



## **Research Report 2004**

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# Contents

<b>Preface</b>	<b>3</b>
<b>Research areas</b>	<b>5</b>
<b>Research centers</b>	<b>7</b>
<b>Research seminars</b>	<b>9</b>
<b>1 Publications</b>	<b>9</b>
1.1 Publications in 2004 . . . . .	9
1.1.1 Books (authored or edited) . . . . .	9
1.1.2 Chapters/articles in books and serials with international refereeing . . . . .	9
1.1.3 Articles in international journals . . . . .	10
1.1.4 Articles/communication in proceedings of international conferences . . . . .	14
1.1.5 Other publications . . . . .	17
1.2 Publications accepted or submitted in 2004 . . . . .	18
<b>2 Academic degrees awarded in 2004</b>	<b>25</b>
2.1 Doutoramentos/Ph.D.'s . . . . .	25
2.2 Mestrados/M.A.'s/M.S.c.'s . . . . .	25
<b>3 Research lectures by department members</b>	<b>27</b>
<b>4 Guest program</b>	<b>36</b>
<b>5 Postdoctoral fellows</b>	<b>47</b>
5.1 Publications by postdoctoral fellows . . . . .	48
<b>6 Research programs and sponsorship</b>	<b>50</b>
6.1 Research projects coordinated by department members . . . . .	50
6.2 Participation in other research projects . . . . .	51
<b>7 Organizations of scientific events</b>	<b>54</b>
7.1 Events which took place in 2004 . . . . .	54
7.2 Events taking place after 2004 . . . . .	56
<b>8 Other information</b>	<b>58</b>
8.1 Editorial boards . . . . .	58
8.2 Scientific management positions . . . . .	58
8.3 New Positions . . . . .	59
8.4 Personal notes by department members . . . . .	59



## Preface

In the fourteenth year of the publication of this report we reassert its original goals:

*The Department of Mathematics regards the annual publication of this research report as an important instrument of scientific policy. The report fulfills simultaneously two complementary purposes. Internally, it highlights the research publications by department members and their involvement in international scientific exchange as a public statement of the importance we attach to them. Externally, it provides information to interested people outside the department about our current research work. Reflecting the scientific activity developed by its members, the research report is a helpful way of assessing the level of achievement of the objectives embraced by the department. These include the pursuit of internationalization as a way to achieve recognition as a mathematics research department.*

The Department of Mathematics has at present 108 members holding Ph.D. degrees and is the largest mathematics department in the country. All information regarding the department and its own graduate and undergraduate programs is available through the Internet (<http://www.math.ist.utl.pt>).

The department experienced a fast development since it embraced the goal of becoming a research department about 20 years ago. Its members obtained Ph.D. degrees from a diversified group of leading universities in mathematics while their relative youth accounts for an energetic environment and provides a good opportunity for innovative and challenging research projects.

In 1996, 1999 and 2002 the activities of the research centers that involve the department members were subjected to external international reviews within the overall Research Units Assessment scheme established, at internal level, by the Science and Technology Foundation, the public agency responsible for promoting, funding and evaluating research in Portugal. The research centers related to our department received very high ratings, acknowledging the high international value of the research performed. The organization of this report reflects the activities of the centers associated to our department. However, only the research carried out by the department members is included in this report.

We would like to thank everyone who was involved in the organization of this issue, especially Prof. José Natário, who coordinated the production of the report. We are also grateful to Margarida Silva Carvalho for her work in the compilation of information and L<sup>A</sup>T<sub>E</sub>X processing of this issue.

Lisbon, October, 2005  
The Department Chairman,

Prof. Carlos J. S. Alves



## Research centers

Most of the research activities in the Department are organized in research centers approved and regularly assessed by international evaluation panels within a scheme of national scope established by the Science and Technology Foundation, the public agency responsible for promoting, funding and evaluating research in Portugal.

The majority of the Department staff belongs to one of the following Centers:

- Center for Logic and Computation, coordinated by C. Sernadas, with 15 Ph.D. members.  
URL: <http://www.math.ist.utl.pt/clc/>
- Center for Mathematical Analysis, Geometry, and Dynamical Systems, coordinated by C. Rocha, with 48 Ph.D. members.  
URL: <http://www.math.ist.utl.pt/cam/>
- Center for Mathematics and its Applications, coordinated by A. Sequeira, with 48 Ph.D. members and research groups in Operator Theory, Banach Algebras and Applications; Numerical Analysis and Applications in Continuum Mechanics; Statistics and Stochastic Processes; Mathematical Physics; Harmonic Analysis, Operator Theory and Applications.  
URL: <http://www.math.ist.utl.pt/cma/>

Other Centers, mainly based on researchers of other departments, count with one or two members of the Department of Mathematics, namely:

- Center for Mathematics and Fundamental Applications, CMAF (Lisbon University), coordinated by L. Sanchez.  
URL: <http://cmaf.lmc.fc.ul.pt/>
- Center for Plasma Physics, coordinated by J. T. Mendonça.  
URL: <http://cfp.ist.utl.pt/>
- Laboratory of Modeling of Agents, coordinated by Luís Correia  
URL: <http://labmag.di.fc.ul.pt/>
- Mathematical Physics Group, Lisbon University, coordinated by J.-C. Zambrini.  
URL: <http://gfm.ci.ii.fc.ul.pt/>

## Research areas

The research activity mentioned above is developed in the following main areas:

### *Dynamical Systems and Differential Equations*

The dominant research in this area falls within the general field of mathematical analysis with an emphasis on nonlinear problems whose interest in applications is well known. The activities cover the following subjects: dynamical systems and ergodic theory, ordinary, partial and functional differential equations, calculus of variations and optimization, geometric, topological and algebraic methods in nonlinear analysis, control theory and mechanics of continuous media. The research follows five lines of work: qualitative theory of dynamical systems; geometric mechanics and Hamiltonian systems; methods of nonlinear analysis in mechanics of continuous media; methods of nonlinear systems analysis in control theory; ergodic theory and dynamical systems.

### *Geometry and Topology*

The work in these areas addresses several topics which can be divided into five main fields as follows: i) symplectic geometry, including the study of topological invariants of groups of symplectomorphisms, presymplectic invariants, Poisson manifolds and Hamiltonian circle actions; ii) algebraic geometry, covering the theory of algebraic curves and surfaces, moduli of instantons and vector bundles, spaces of algebraic cycles and pluricanonical maps to projective space; iii) algebraic topology, including elliptic cohomology, algebraic K-theory, equivariant homotopy theory and homological algebra; iv) differential geometry, involving Lie groupoids and algebroids, Kähler geometry, geometric quantization, gerbes, noncommutative geometry and infinite dimensional differential geometry; v) discrete geometry, with emphasis on oriented matroids and arrangements of hyperplanes. The research in geometry and topology also addresses applications to problems motivated from areas of mathematical-physics such as general relativity, symmetries of dynamical systems, Yang-Mills and Chern-Simons theory, string theory and quantum topology.

