, trees and flows: graph optimization problems with industrial applications".
- P. Deuflhard (Berlin): "New computational concepts, adaptive differential equation solvers, and virtual labs".
- J.L. Lions (Paris): "Mathematical problems in industry".
- G. Strang (MIT): "Wavelet transforms and cosine transforms in signal and image processing".
- R. Mattheij (Eindhoven): "Mathematics of glass".

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http://www.math.unifi.it/CIME/

MAFELAP 1999
TENTH CONFERENCE ON
THE MATHEMATICS OF FINITE
ELEMENTS AND APPLICATIONS


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

Other information: CAM Newsletter 13, nr. 3.

Contact address:
The Secretary, MAFELAP 1999
BICOM, Brunel University
Uxbridge, UB8 3PH, U.K.
Tel.: (+44) 1895 203270
Fax: (+44) 1895 203363
email: mafelap@brunel.ac.uk
http://www.brunel.ac.uk/~icsrbicm/mafelap99

FIRST INTERNATIONAL SYMPOSIUM ON
IMPRECISE PROBABILITIES AND THEIR
APPLICATIONS

Date: 30 June – 2 July, 1999.

Location: Ghent, Belgium.

Other information: CAM Newsletter 14, nr. 3.

Contact address:
SIPTA '99 Secretariat
p/a Gert de Cooman, Un. Gent
Onderzoeksgroep SYSTeMS
Technologiepark - Zwijnaarde 9
9052 Zwijnaarde, Belgium
Tel.: +32-(0)9-264.56.53
Fax: +32-(0)9-264.58.40
email: isipta99@ensmain.rug.ac.be
http://ensmain.rug.ac.be/~isipta99

FIFTH INTERNATIONAL CONFERENCE ON
COMPUTATIONAL MODELLING OF
FREE AND MOVING BOUNDARY
PROBLEMS

Date: 30 June – 2 July, 1999.

Location: Ljubljana, Slovenia.

Other information: CAM Newsletter 14, nr. 3.

Contact address:
Sally Radford, Conference Secretariat, MB99
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, UK
Tel.: 44 (0) 1703 293223
Fax: 44 (0) 1703 292853
email: sradford@wessex.ac.uk
http://www.wessex.ac.uk/conferences/1999/mb99/

FOURTH AFA INTERNATIONAL CONFERENCE
OF CURVES AND SURFACES

Date: 1-7 July, 1999.

Location: Saint–Malo, France.

Other information: CAM Newsletter 14, nr. 2.

Contact address:
Curves and Surfaces, LMC-IMAG
BP 53, 38041 Grenoble, CEDEX 09, France
Fax: 33 76 63 12 63
email: saint-malo@imag.fr
http://www.enst.fr/~afa/saint-malo/
FOURTH INTERNATIONAL CONFERENCE ON INDUSTRIAL AND APPLIED MATHEMATICS

Date: 5–9 July, 1999.
Location: Edinburgh, Scotland.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
Congress Secretariat, c/o Meeting Makers
Jordanhill Campus
76 Southbrae Drive, Glasgow G13 1PP
Scotland, UK
Tel.: +44 (0)(141) 553 1930
Fax: +44 (0)(141) 552 0511
email: iciam@meetingmakers.co.uk
http://www.ma.hw.ac.uk/iciam99/

9TH IFIP TC7 CONFERENCE ON SYSTEM MODELLING AND OPTIMIZATION

Date: 12–16 July, 1999.
Location: Cambridge, England.
Other information: CAM Newsletter 14, nr. 2.
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ESA’99
SEVENTH ANNUAL EUROPEAN SYMPOSIUM ON ALGORITHMS

Location: Prague, Czech Republic.
Aim and Scope: The Symposium covers research in the use, in the design, and in the analysis of efficient algorithms and data structures as it is carried out in computer science, discrete applied mathematics and mathematical programming.

