BULLETIN

INTERNACIONAL CENTER FOR MATHEMATICS

June 1997

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Coming events

Summer School on Mathematical Methods of Science and Engineering of Materials

CIM (Coimbra, Observatório Astronómico), August 23 - September 6, 1997

During the first week there will be one basic course of introduction to variational methods in nonlinear elasticity (including Young measures), and two of introduction to models of engineering for material and structural optimization and to homogenization techniques for composite materials (including numerical methods).

These courses are directed to graduate students and young post-docs in Mathematics (functional analysis, differential equations, numerical analysis, ...) and in Engineering (mechanics, materials, ...), interested on research in this area. They will be lectured by: Pablo Pedregal (Ciudad Real, Spain), Noburo Kikuchi (Michigan, USA) and José Guedes (IST, Lisbon, Portugal).

During the first 3 days of the second week there will be specialised courses, aimed at dealing with research topics in this area, lectured by: Allaire, Chipot, Francfort, Kinderlehrer, Luskin, Rogers, Sigmund.

During the last 2 days there will be a workshop in which researchers and students will explain their research results and will present ongoing research works.

Informations:
via internet: http://www.cim.pt
via e-mail: mater97@hermite.cii.fc.ul.pt
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Summer School on Mathematical Foundations of Computation

CIM (Coimbra, Observatório Astronómico), September 8 - 11, 1997

The school aims at providing the participants with an overview as complete as possible of the formal methods and techniques useful in computing, namely computability, complexity and semantics of specification and programming languages.

PROGRAM

Courses:

Semantics of Logic Programming
Prof. Dr. José Júlio Alferes (U.Évora)

Logic Programming introduced to computer science the important concept of declarative – as opposed to procedural – programming. Ideally, a programmer should only be concerned with the declarative meaning of the program, while the procedural aspects of programs' execution are handled automatically. Due to its declarative nature, logic programming quickly became a candidate for knowledge representation.

For its proper use as a tool for knowledge representation, logic programming must be equipped with a precise meaning or semantics. In this course we begin by motivating for the need of a semantics for logic programs with negation, and presenting the problems

involved in making such a definition. Several attempts to the definition of a semantics for logic programs are then presented, such as the completion semantics, stable models, answer-set, and the well-founded semantics. We proceed by relating logic programming semantics to some well known formalism for non-monotonic reasoning and knowledge representation. Finally, it is shown how logic programming equipped with a proper semantics can be used to solve knowledge representation problems.

Domains and Denotational Semantics

Prof. Dr. Luís Monteiro (FCTUNL)

The generalized use of recursion is one of the more salient features of the nature of definitions in computer science. What is typical of the nature of recursion is that an entity is defined in terms of itself, where the parts already defined are systematically used in the definition of the remaining parts. At the end of the decade of 1960, Scott proposed a theory of computation based on the notion of partiality, to give meaning to any kind of recursive definitions, like procedures, functions, relations and types. Scott's theory had an enormous impact in all areas of computer science, including the denotational semantics of programming languages. In this course we review the main constructions of Scott's theory and its application to denotational semantics. Several areas where the theory has not found so far a satisfactory application, like concurrency, and recent proposals to deal with such problems will be mentioned.

Algebraic Combination of Logics

Prof. Dra. Cristina Sernadas (ISTUTL)

The field of combination of logics has recently attracted much attention triggered namely by software engineering and artificial intelligence applications. In this course, several mechanisms for combining logics are analysed from the point of view of category theory. The relevant categories (such as interpretation systems, satisfaction systems, Hilbert calculi, derivation systems and consequence systems) are presented and related via adjunctions. Both (co)limits and (co)cartesian liftings are used for the categorial characterization of combination mechanisms like synchronization (on formulae and on models) and (possibly constrained) fibring. Illustrations are provided with special emphasis on temporal logic. Some preservation results (soundness and completeness) are established. Some open research problems are identified.

Special Sessions

Category Theory, moderated by Prof. Dra. Manuela Sobral (FCTUC).

Computational Geometry, moderated by Prof. Dra. Ilda Perez (FCUL)

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Workshop on nonparametric and semiparametric methods

International Center for Mathematics - Human Capital and Mobility Network

The Group of Probability and Statistics of the Department of Mathematics of the University of Coimbra is organizing a workshop integrated into the programme of activities of CIM and within the HCM project Nonparametric and Semiparametric Statistical Methods. The aim of this workshop is to promote and disseminate information, particularly amongst young researchers, in new scientific areas like Non-linear Models and Nonparametric and Semiparametric Inference and to bring together various teams involved in the project. The general programme will include invited and contributed papers and two short courses on those areas presented by Profs. M. Hallin (Univ Libre de Bruxelles) and K. F. Turkman (Univ. Lisboa).

Invited speakers:

M. Hallin (Univ. Libre de Bruxelles)
K. F. Turkman (Univ. de Lisboa)
J. Beirlant (Catholic Univ. of Leuven)
H. Tong (Univ. of Kent) (to be confirmed)
W. Hardle (Humb. Univ. zu Berlin) (to be confirmed).

Place: Dep. de Matemática - Universidade de Coimbra

Organization:

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Mathematical research in Portugal: trends, organization and perspectives

Debate - International Center for Mathematics

Coimbra, December 1997

The assessment of Portuguese research units carried out last year, with immediate effects on their respective grants, yields a good opportunity to reopen the debate on the orientation of research activities and policies in Portugal.

The abovementioned assessment had novel characteristics and, without challenging the quality of the evaluation panel nor the relevancy of its comments, it's undisputable that this process raises broad questions to which the Portuguese mathematical community, unless it forfeits its very right to existence, can and should give thought.

CIM organizes the present debate with this intention in mind. It is not the first time, nor will it be the last, that these issues are considered. But the discussion is useful in itself, and contact in some depth with the problems and the diversity of perspectives will make the Portuguese mathematical community more responsible and better prepared.

The debate will be established around dichotomies or "tensions" assumed to be present in the Portuguese mathematical community, or even in each individual mathematician. This does not aim at resolving these tensions, but rather at using them as points of departure for the debate.

News

The CIM Scientific Committee had its first ordinary meeting on the 22nd March 1997. All the european members were present. The members from America (Richard Brualdi, Jacob Palis and Efim Zelmanov) were unable to come to Coimbra.

In this meeting Professor Hugo Beirão da Veiga was elected President of the Scientific Committee and Professor Paula Oliveira was elected Secretary.

The Scientific Committee discussed the activity plan submitted by the Directors. ∇

The CIM congratulates Professor José Luiz Fiadeiro on his being awarded the IBM 96 Prize for his work *Emergência em Sistemas de Software Complexos*.

Professor Fiadeiro gained his Ph.D in 1989 from the Instituto Superior Técnico, under the supervision of Professor Amílcar Sernadas and he is Associate Professor at the Departamento de Informática da Faculdade de Ciências da Universidade de Lisboa. ∇

On the 25th and 26th March 1997 a cycle of talks on Convex Bodies by Prof. S. A. Robertson took place. These talks are the subject of Publication n° 3 of CIM – Three talks on convex bodies, already available. ∇

Prof. J. A. Green delivered a talk entitled One hundred years of Group Representations on the 5th May 1997. The text of this talk will be published by the CIM. ∇