### *Operator Theory and Integral Equations*

The work in this area is focused on classes of linear operators like Toeplitz, Carleman-Shift singular integral operators and pseudo-differential operators. Current problems under investigation include factorization of (semi)-almost periodic matrix-valued symbols, diffraction problems with approximate boundary conditions of arbitrary order, normalizations problems, symbol calculi, index theory and methods for classes of convolution type operators.  $C^*$  algebras of operators on Hardy and Bergman spaces and invertibility theory for non local  $C^*$  algebras are other research topics. Applications of the above topics to elliptic boundary-value problems, in particular, problems in diffraction theory are being studied. Applications to other problems in Mathematical Physics such as integrable systems are also of interest to members of the research group.

### *Probability, Statistics and Applications*

The research in this general area has focused on queuing theory and quality control, multivariate analysis, stochastic optimization, categorical data analysis and statistical inference. In queuing theory and quality control interest is concentrated on order relations, transient behavior, threshold problems, and on control charts. In the area of multivariate analysis, topics of interest are factor analysis and related models, multidimensional scaling and discriminant analysis. Particular attention is given to the study of the robustness of these methods. In categorical data analysis and statistical inference, emphasis has been given to incomplete data and statistical theory advanced topics relying on measure and integration.



### *Numerical Analysis and Applications in Continuum Mechanics*

Research in this area has been focused on mathematical and numerical problems in differential and integral equations with applications in continuum mechanics. More precisely:

- (i) mathematical and numerical analysis of models in haemodynamics, analysis of the motion of rigid bodies in viscous fluids, analysis of thin flows in lubrication and oceanography;
- (ii) singular boundary value problems for second order nonlinear ordinary differential equations, mathematical analysis and numerical methods for Volterra integral equations with singular kernels;
- (iii) mathematical and numerical analysis for direct and inverse problems in acoustic and elastic scattering, meshless methods for partial differential equations.

### *Logic and Computation*

Research in this area is concentrated on four main topics: (i) abstract deductive systems, with emphasis on analysis and synthesis of logic systems, including modal logic, hybrid logic, paraconsistent logic, observational logic, probabilistic logic, algebraic logic, higher-order logic and categorical logic, with applications in knowledge representation, software engineering and security; (ii) probabilistic and quantum computation and information, including probabilistic models of computation, quantum computation and quantum cryptography, with applications in security; (iii) dynamical systems and computational complexity, including digital and analog computation, physical realizability of analog computational classes, recursive functions over the reals, analog characterization of low time complexity classes, links between computational complexity and dynamical systems, neural networks, brain modeling with dynamical systems, and applications in classification of spatial data; (iv) type theory, constructive mathematics and mobile computation, including higher-order logics and type systems applied to constructive mathematics and to provably correct concurrent and distributed mobile systems.

### *Other Areas*

There are also some members of the department working in other areas, including operations research and the theory of distributions.

## Research seminars

During 2004 the Department of Mathematics at Instituto Superior Técnico ran regular sessions of the following seminars:

- CEMAT's Open Seminar (3 sessions).  
Organizer: Adélia Sequeira.
- Seminar on Algebra (1 session).  
Organizers: Pedro Ferreira dos Santos, Pedro Resende and Maria Vaz Pinto.
- Seminar on Analysis, Geometry, and Dynamical Systems (32 sessions).  
Organizer: Luis Barreira.
- Seminar on Applied Mathematics and Numerical Analysis (13 sessions).  
Organizer: Carlos Alves.
- Seminar on Functional Analysis and Applications (19 sessions).  
Organizer: Frank-Olme Speck.
- Seminar Geometria em Lisboa, (16 sessions).  
Organizer: Sílvia Anjos.
- Seminar on Logic and Computation (30 sessions).  
Organizer: Amílcar Sernadas.
- Seminar on Mathematical Physics (4 sessions).  
Organizers: Carlos Florentino, José Natário.
- Seminar on Mathematics, Systems and Robotics, in collaboration with ISR (6 sessions).  
Organizers: Diogo Gomes and João Xavier (ISR).
- Seminar on Partial Differential Equations (27 sessions).  
Organizers: Diogo Gomes.
- Seminar on Probability and Statistics (11 sessions).  
Organizer: Ana Maria Pires.
- Seminar on Quantum Computation and Information (24 sessions), in collaboration with the Department of Physics.  
Organizer: Ana Maria Martins (Department of Physics), Jorge Buescu and Paulo Mateus.
- Seminar on Spectral Theory (6 sessions).  
Organizer: Pedro Freitas.
- Seminar on Topological Quantum Field Theory Club (1 sessions).  
Organizers: José Mourão and Roger Picken.

**Colloquium:** the department also runs a Colloquium, jointly sponsored by the Center for Logic and Computation, the Center for Mathematical Analysis, Geometry, and Dynamical Systems, and the Center for Mathematics and its Applications, with 1 session in 2004. The organizer was Pedro Resende.

# 1 Publications

## 1.1 Publications in 2004

### 1.1.1 Books (authored or edited)

- **Center for Logic and Computation (CLC)**

J. Carmo, A. Sernadas, C. Sernadas, F. M. Dionísio, and C. Caleiro, *Introdução à Programação em Mathematica*, (*Introduction to Programming in Mathematica*), (2<sup>nd</sup> Edition), IST Press, 2004.

W. A. Carnielli, F. M. Dionísio, and P. Mateus, (Eds.), *Proceedings of CombLog'04, Workshop on Combination of Logics: Theory and Applications*, DMIST, 2004.

- **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

R. L. Fernandes e M. Ricou, *Introdução à Álgebra*, Coleção Ensino da Ciência e da Tecnologia, vol. 15, IST Press, Lisboa, 2004.

J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky (Eds.), *Iteration theory (ECIT'02), Proceedings of the 14th European Conference*, Évora, 2002, Grazer Mathematische Berichte, 346, Karl-Franzens-Universität Graz, Graz, 2004.

- **Center for Mathematics and its Applications (CEMAT)**

J. A. Branco, *Uma Introdução à Análise de Clusters (An Introduction to Cluster Analysis)*, Edições SPE, Lisboa, 2004.

I. Gohberg, A. F. dos Santos, F.-O. Speck, F. S. Teixeira, W. Wendland, *Operator Theoretical Methods and Applications to Mathematical Physics, The Erhard Meister Memorial Volume*, Operator Theory: Advances and Applications, Vol. 147, Birkhäuser, Basel 2004.

A. Kirsch, C. J. S. Alves (Eds.), *Inverse Obstacle Problems*, Mathematics and Computers in Simulation, Volume 66 - Issues 4-5, Elsevier Publ., 2004.