Topics:
• Approximation Algorithms
• Combinatorial Optimization
• Computational Biology
• Computational Geometry
• Databases and Information Retrieval
• Graph and Network Algorithms
• Machine Learning
• Number Theory and Computer Algebra
• On-line Algorithms
• Pattern Matching and Data Compression
• Symbolic Computation
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FoCM’99
FOUNDATIONS OF COMPUTATIONAL MATHEMATICS

Location: Oxford University, UK.
Other information: CAM Newsletter 14, nr. 3.
Contact address:
email: FoCM@comlab.ox.ac.uk
http://www.damtp.cam.ac.uk/user/na/FoCM/

THIRD EUROPEAN CONFERENCE ON NUMERICAL MATHEMATICS AND ADVANCED APPLICATIONS

Location: Jyvaskyla, Finland.
Other information: CAM Newsletter 14, nr. 3.
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email: enumath99@math.jyu.fi
http://www.math.jyu.fi/enumath
Date: 1–7 August, 1999.
Location: Berlin. Germany.
Other information: CAM Newsletter 14, nr. 3.
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SCICADE99 Conference on
Scientific Computing and Differential Equations

Date: 9–13 August, 1999.
Location: Fraser Island, Queensland, Australia.
Organizer: Kevin Burrage.
Invited speakers: J. Butcher (Auckland, New Zealand), E. Hairer (Geneva, Switzerland), T. Mitsui (Nagoya, Japan), L. Petzold (Santa Barbara, U.S.A.), E. Platen (UTS Sydney, Australia), M. Zennaro (Trieste, Italy).
Topics: All aspects of numerical methods for differential equations, as well as high performance computing, numerical linear algebra, approximation techniques and scientific computing applications.
Other information: There will be up to two "young talent" invited speakers with the same status as invited speakers. Those wishing to be considered for the young talent awards are invited to submit a manuscript to the SciCADE conference organiser by May 1, 1999. The authors of the best two papers will then be asked to give invited lectures at SciCADE99. The criteria for eligibility are (i) candidates must be under 35 as of January 1, 1999 and (ii) they must have not completed a PhD earlier than January 1995.

In addition to the programme of invited lectures, most of SciCADE99 will be run as minisymposium sessions with up to three sessions in parallel. The following people have already agreed to organise such sessions:
• Uri Ascher: "Optimization problems in differential equations".
• Chan Basaruddin, Heru Suhartanto: "Numerical methods for DAEs".
• Alfredo Bellen and Christopher Baker: "Numerical methods for delay equations".
• Claus Bendtsen: "Parallel methods for ODEs".
• Hermann Brunner: "Numerical methods for Volterra integral and integro-differential equations".
• John Butcher and Luigi Brugnano: "Novel methods for ODEs".
• Kevin Burrage and Tom Mitsui: "Numerical methods for Stochastic equations".
• Wayne Enright: "Software issues".
• Jocelyne Erhel: "Solution of Linear systems".
• Ernst Hairer: "Symplectic methods".
• Syvert Norsett and Bryn Owren: "Lie Group methods".
• Linda Petzold: "Numerical methods for DAEs".
• Eckhard Platen: "Computational Financial Applications".
• Bob Skeel: "Stiff and multiscale integrators".
• Marc Spijker: "Stability issues for IVP methods".
• Jacques de Swart: "Software issues in ODEs".
• Stefan Vandewalle: "Waveform Relaxation Techniques".

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XI International Workshop on
Numerical Methods for Viscoelastic Flows

Date: 25–28 August, 1999.
Location: Vaals, The Netherlands.
Organizer:
The section Materials Technology of the Eindhoven University of Technology.

Topics:
- Comparison with Experimental Findings
- Continuum / Macroscopic Development and Mathematical Analysis
- Development of Numerical Methods for Viscoelastic Flow Simulations
- Free Surface Flow Simulations
- Mathematical Analysis of Singularities
- Molecular / Microscopic Modeling and Stochastic Simulations
- Multidimensional Viscoelastic Flow Simulations
- Non-Isothermal Flows
- Simulation of Stress-Induced Phenomena in Viscoelastic Flows
- Time-Dependent Flows
- Viscoelastic Flow Instabilities

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http://www.mate.tue.nl/workshop

INTERNATIONAL CONFERENCE ON MATHEMATICS IN APPLICATIONS

Date: 25-28 August, 1999.
Location: Novosibirsk, Russia.
Organizers:
- Novosibirsk State University
- Keldysh Institute of Applied Mathematics RAS
- Sobolev Institute of Mathematics SB RAS.

