CIM

BULLETIN

INTERNACIONAL CENTER FOR MATHEMATICS

December 1997

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COMING EVENTS

Linear Algebra and Control Theory: Thematic Term
CIM (Coimbra, Observatório Astronómico), May - July 1998

This is the first notification of a thematic term on the subject of Linear Algebra and Control Theory to be held at the Coimbra Astronomical Observatory in the Spring of 1998 (May 11th to end of July). The main goals of the term will be:

◇ To bring together researchers from all over the world to work together in the areas of Linear Algebra, Matrix Theory and Linear Systems, exchanging ideas, producing papers and in general contributing to the development of this interdisciplinary field through theoretical, practical and numerical perspectives;

◇ To further the training of graduates, mostly from Spain and Portugal;

◇ To foster a closer relationship between the scientific communities of Portugal, Spain and the rest of the world.

STRUCTURE (Provisional)
1. It is hoped that some researchers will atend the event throughout the full three months, whilst others may prefer to participate for periods of one month or less. The invitation procedure is still under way.
2. A weekly research seminar will be organized, led by either one of the permanent members or by guest speakers.
3. There will be two summer schools aimed at graduate students, each consisting of two ten-hour courses. The first is planned for the end of May/beginning of June and will be on Linear Systems: Structure and Design; whilst the second, will be on Linear Algebra and Control Theory, is provisionally booked for July.
4. A workshop will be held in the last week of June, when most short-stay researchers will be present.
5. Two travel/accommodation awards will be available for postdoctoral students.

The following researchers have already agreed to participate in the Thematic Term:

May to July:
P. Fuhrmann (Ben Gurion University of the Negev, Israel); J.Queiró, E.Marques de Sá (University of Coimbra); F.C.Silva (University of Lisbon); I.Zaballa (Basque Country University).

May only:
I. Baragaña (Basque Country University), J.J. Loiseau (CNRS of Nantes, France); P.Zagalk (Academy of Sciences, Prague, Czech Republic).

June only:
P.Lancaster (University of Calgary, Canada); J.J.Climent (University of Alicante, Spain); J.M.Garcia (Basque Country University); D.Hinrichsen (University of Bremen, Germany); Ch.Johnson (The William and Mary College, Virginia, USA); A.Markus (Ben Gurion University of the Negev, Israel); V.Mehrmann (Chemnitz University of Technology, Germany); P.Van Dooren (Catholic University of Louvain, Belgium).

July only:
F.Puerta (Technological University of Catalonia); J. Rosenthal (University of Notre Dame, Indiana, USA); C. Schere (Technological University of Delft, The Netherlands).

Information
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Summer School on Optimal Shape Design

2-7 June 1998, Tróia, Portugal

There will be 5 courses in paralel, on the theory and techniques to determine the best possible shape to build structures and devices, such as ships, buildings, airplanes, in the sense of having the smallest possible cost (be it of construction, of maintenance or mixed), under certain restrictions retained adequate. They are aimed at graduate students and young post-docs interested in developing research in this area, coming either from mathematics (specially functional analysis, differential equations or numerical analysis) or from engineering. The intention is to show to young mathematicians how to deal with a class of problems coming from engineering, and how to solve them using theoretical and numerical methods ; and on the other hand to present to young engineers the best theoretical methods that mathematicians have recently developed, and to show that these may in fact be used to solve difficult engineering problems.

This is a joint organization of CIM with CIME (Florence, Italy).

Courses:

Some nonconvex shape optimization problems (Kawohl - Koeln, Germany)

Mesh adaptation for optimal shape design (Pironneau - Analyse Numérique, Paris VI, France)

Homogenization methods in optimal shape design (Tartar - Carnegie-Mellon, USA)

Explicit solution in elastic optimization (Villaggio - Pisa, Italy)

Optimal shape design: theory, models, numerical algorithms (Zolesio - INRIA, France)

Informations

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Autumn School on Nonlinear Analysis and Differential Equations

CMAF - CIM (Lisbon), September 14 - October 30, 1998

SHORT COURSES on:

Longtime behaviour of solutions to the Navier-Stokes equation for compressible flow (E. Feireisl)

Continuation theorems for differential systems with p-Laplacian like operators (J. Mawhin)

Twist mappings, invariant curves and periodic differential equations (R. Ortega)

Variational inequalities with application to obstacle problems (K. Schmitt)

Remarks about ordinary differential equations for population models (F. Zanolin)

Other short courses will be delivered by D. G. de Figueiredo, P. Habets, and M.M. Marques.

A SEMINAR will take place on wednesdays. The following persons are expected to participate:

J. Andres, D. Arcoya, A. Cabada, A. Cañada, A. Capietto, M. Feckan, A. Fonda, J.P. Gossez, G. Ladas, D. Lupo, J.J. Nieto, M. N. Nkashama, D. O'Regan, F. Pacella, M.Tarallo, S. Terracini, S. Tersian, C. Troestler, E. Serra, M. Willem.