C. D. Paulino and J. A. Branco, *Exercícios de Probabilidades e Estatística*, Escolar Editora, 2004.

A. Quarteroni and A. Sequeira, Eds., *Applied Mathematics for Industrial Flow Problems – AMIF*, Computing and Visualization in Science, vol. 6, nrs. 2-3, Springer-Verlag, Heidelberg, 2004.

### 1.1.2 Chapters/articles in books and serials with international refereeing

- **Center for Logic and Computation**

L. Cruz-Filipe, H. Geuvers and F. Wiedijk, *C-CoRN: the Constructive Coq Repository at Nijmegen*, in Mathematical Knowledge Management, Third International Conference (MKM 2004), A. Asperti, G. Bancerek and A. Trybulec Eds., MKM 2004, Lecture Notes in Computer Science, 3119, Springer-Verlag, 2004, pp. 88-103.

L. Cruz-Filipe and F. Wiedijk, *Hierarchical Reflection in Theorem Proving in Higher Order Logics*, 17th International Conference, TPHOLs 2004, K. Slind, A. Bunker and G. Gopalakrishnan Eds., TPHOLs 2004, Lecture Notes in Computer Science, 3223, Springer-Verlag, 2004, pp. 66-81.

P. Mateus and A. Sernadas, *Reasoning about quantum systems*, in Logics in Artificial Intelligence, In J. Alferes and J. Leite (Eds.), Ninth European Conference, JELIA'04, Lecture Notes in Artificial Intelligence 3229, Springer-Verlag, 2004, pp. 239–251.

V. T. Vasconcelos, A. Ravara and S. Gay, *Session types for functional multithreading*, in 15th International Conference on Concurrency Theory, August 25-2, 2004, Lecture Notes in Computer Science, 3170, Springer-Verlag, 2004, pp. 497-511.

• **Center for Mathematics and its Applications (CEMAT)**

M. A. Bastos, A. Bravo, Yu. Karlovich, *Convolution type operators with symbols generated by slowly oscillating and piecewise continuous matrix functions*, Operator Theory: Advances and Applications, Vol. 147, Birkhäuser, Basel, 2004, pp. 151-174.

L. Castro, F.-O. Speck and F. S. Teixeira, *On a class of wedge diffraction problems posted by Erhard Meister*, Operator Theoretical Methods and Applications to Mathematical Physics, The Erhard Meister Memorial Volume, I. Gohberg et al. Eds., Operator Theory: Advances and Applications, Vol. 147, Birkhäuser, Basel, 2004, pp. 211-238.

M.C. Morais, and A. Pacheco, *A note on stochastic ordering criteria in SPC for the case of correlated output*, in Frontiers in Statistical Quality Control 7, H.-J. Lenz and P.-Th. Wilrich Eds., Physica-Verlag, 2004, pp. 237-260.

M. R. Oliveira, J. A. Branco, C. Croux, and P. Filzmozer, *Robust redundancy analysis by alternating regression*, in M. Hubert, G. Pison, A. Struyf, and S. Van Aelst Eds., Theory and Applications of Recent Robust Methods, Birkhäuser, Basel, 2004, pp. 235-246.

F.-O. Speck, *In memory of Erhard Meister (a short biography)*, Operator Theoretical Methods and Applications to Mathematical Physics, The Erhard Meister Memorial Volume, I. Gohberg et al. Eds., Operator Theory: Advances and Applications, Vol. 147, Birkhäuser, Basel, 2004, pp. 27-46.

• **Other Research Units**

J. Neto, J. Félix Costa, P. Carreira, and M. Rosa, *A compiler and simulator for partial recursive functions over neural networks*, Applications and Science in Soft Computing, in Ahmad Lotfi and Jonathan M. Garibaldi Eds., Springer-Verlag, 2004, pp. 39-46.

M. F. Ramalhoto, R. Goeb, A. Pievatolo, O. Evandt and C. McCollin, *Statistical Process Control Procedures in Relation with Reliability Engineering*, Probabilistic Safety Assessment and Management-PSAM7/ESREL'04, edited by C. Spitzer, U. Schmocker, V. N. Dang, 5, Springer-Verlag, London, 2004, pp. 3048-3059.

**1.1.3 Articles in international journals**

• **Center for Logic and Computation (CLC)**

J. Almeida and J. P. Teixeira, *The space of state vectors: A hyperfinite approach*, Journal of Mathematical Physics, 45(1), 2004, 1-20.

P. Gouveia and J. Ramos, *Multi-agent systems specification and certification: A situation and state calculus approach*, Annals of Mathematics and Artificial Intelligence (2-4) 41, (2004), 301-338.

C. Hermida, *Descent on 2-Fibrations and Strongly 2-Regular 2-Categories*, Applied Categorical Structures, (5) 12, (2004), 427- 459.

C. Hermida and P. Mateus, *Paracategories II: Adjunctions, fibrations and examples from probabilistic automata theory*, Theoretical Computer Science, 311, (2004), 71-103.

P. Mateus, A. Sernadas, C. Sernadas, and L. Viganò, *Modal sequent calculi labelled with truth values: Completeness, duality and analyticity*, Logic Journal of the IGPL, (3) 12, (2004), 227-274.

**• Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

M. Aganagic, M. Mariño and C. Vafa, *All loop topological string amplitudes from Chern-Simons theory*, Commun. Math. Phys. 247 (2004) 467-512.

M. Aganagic, A. Klemm, M. Mariño and C. Vafa, *Matrix model as a mirror of Chern-Simons theory*, J. High Energy Phys. 2 (2004) 10, 1-45.

J. Alves and J. Sousa Ramos, *Kneading theory for tree maps*, Ergod. Th. and Dynam. Syst. 24 (2004), 957-985.

S. Anjos e G. Granja, *Homotopy decomposition of a symplectomorphism group of  $S^2 \times S^2$* , Topology 43 (2004) 599-618.

L. Barreira and P. Doutor, *Birkhoff averages for hyperbolic flows: variational principles and applications*, J. Statist. Phys. 115 (2004), 1567-1603.

L. Barreira, L. Radu and C. Wolf, *Dimension of measures for suspension flows*, Dyn. Syst. 19 (2004), 89-107.

V. Bouchard, B. Florea and M. Mariño, *Counting higher genus curves with crosscaps in Calabi-Yau orientifolds*, J. High Energy Phys. 12 (2004) 35, 1-34.

J. Buescu, *Positive integral operators in unbounded domains*. J. Math. Anal. Appl. 296 (2004), 244-255.

J. Buescu, F. Garcia, I. Lourtie, A. Paixão, *Positive definiteness, integral equations and Fourier transforms*, Jour. Int. Eq. Appl. (16) 1 (2004), 33-52.