Aim and Scope: The conference is dedicated to the 70th birthday of Sergei K. Godunov. The main topics of the conference are closely related to his scientific interests:
- Differential Equations
- Numerical Methods
- Continuum Mechanics

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EURO-PAR’99
EUROPEAN CONFERENCE ON PARALLEL COMPUTING

Date: 31 August – 3 September, 1999.
Location: Toulouse, France.
Organizers: CERFACS and ENSEEIH - IRIT.
Invited speakers:
Richard Brent (Oxford Un. Comp. Lab.), Philippe Courtier (LODYN, Un. P. et M. Curie), Jack Dongarra (Un. of Tennessee and Oak Ridge Nat. Lab.), Cherri Pancake (Oregon State Un.), Horst Simon (NERSC, Lawrence Berkeley Nat. Lab.), Tom Sterling (Jet Propulsion Lab.).

Topics: Euro-Par’99 is organized as a day of tutorials, two-day plenary sessions, and a number of parallel sessions on the following topics:
- Support Tools and Environments
- Performance Evaluation and Prediction
- Scheduling and Load Balancing
- Compilers for High Performance Systems
- Parallel and Distributed Databases
- Fault Avoidance and Fault Removal in Real-Time Systems
- Theory and Models for Parallel Computation
- High-Performance Computing and Applications
- Parallel Computer Architecture
- Distributed Systems and Algorithms
- Parallel Programming: Models, Methods and Languages
- Architectures and Algorithms for Vision and other Senses
- Numerical Algorithms for Linear and Nonlinear Algebra
- Emerging Topics in Advanced Computing in Europe
• Routing and Communication in Interconnection Networks
• Instruction-Level Parallelism and Uniprocessor Architecture
• Concurrent and Distributed Programming with Objects
• Global Environment Modelling
• Numerical Reliability and Parallel Computing
• Fault Tolerant Computing
• Educational Issues
• High-Performance Data Mining and Knowledge Discovery
• Symbolic Computation

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http://www.enseeiht.fr/europar99/

EPSICODE ’99
INTERNATIONAL CONFERENCE ON
NUMERICAL METHODS FOR TRANSPORT–DOMINATED AND RELATED PROBLEMS

Date: 20–23 September, 1999.
Location: Schloss Wendgräben, Magdeburg, Germany.
Organizers: Lutz Tobiska (Magdeburg), Martin Stynes (Cork, Ireland), Lutz Angermann (Magdeburg), Volker John (Magdeburg).
Invited speakers: V.F. Butuzov (Moscow), C. Canuto (Torino), P.W. Hemker (Amsterdam), R.B. Kellogg (Maryland), G. Lube (Göttingen), R. Rannacher (Heidelberg), H.-G. Roos (Dresden), G.I. Shishkin (Ekaterinburg), E. Süli (Oxford), R. Verfürth (Bochum), P. Wesseling (Delft).

Topics:
• Discretization techniques: FDM, FEM, FVM, spectral methods, collocation methods.
• Solution of the discrete algebraic problems: multigrid, domain decomposition, parallelization.
• Analytical approaches: asymptotic expansions, Shishkin-type decompositions.
• Error estimates and adaptive approaches.
• Modelling and applications.

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EPSICODE99
CTAC99 Conference and Workshops on Computational Techniques and Applications

Date: 20–24 September, 1999.
Location: Australian Nat. Un., Canberra, Australia.

Invited speakers:
- Jack Dongarra (Un. Tennessee): "Connecting computational needs to computing resources".
- Markus Hegland (Austr. Nat. Un.): "Computational challenges in data mining".
- Steve Hirschman (Oak Ridge Nat. Lab.): "Variational methods in plasma physics".
- John Lewis (Boeing Corporation): "How many matrices does it take to keep a 777 flying?"
- Terry Speed (Un. of California at Berkeley): "Computational biology".
- Grant Steven (Un. of Sydney): "Evolutionary structural optimization".
- Alistair Watson (Un. of Dundee): "Numerical problems in optimisation and approximation".