There will be ample time for discussions and working sessions between participants. Research students may collaborate in the SEMINAR with short talks to present their work.

Local organizers:

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School of Finite Elements and Applications

CIM (Coimbra, Portugal), September 28 - October 2, 1998

The objectives of this school are the presentation of the basic concepts of the finite element method (mathematical and numerical aspects, scientific computing) and the diffusion of research works in the area of the applications of that method. The program of this school consists of:

⋄ A short course on finite elements (7h30m) by professor Juan Viaño Rey (Univ. Santiago de Compostela, Spain).

⋄ Presentation of software on finite elements (3h45m) by professor Nuno Ferreira Rilo (Univ. Coimbra, Portugal).

⋄ Nine conferences (1h15m each) by professors Isabel N. Figueiredo (Univ. Coimbra, Portugal), José Miranda Guedes (Instituto Superior Técnico, Portugal), Rogério P. Leal (Univ. Coimbra, Portugal), Paulo B. Lourenço (Univ. Minho, Portugal), Luís F. Menezes (Univ. Coimbra, Portugal), Luís A. Oliveira (Univ. Coimbra, Portugal), Luís M. Trabucho (Univ. Lisboa, Portugal), Luís N. Vicente (Univ. Coimbra, Portugal) and Enrike Zuazua (Univ. Complutense de Madrid, Spain).

The school has a multidisciplinar character (mathematics, mechanics, physics and scientific computing)

and is addressed to mathematicians and engineers.

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NEWS

A debate on "Mathematical research in Portugal: trends, organization and perspectives" was held in Coimbra on 6, 7 December. This was an initiative of CIM.

The debate consisted of a sequence of sessions, with subjects introduced by invited speakers.

Around 80 people participated in the debate, representing research units in Mathematics and CIM associated institutions. CIM is considering the possibility of publishing a book with the contributions to the debate.

Support from JNICT, CMAF and CMUC is acknowledged.

PROGRAM

O financiamento do ensino superior e a investigação
Eduardo Marçal Grilo (Minister of Education)

O processo de avaliação de 1996
Irene Fonseca (Carnegie Mellon University e Max Planck Institut - Leipzig)

O futuro da avaliação
Luís Magalhães (Fundação para a Ciência e Tecnologia)

A Matemática e a Economia portuguesa
Artur Alves (Universidade de Coimbra)
Luís Trabucho (CMAF - Lisbon)

A organização institucional da investigação
Fernando Dias Agudo (Academia das Ciências)
José Francisco Rodrigues (CMAF - Lisbon)

Cultura vs. especialização
Maria Paula Oliveira (CMUC)
Teresa Monteiro Fernandes (CMAF - Lisbon)

Áreas preferenciais de investigação
Eduardo Rêgo (Centro de Mat. da Univ. do Porto)
João Paulo Dias (CMAF - Lisbon)

Escolas nacionais de Matemática
Ana Bela Cruzeiro (Grupo de Física-Mat. - Lisbon)
Graciano de Oliveira (CMUC)   ▽

FIVE QUESTIONS TO JOÃO CARAÇA

João Caraça, who has a D. Phil. in Nuclear Physics from Oxford University and gained his Aggregate Professorship in Physics from Lisbon University, is Director of the Science Department at the Calouste Gulbenkian Foundation, and Professor at the School of Business and Management at the Technical University of Lisbon, where he supervises the Master's Degree in Economics and Management of Science and Technology. He is also the science adviser of the President of the Republic.

His interests lie mostly in the areas of science and technology policy, and in prospective studies. He has written over a hundred scientific papers and books including *From Knowing to Doing: Why Organize Science?* (*Do Saber ao Fazer: Porquê Organizar a Ciência?*; 1993) and *Science* (*Ciência*; 1997), and collaborated in *Limits to Competition* (*Limites à Competição*; 1994).

The portuguese scientific community has greatly benefited from Professor Caraça's activities in the Calouste Gulbenkian Foundation and JNICT. We would like to mention the strong interest he showed in the possibility of having some CIM activities funded by the Calouste Gulbenkian Foundation.

If you don't mind, I would like to begin with a rather abrupt question. Professor Caraça, What is Science?

'As I have tried to explain in my book, science is a particular way of conjecturing about reality which cannot easily be summed up by a simple definition or schematic phrase. It is a collection of responses which have evolved over time and result from different perspectives: the historical perspective; the world vision; epistemological perspective; learning, cultural, social, communicational perspectives etc.

It may be said, however, that science, as a specific area of disciplinary knowledge that requires very precise language, exists on an immaterial dimension; that is to say, it only comes into being because it is communicated, because its hypotheses are continually being