A. Calabri, C. Ciliberto and M. Mendes Lopes, *Even sets of four nodes on rational surfaces*, Math. Res. Lett. (11) 5-6 (2004), 799-808.

V. Cardoso, J. Natário and R. Schiappa, *Asymptotic quasinormal frequencies for black holes in non-asymptotically flat spacetimes*, Journal of Mathematical Physics 45 (2004), 4698-4713.

J. Chabrowski and P. Girão, *On the exterior Neumann problem involving the critical Sobolev exponent*, Topol. Methods Nonlinear Anal. 23 (2004), 33-43.

M. Crainic and R.L. Fernandes, *Integrability of Poisson brackets*, J. of Differential Geometry 66, (2004) 71-137.

R. Cordovil, and D. Forge, and S. Klein, *How is a chordal graph like a supersolvable binary matroid?*, Discrete Math., 288 (2004), 167-172.

P. Exner, P. Freitas and D. Krejčířík, *A lower bound to the spectral threshold in curved tubes*, R. Soc. Lond. Proc. Ser. A Math. Phys. Eng. Sci., 460 (2004), 3457-3467.

R. L. Fernandes and P. Monnier, *Linearization of Poisson brackets*, Lett. Math. Phys. 69, (2004) 89-114.

B. Fiedler, C. Rocha and M. Wolfrum, *Heteroclinic orbits between rotating waves of semilinear parabolic equations on the circle*, J. Differential Equations, 201 (2004), 99-138.

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D. A. Gomes and A. M. Oberman, *Computing the effective Hamiltonian using a variational approach*, SIAM J. Control Optim. 43 (2004), 3, 792-812.

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- D. A. Gomes and E. Valdinoci, *Lack of integrability via viscosity solution methods*, Indiana Univ. Math. J., 53 (2004), 4, 1055–1071.
- M. Mariño and N. Wyllard, *A note on instanton counting for  $N = 2$  gauge theories with classical gauge groups*, J. High Energy Phys. 5 (2004) 21, 1-23.
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- D. Mendes and J. Sousa Ramos, *Kneading theory for triangular maps*, Int. J. Pure Appl. Math. (2) 10, (2004), 421-450.
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- P. F. dos Santos and Paulo Lima-Filho, *Quaternionic algebraic cycles and reality*, Trans. Amer. Math. Soc. 356 (2004), 12, 4701–4736.
- P. M. Santos, E. Zappale, *Second-order analysis for thin structures*, Nonl. Analysis, 56-5 (2004), 643-791.
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- S. Vinagre, R. Severino, J. Sousa Ramos, *Symbolic Dynamics in Chaotic Wave Vibration*, Int. J. Pure Appl. Math. 16, 2 (2004), 267-283.
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- C. J. S. Alves and A. L. Silvestre, *On the determination of point-forces on a Stokes system*, Math. Comp. Sim. 66 (2004), 385-397.
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A. L. Brinca, F. J. Romeiras, L. Gomberoff and M. H. Marçal, *On the generation of Totem Pole emissions*, J. Geophys. Res. 109 (2004), A06201, doi:10.1029/2004JA010388.

R. Coutinho, B. Fernandez, *Fronts in extended systems of bistable maps coupled via convolutions*, Nonlinearity 17 (2004) 23-47.

R. Coutinho, B. Fernandez, *Spatially extended circle maps: Monotone periodic dynamics of functions with linear growth*, J. Nonlinear Sci. 14 (2004) 93–118.

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O. Evandt, S.Y.Coleman, M. F. Ramalhoto and C. van Lottum, *A Little Known Robust Estimator of the Correlation Coefficient and Its Use in a Robust Graphical Test for Bivariate Normality with Applications in the Aluminium Industry*, Quality and Reliability Engineering International 20 (5), 2004, 433-546.

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- Yu. I. Karlovich and L. Pessoa, *Algebras generated by Bergman and anti-Bergman projections and by multiplications by piecewise continuous coefficients*, Integral Equations and Operator Theory, 52, (2005), 219-270.
- A. Yu. Karlovich, Pedro A. Santos, *On Asymptotics of Toeplitz Determinants with Symbols of Nonstandard Smoothness*, Journal of Fourier Analysis and Applications, Volume 11, Issue 1, Feb 2005, pp. 43-72.
- M. Kwiatkowska, G. Norman and A. Pacheco, *Model checking expected time and expected reward formulae with random time bounds*, Computers and Mathematics with Applications, 2004, in print.
- P. M. Lima, N. B. Konyukhova, N. V.Chemetov and A. I. Sukov, *Mathematical analysis and numerical solution of a singular problem in nonlinear physics*, preprint.



- P. M. Lima, N. B. Konyukhova, N. V. Chemetov and A. I. Sukov, *Analytical-numerical investigation of bubble-type solutions of nonlinear singular problem*, preprint.
- P. Lopes and D. Roseman, *On finite racks and quandles*, submitted to Comm. Algebra.
- P. Lopes and C. A. Morales, *The knot group and the fundamental group of the embedding 3-manifold*, to appear in J. Knot Theory Ramifications.
- H. Mascarenhas, B. Silbermann, *Convolution type operators on cones and their finite sections*, accepted in Math. Nachr.
- M. C. Morais, A. Pacheco and W. Schmid, *On the stochastic behaviour of the run length of EWMA control schemes for the mean of correlated output in the presence of shifts in sigma*, preprint.
- M. C. Morais and A. Pacheco, *Assessing the impact of head starts in the performance of one-sided Markov-type control schemes*, submitted.
- M. C. Morais and A. Pacheco, *Misleading signals in joint schemes for mu and sigma*, submitted.
- L. Nadau, *Numerical modelling of blood flow in small vessels: A finite volume method applied to the Oldroyd-B model*, 2004, preprint.
- J. E. Nelson and R. F. Picken, *Constant connections, quantum holonomies and the Goldman bracket*, submitted to Adv. Theor. Math. Phys., math-ph/0412007.
- S.A. Nazarov, A. Sequeira, M. Specovius-Neugebauer and J.H. Videman, *Artificial boundary conditions for viscoelastic flows*, submitted.
- C.D.M. Paulino, G.L. Silva, and J. Achcar, *Bayesian Analysis of Correlated Misclassified Binary Data*, accepted in Computational Statistical and Data Analysis.
- A. Robertson and A. Sequeira, *A director theory approach for modeling blood flow in the arterial system: an alternative to classical 1D models*, to appear in Mathematical Models and Methods in Applied Sciences (M3AS), Vol. 15, nr.6, (2005), 871-906.
- C. M. Santos-Pereira and A. M. Pires, *On optimal reject rules and ROC curves*, to appear in Pattern Recognition Letters.
- P. A. Santos and B. Silbermann, *An approximation theory for operators generated by shifts*, preprint, Departamento de Matemática, Instituto Superior Técnico, Lisbon, Portugal, 2004.
- N. Sepúlveda, C. D. Paulino and C. Penha-Gonçalves, *Statistical Models for the Joint Action of Two Loci in Complex Binary Traits*, submitted.
- N. Sepúlveda, C. D. Paulino and C. Penha-Gonçalves, *Modelos de interação genética em fenótipos binários complexos*, Submitted to Proceedings of 12<sup>o</sup> Congresso Anual da Sociedade Portuguesa de Estatística, SPE.
- G. L. Silva, C. B. Dean, J. Courteau, T. Niyonsenga and A. Vanasse, *Análise espacial de admissão de pacientes com infarto do miocárdio em Quebeque*, Actas do XII Congresso da SPE 2004, accepted.
- M. Stosic and R. F. Picken, *Parasupersymmetric Quantum Mechanics of Order 3 and a Generalized Witten Index*, submitted to the Proceedings of the Workshop on Quantum Gravity and Noncommutative Geometry, Univ. Lusófona, Lisbon, 20-23/7/2004, math-ph/0407019
- M. Steinhauer, J. M. Urbano and J. H. Videman, *New global a priori estimates for the solution of the third-grade fluid equations*, submitted.