Topics: All aspects of computational mathematics; scientific, technical, and industrial applications; and high performance computing

Other information: The conference is followed by two days of workshops on major contemporary topics in computational mathematics. The following workshops are planned for CTAC99:
- Data Mining (Markus Hegland).
- High Performance Computing (Lutz Gross).
- Advances in Differential Equations (Mike Osborne).
- Scientific Visualisation and Virtual Environments (Henry Gardner).

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Workshop on the Complexity of Multivariate Problems

Date: 4–8 October, 1999.
Location: Baptist Un., Hong Kong.
Organizers: F. Hickernell, H. Woźniakowski.

Aim and Scope: Many practical problems involve more than one variable. Such problems have been studied by computer scientists, mathematicians, and statisticians. This workshop brings together experts in various fields to discuss the computational complexity of multivariate problems, including
- integration and approximation,
- average-case and worst-case analyses,
- the problem of high dimensionality, and
- generation of low discrepancy sets and sequences.


Other information: All Speakers will be invited to submit papers based on their talks for publication in a special issue of the Journal of Complexity.

Contact address:
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PARAOPTVI
6th International Conference on Parametric Optimization

Date: 4–8 October, 1999.
Location: Dubrovnik, Croatia.

Invited speakers: E.G. Golshtein (Russia), P. Kall (Switzerland), H. Maurer (Germany), B. Mordukhovich (USA), S. Rolewicz (Poland), L.M. Seiford(USA), A. Wierzbicki(Poland).
Topics:
- Structural Analysis in Optimization, Optimal Control and Variational Inequalities.
- Stability and Sensitivity.
- Pathfollowing Methods.
- Data Envelopment Analysis.
- Applications in Multiobjective, Stochastic and Global Optimization.
- Applications in Engineering, Economics and Finance.

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12TH INTERNATIONAL CONFERENCE ON
DOMAIN DECOMPOSITION METHODS

Date: 25–28 October, 1999.
Location: Chiba University, Japan.

Conference themes:
- Domain decomposition in science and engineering
- Theoretical developments
- Multilevel methods
- Parallel machine architecture
- Parallel algorithms and their implementation
- Demonstrations and evaluations of large-scale codes.

Application Topics:
- Acoustics and electromagnetics
- Grid generation
- Aerospace applications
- Mathematical surface problems
- Automotive applications
- Micro-electronics applications
- Biological applications
- Optimization
- Control applications
- Parallel processing
- Coupled phenomena
- Particulate flows
- Dimension reduction
- Ship applications.

Other information:
Proposals for contributed papers are due by March 31, 1999.

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WORKSHOP ON
NUMERICAL TREATMENT FOR
DYNAMICS OF
INTERFACES AND PATTERNS

Date: 4–6 November, 1999.
Location: Kobe, Japan.

Organizers:
M. Kimura (Hiroshima Un.), M. Mimura (Hiroshima Un.), T. Nakaki (Hiroshima Un.), K. Tomoeda (Osaka Inst. of Technology).

Aim and Scope:
This international workshop is planned to focus on numerical computation of dynamics of free boundaries, interfaces and patterns. This area is attracting attentions of many researchers in the fields of natural science and engineering, under the influence of rapid progress of computers in recent years, advanced methods of mathematical treatment, developments in numerical simulations, several discoveries of attractive formations of shapes and patterns. On the other hand, we come up against new problems, e.g. mathematical analysis of numerical methods for free boundary problems, and numerical simulation of unstable evolution phenomena of interfaces, etc. To answer these problems, we may need some innovative ideas or new concepts which are not in present frameworks.

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3 Institutional reports and doctoral theses

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Reports:


COLLEGE OF SCIENCE AND TECHNOLOGY
NIHON UNIVERSITY
KANDASURUGADAI 1-8-14, CHIYODA WARD
TOKYO, 101, JAPAN

Doctoral thesis
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