J. Teixeira, Gonzalo E. Pizarro, Marcos Sepúlveda and Daniel R. Noguera, *Bitwise implementation of a two-dimensional cellular automata*, J. Computation in Civil Engineering, accepted.

J. Teixeira, *A hyperfinite approach to the Burgers equation in  $R^n$* , to appear in Proceedings of the conference on Nonstandard Mathematics, Aveiro 2004.

V. L. D. Tomazella, F. Louzada-Neto, and G. L. Silva, *Bayesian modelling for multivariate lifetime data with homogeneous Poisson process and additive frailty*, submitted.

J. H. Videman, J. M. Urbano and D. Bresch, *School and Workshop on Oceanography, Lakes and Rivers*, CIM Preprint Series 25, 300 p.

#### • Other Research Units

A. B. Cruzeiro and F. Cipriano, *Flows associated with irregular  $\mathbb{R}^d$ -vector fields*, accepted in J. Diff. Equations.

A. B. Cruzeiro & X. Zhang,  *$L^p$ -Gradient estimates of symmetric Markov semigroups for  $1 < p \leq 2$* , accepted in Acta Math. Sinica.

A. B. Cruzeiro & X. Zhang, *Harnack-Bismut type formulae for connections with torsion*, submitted.

A. B. Cruzeiro, *On some probabilistic estimates of heat kernels and applications*, submitted.

J. Félix Costa and F.A. Dória, (Guest Editors), Special Issue of the Journal of Applied Mathematics and Computation on Hypercomputation, Elsevier, in print.

J. Félix Costa and J. Mycka, *What lies beyond the mountains, computational systems beyond the Turing limit*, Bulletin of the European Association for Theoretical Computer Science, 85, EATCS, 2005, pp. 181-189.

R. Goeb, C. McCollin and M. F. Ramalhoto, *Ordinal Methodology in the Analysis of Likert Scales*, accepted for publication in Quality and Quantity, Springer Science.

H. Guerra and J. Félix Costa, *Processes with local and global liveness requirements*, submitted.

R. Kenett, M. F. Ramalhoto and J. Shade, *Statistics does what? Stochastics, Six Sigma, Signal and Noise*, submitted.

C. McCollin, D. Stewardson, M. F. Ramalhoto and A. Hiller, *A Flowchart Approach to Problem Solving: Some Case Studies*, submitted.

J. Mycka and José Félix Costa, *The computational power of continuous dynamic systems, Machines, Computations, and Universality (MCU 2004)*, Lecture Notes in Computer Science 3354, Springer-Verlag, (2005), 163–174.

J. Mycka and J. Félix Costa, *The  $P \neq NP$  conjecture, the quest for the Holy Grail in real and complex analysis*, submitted.

J. Mycka and J. Félix Costa, *A new conceptual framework for analog computation*, submitted.

J. Mycka and J. Félix Costa, *Undecidability over continuous-time*, submitted.

J. Pacheco and J. Félix Costa, *Immune algorithms as formal probabilistic algorithms*, submitted.

M. F. Ramalhoto and R. Goeb, *An Innovative Strategy to Put Integrated Maintenance, Reliability and Quality Improvement Concepts Into Action*, accepted for publication by Balkema.

## 2 Academic degrees awarded in 2004

### 2.1 Doutoramentos/Ph.D.'s

J. L. Linhares da Rocha, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 28.1.04. *Thesis*: Invariantes Topológicos e Métricos de Sistemas Dinâmicos de Baixa Dimensão. *Supervisor*: J. Sousa Ramos.

M. C. Esperança Amado, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 12.2.04. *Thesis*: Bootstrap Robusto com Base na Função de Fluência. *Supervisor*: Ana Pires Parente.

L. A. Beirão da Veiga, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 21.5.04. *Thesis*: Theoretical and Numerical Analysis of Some Problems in Structural Mechanics. *Supervisor*: A. Sequeira and Franco Brezzi.

H. Oliveira, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 3.6.04. *Thesis*: Iteradas de Aplicações Não-Polinomiais. *Supervisor*: J. Sousa Ramos.

L. Cruz-Filipe, PhD in Mathematics, University of Nijmegen, The Netherlands, 15.06.04. *Thesis*: Constructive Real Analysis: a Type-Theoretical Formalization and Applications. *Supervisor*: H. Barendregt.

P. M. Barros Correia, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 26.7.04. *Thesis*: Numerical Simulation of a Non-Newtonian Fluid Flow Model Using Finite Element Models. *Supervisor*: A. Sequeira.

M. Rodríguez Olmos, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 1.10.04. *Thesis*: Singular Values of the Momentum Map for Cotangent Lifted Actions. *Supervisor*: E. Sousa Dias.

P. Jesus Soares, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 22.11.04. *Thesis*: Análise Bayesiana de Dados Deficientemente Categorizados. *Supervisor*: C. D. Paulino.

C. Dias Pereira, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 3.12.04. *Thesis*: Reconhecimento de Padrões: Classificação Supervisionada com Rejeição de Observações. *Supervisor*: Ana Pires Parente.

A. L. R. Branco Correia, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 3.12.04. *Thesis*: Arithmetical Properties of the Rees Algebras of Modules. *Supervisor*: S. Zarzuela Armengou and M. Vaz Pinto.

### 2.2 Mestrados/M.A's/M.S.c.'s

P. Serrenho, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 6.1.04. *Thesis*: Análise e Simulação Numérica para a Identificação de Fissuras por Difrração Acústica. *Supervisor*: C. J. S. Alves.

C. I. Correia Diogo, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 6.2.04. *Thesis*: Problemas de Riemann-Hilbert com Símbolos Triangulares Oscilatórios e Factorização Generalizada. *Supervisor*: C. Câmara.

C. R. Jesus Vaz, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 25.2.04. *Thesis*: Suporte de Quantales e Aplicações à Lógica Modal. *Supervisor*: P. Resende.

R. Lopes da Silva, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 19.5.04. *Thesis*: Estabilidade em Equações Diferenciais Não Autónomas. *Supervisor*: L. Barreira.

N. J. Bernardino, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 20.5.04. *Thesis*: Normalização da Imagem de Owh em Problemas de difracção no Plano com Descontinuidades. *Supervisor*: A. Moura Santos.

J. N. Marques Ferreira, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 27.7.04. *Thesis*: O Problema de Carleman Generalizado. *Supervisor*: G. Litvinchuk.

M. D. Luís Reis, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 27.7.04. *Thesis*: O Problema de Hilbert Generalizado. *Supervisor*: G. Litvinchuk.

G. Costa Jacinto, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 30.7.04. *Thesis*: Modelo Adaptativo de Partilha de Largura de Banda em Cenário de Auto-Estrada. *Supervisor*: A. Pacheco Pires.

N. H. Sepúlveda, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 16.9.04. *Thesis*: Modelos Estatísticos para a Acção Conjunta de dois Loci em Fenótipos Binários Complexos. *Supervisor*: C. D. Paulino.

A. P. Lourenço Francisco, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 7.12.04. *Thesis*: Algoritmos para a Predição da Estrutura Terciária de Proteínas. *Supervisor*: A. Oliveira.

D. Canha Gouveia, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 10.12.04. *Thesis*: Operadores de Convolução de Símbolo com Lacuna Espectral Maior ou Igual a 1 e Aplicação ao Caso de um Trinómio. *Supervisor*: C. Câmara.

### 3 Research lectures by department members

- **Center for Logic and Computation (CLC)**

C. Caleiro,

- *Cryptofibring*, Workshop on Combination of Logics - Theory and Applications (CombLog'04), Lisbon, 28-30.7.04.
- *Metareasoning about security protocols using distributed temporal logic*, Workshop on Automated Reasoning for Security Protocol Analysis at IJCAR'04, Cork, Ireland, 4.7.04.
- *Combining classical and intuitionistic logics*, Seminaire de l'Institut de Logique, Université de Neuchâtel, Switzerland, 7.6.04.
- *Metalevel analysis of security protocols*, Information Security Seminar, Department of Computer Science, ETH, Zurich, Switzerland, 24.5.04.
- *Combining logics - The collapsing problem*, Encontro Nacional da Sociedade Portuguesa de Matemática 2004, Instituto Superior de Engenharia do Porto, 5-8.5.04.
- *Cryptomorphisms at work*, 17th Workshop on Algebraic Development Techniques, Barcelona, Spain, 27-29.3.04.

L. Cruz-Filipe,

- *Hierarchical Reflection*, oral presentation, TPHOLs 2004, Park City, Utah, USA, 14-17.9.04.
- *First-Order Logic with Partial Functions*, Brouwer Seminar, Radboud University of Nijmegen, Nijmegen, Netherlands, 6.9.04. C-CoRN: The Constructive Coq R.

C. Hermida,

- *A fibrational framework for relational parametricity*, MFPS XX, Workshop on Mathematical Foundations of Programming Semantics, CMU, Pittsburgh, USA, 22-26.5.04.
- *A roadmap to the unification of weak categorical structures: transformations and equivalences among the various notions of pseudo-algebra*, invited participant, IMA 2004 Summer Program workshop: n-Categories: Foundations and Applications, Minneapolis, USA, 7-18.6.04.
- *Fibrations between Fibrations and Logic of Parametric Polymorphism*, CT04 (International Category Theory conference) UBC, Vancouver, Canada, 18-24.7.04.
- *Paracategories and saturated partial algebra*, Seminário de Álgebra, Universidade de Coimbra, Portugal, 19.10.04.

P. Mateus,

- *Exogeneous quantum logic*, Portuguese Category Seminar 04, Coimbra, 18-22.6.04.
- *An overview of quantum computation*, Mathematics, Systems and Robotics Seminar, CAMGSD/ISR, IST, Lisboa, Portugal, 2.4.04.

A. Ravara,

- *Session types for inter-process communication*. BRICS Seminar, Department of Computer Science, Aalborg University, Denmark, 13.2.04.
- *Spatial types for processes*, Meeting of the Appsem II Project, Tallinn, Estonia, 15.4.2004.
- *Spatial types for processes*, Plenary Lecture, Global Computing: MYTHS-MIKADO-DART Joint Workshop, Venice, Italy, 14-16.6.04.

- *Typing migration control in Lsdpi*, Plenary Lecture, Workshop on Foundations of Computer Security (Satellite event of ICALP04), Turku, Finland, 12-13.7.04.

A. Sernadas

- *Exogeneous quantum logic*, Contributed communication, Workshop on Combination of Logics - Theory and Applications (CombLog'04), Lisbon, 28-30.7.04.
- *Combining logic systems - Why, how, what for?* Invited talk, Seminário de Álgebra, CMUC, Coimbra, Portugal, 17.2.04.

C. Sernadas, *Preservation of interpolation by fibring*, Workshop on Combination of Logics - Theory and Applications (CombLog'04), Lisbon, 28-30.7.2004.

• **Center for Mathematical Analysis, Geometry and Dynamical System (CAMGSD)**

M. Abreu, *Topology of symplectomorphism groups and spaces of complex structures*, Invited speaker, Symplectic Topology, Stare Jablonki, Poland, 3-10.7.04.

S. Anjos,

- *Homotopy decomposition of a group of symplectomorphisms of  $S^2 \times S^2$* , Workshop on Symplectic Topology (CRM Informal special semester in symplectic geometry and topology), Montréal, Canada, 6-12.11.04.
- *The topology of the space of symplectic balls in  $S^2 \times S^2$* , ECM Sattelite Conference on Symplectic Topology, Stare Jablonki, Poland, 3-10.07.04.

J. Buescu, *Positive definite matrices and reproducing kernel inequalities*, Communication, ILAS 2004, Coimbra, July 2004.

A. Cannas da Silva,

- *A panorama of 4-manifolds*, MIT Differential Geometry Seminar, Massachusetts Institute of Technology, USA, 5.4.04.
- *4-manifolds, symplectic or not*, Invited Double Lecture, Conference on Lie Groups and Symplectic Geometry, University of Utrecht, The Netherlands, 23-25.6.04.
- *Fold forms for four-folds*, Princeton Topology Seminar, Princeton University, USA, 23.9.04.

R. Cordovil, *Un théorème de Gil Kalai sur les polyèdres simples revisité du point de vue des matroïdes orientés*, Séminaire Combinatoire Algébrique et Géométrique, Paris VI, França, 25.11.04.

F. Costa, *Centre Manifolds and Self-Similarity in a Coagulation Model*, School of Mathematical Sciences, University of Nottingham, UK, 2.04.

R.L. Fernandes,

- *Stability of symplectic leaves*, Geometry and Topology Seminar, University of Utrecht, The Netherlands, 12.04.
- *Stability of symplectic leaves*, Séminaire Gaston DARBOUX, Université Montpellier, 11.04.
- *Momentum maps in Poisson geometry*, plenary lecture, 10th International Conference in Modern Group Analysis, Larnaca, Cyprus, 10.04.
- *Rigidity vs softness in Poisson Geometry*, invited lecture, XIII Workshop on Geometry and Physics, Murcia, Spain, 9.04.

- *Stability of symplectic leaves*, Séminaire d'algèbres de Lie, Université de Genève, Switzerland, 8.04.
- *Poisson Fibrations*, Bernoulli Center, École Polytechnique Fédérale de Lausanne, Switzerland, 8.04.
- *First Steps in Poisson Topology*, Plenary Lecture, 4th Conference on Poisson Geometry and related fields, University of Luxembourg, 6.04.
- *Deformation vs. Linearization of Poisson structures*, invited lecture, Structures de Contact, Structures de Poisson, Singularités, Colloque en l'honneur de Claude Albert et Jean-Paul Dufour, Université Montpellier II, 6.04.

P. Freitas,

- *A Li-type criterion for zero-free half-planes of Riemann's zeta function*, Invited, CMAF, 11.04.
- *Nodal domains of the Laplacian*, Invited, Conference in honour of João Paulo Dias, Lisboa, 9.04.
- *Domínios nodais do Laplaciano*, Invited, Coimbra, 3.04.

P. Girão,

- *Uma família de desigualdades para funções de Sobolev*, Centro de Matemática e Aplicações Fundamentais, Lisboa, 3.04.
- *A family of sharp inequalities for Sobolev functions*, American Institute of Mathematical Sciences Fifth International Conference on Dynamical Systems and Differential Equations, California State Polytechnic University, Pomona, CA, USA, 16-19.6.04.

D. A. Gomes,

- *Programação linear e equações diferenciais parciais não lineares*, 4<sup>o</sup> Fórum de Investigadores Portugueses Universidade de Coimbra, Coimbra, 7.04.
- *Entropy penalization methods for Hamilton-Jacobi equations*, Rencontres Mathématiques de Rouen, Rouen, France, 6.04.
- *Métodos de Equações Diferenciais Parciais em Mecânica Clássica*, Dep. de Matemática, Universidade de Aveiro, 6.04.
- *On the detection of gaps of Aubry-Mather sets*, Workshop on Hamiltonian Dynamical Systems, Centre de Recherches Mathématiques, Université de Montreal, Montreal, Canada, 5.04.
- *A Variational Formulation for the Navier-Stokes equation*, Dep. de Matemática, Universidade de Lisboa, 1.04.

M. Mariño,

- *Chern-Simons theory and topological strings*, Graduate School Topological invariants, enumerative geometry and dualities in physics, Departamento di Matematica, Università di Torino, 3.04.
- *Topological strings and integrable hierarchies*, Trieste Spring School on String Theory, 3.04.
- *Chern-Simons theory and topological strings*, Course at the Summer School on Mathematics and String Theory, Beijing-Hangzhou, China, 7.04.
- *Matrix models and topological strings*, Les Houches School on Applications of Random Matrices in Physics, Les Houches, 6.04.

- *Chern-Simons theory and matrix models*, Minicourse at 2004 Workshop on Algebraic Geometry and Physics, Lisbon, IST, 9.04.
- *Chern-Simons theory and the topological vertex*, Conference on Geometry and Topology of String Theory, Northwestern University, 5.04.
- *Topological string theory as an exactly solvable model of string dynamics*, Seminar at the University of Lausanne, 11.04.

M. Mendes Lopes,

- *The bicanonical map of surfaces of general type with  $p_g = 0$  and  $K^2 = 6$* , Invited, Workshop: Classification of surfaces of general type with small invariants, Oberwolfach, 16.02.04.
- *A new family of surfaces with  $p_g = 0$  and  $K^2 = 3$* , Invited, Workshop: Classification of surfaces of general type with small invariants, Oberwolfach, 20.2.04.
- *The bicanonical map of surfaces with  $p_g = 0$  and  $K^2 = 6$* , Seminario di Geometria Algebrica, Universita di Tor Vergata (Roma II), Italia, 9.3.04.
- *Even sets of nodes on rational surfaces*, Universita di Pisa, Italia, 1.12.04.

J.P. Nunes, *Analytic and Geometric Aspects of Theta Functions*, XIIIth Oporto Meeting in Geometry, Topology and Physics, Oporto, 7.04.

P. Pinto,

- *Subfactores e Invariantes Modulares*, Seminarios de Álgebra, Departamento de Matemática, Universidade do Algarve, 26.5.04.
- *Subfactors and Modular Invariants: Examples*, Invited talk, Conference on Quantum Spaces – Noncommutative Geometry, Institute for Advanced Studies, Dublin 15-19.11.04.

J.S. Ramos,

- *DNA complexity*, Workshop em Linguagem e Comunicação em Sistemas Complexos, Convento da Arrábida, 5-7.7.04.
- *Entropia: da máquina a vapor ao DNA*, Faculdade de Ciências de Lisboa, CFCUL, 15.7.04.

P. Resende,

- *Groupoids, inverse semigroups, and their quantales*, Category Theory Seminar, Department of Pure Mathematics and Mathematical Statistics, Cambridge University, 23.11.04.
- *Groupoid quantales*, Plenary Lecture, International Category Theory Conference (CT04), University of British Columbia, Vancouver, 18-24.7.04.
- *Groupoid quantales*, Invited Lecture, Portuguese Category Seminar II, Universidade de Coimbra, 22.6.04.
- *Quantales e grupóides*, Invited Plenary Lecture, Encontro Nacional da Sociedade Portuguesa de Matemática, Instituto Superior de Engenharia do Porto, Portugal, 5-8.6.04.
- *Lógica não comutativa*, Invited Lecture, Encontro Nacional da Sociedade Portuguesa de Matemática, Instituto Superior de Engenharia do Porto, Portugal, 5-8.6.04.

A. Serra, *The non-complete Pick property after Quiggin*, Invited talk, Recent Advances in Operator Related Function Theory, Trinity College, Dublin, Ireland, 4-6.8.04.

J. Ventura, *The components of a variety of matrices with square zero and submaximal rank*, Seminari de Topologia, Universitat Autònoma de Barcelona, Spain, 14.4.04.



• **Center for Mathematics and its Applications (CEMAT)**

C. J. S. Alves,

- *Numerical determination of eigenfrequencies and eigenmodes using the method of fundamental solutions*, Keynote lecture, International Conference on Computational & Experimental Engineering and Sciences (ICCES'04), Madeira, 26-29.7.05.
- *Acoustic scattering by multicracks using a boundary finite element method*, 5th International Conference on Boundary Elements Techniques (BETEQ 2004), Lisboa, 21-23.7.05.

C. Amado, *Bootstrap robusto para selecção de variáveis em análise discriminante: Parte II*, XII Congresso Anual da Sociedade Portuguesa de Estatística, Évora, Portugal, 29.9-2.10.04.

J. Branco, *Análise de Clusters*, Minicourse at XII Congresso Anual da Sociedade Portuguesa de Estatística, Évora, 29.9-2.10.04.

C. Câmara, *Polynomial almost-periodic solutions for a class of oscillatory Riemann-Hilbert problems*, IWOTA 2004, University of Newcastle, UK, 12-16.7.04.

C. Carvalho,

- *Index theory for groupoids I*, Universiteit van Amsterdam, Amsterdam, The Netherlands, 5.04.
- *Index theory for groupoids II & III*, Analysis Seminar, Radboud Universiteit Nijmegen, Nijmegen, The Netherlands, 9.04.

P. Lima,

- *Computational methods for non-uniquely solvable Volterra integral equation*, seminar, Department of Mathematics, University College Chester, UK, 29.4.04.
- *Modelação matemática e simulação numérica da formação de bolhas de gás numa mistura gás-líquido*, Contributed talk, Congresso de Métodos Computacionais em Engenharia, Lisbon, Portugal, 31.5-2.6.04.
- *Analytical-numerical investigation of bubble-type solutions of a nonlinear singular problem*, Contributed talk, International Congress on Computational and Applied Mathematics, Leuven, Belgium, 26-30.7.04.
- *Numerical methods for a Volterra integral equations with non-smooth solutions*, Contributed talk, International Congress on Computational and Applied Mathematics, Leuven, Belgium, 26-30.7.04.
- *Mathematical analysis and numerical solution of a singular problem in nonlinear physics*, Plenary talk, VI International Congress on Mathematical Modelling, Nizhny Novgorod (Russia), 20-26.9.04.

P. Lopes,

- *Racks and quandles*, Algebra Seminar, IMPA, Rio de Janeiro, RJ, Brazil, 4.8.04.
- *On finite racks and quandles*, USP Conference: Groups, Rings and Group Rings, Ubatuba, SP, Brazil, 25-31.7.04.
- *Quandles and racks*, Conference: XIV Encontro Brasileiro de Topologia, Universidade Estadual de Campinas, Campinas, SP, Brazil, 26-30.7.04.
- *Knots, quandles, and colorings*, Colloquium, University of South Florida, Tampa, FL, USA, 23.4.04.

- *Knots, knotted surfaces, and colorings, 2-Knot Mini*, Conference, University of South Alabama, Mobile, AL, USA, 10-11.3.04.
- *Quandles and knotted surfaces*, Computational Topology Seminar, The University of Iowa, Iowa City, IA, USA, 2.3.04.
- *Quandles and knots*, Computational Topology Seminar, The University of Iowa, Iowa City, IA, USA, 10.2.04.

H. Mascarenhas, *Convolution type operators on cones and asymptotic properties*, IWOTA 2004, Newcastle University, Newcastle upon Tyne, England, 12-16.7.04

M. Morais,

- *Stochastic Ordering and SPC, Seminar*, Europa Viadrina University, Frankfurt (Oder), Germany, 9.12.04.
- *Esquemas com intervalos amostrais variáveis revisitados* (Variable sampling intervals revisited), (Co-author: António Pacheco), XII Congresso Anual da Sociedade Portuguesa de Estatística, Évora, Portugal, 29.9.04-2.10.04.
- *Misleading signals in joint schemes for  $\mu$  and  $\sigma$* , (Co-author: António Pacheco), VIIIth International Workshop on Intelligent Statistical Quality Control, Stefan Banach International Mathematical Center, Warsaw, Poland, 14.6.04-16.6.04.
- *Joint schemes for the mean and variance revisited*, (Co-author: António Pacheco), Karlsruher Stochastik-Tage 2004, Universität Karlsruhe, Germany, 23.03.04-26.03.04.

C. D. Paulino,

- *Bayesian Analysis of Correlated Misclassified Binary Data* (joint with G. Silva and J. Achcar), Poster, 2004 ISBA Meeting, Viña del Mar, Chile, 23-27.5.04.
- *Análise de dados categorizados omissos segundo uma abordagem frequentista em dois estágios*, (joint with Frederico Poleto e Julio Singer), poster, 16<sup>o</sup> Simpósio Nacional de Probabilidades e Estatística, 26-30.7.04.
- *Infection by Human Papilloma Virus – A Bayesian analysis of binomial regression with misclassified response*,
  - Talk in Dep. Estatística, Universidade Federal de São Carlos, SP, Brazil 18.5.04;
  - Talk in Dep. Matemática, Universidade Federal de Lavras, Minas Gerais, Brazil, 14.5.04;
  - Talk in Dep. Estatística, IME – Universidade de São Paulo, Brazil, 11.3.04.

A. M. Pires,

- *Multiple tests for robust regression in microarray data*, Workshop on Robustness for High-dimensional Data (RobHD 2004), Voral, Austria, 5-8.5.04.
- *Testes múltiplos para a regressão em dados de microarrays*, XII Congresso Anual da Sociedade Portuguesa de Estatística, Évora, Portugal, 29.9-2.10.04.

R. Picken,

- *Geometria local e geometria não-local*, Invited lecture, Encontro Nacional da Sociedade Portuguesa de Matemática, Porto, Portugal, 8.5.04.
- *Parallel Transport for Gerbes*, Invited lecture, Workshop on Quantum Gravity and Noncommutative Geometry, Univ. Lusófona, Lisbon, 21.7.04.

- *Classical and Quantum Geometry of Moduli Spaces in 3D Gravity*, Invited lecture, XIII Fall Workshop on Geometry and Physics, Murcia, Spain, 21.9.04.
- *TQFT and Applications*, Seminário Geral, Centro de Matemática da Universidade do Porto, 3.12.04.

I. M. Rodrigues, *Estimadores ponderados na análise de componentes principais comuns: funções de influência e estudo de Monte Carlo*, XII Congresso Anual da Sociedade Portuguesa de Estatística, Évora, Portugal, 29.9-2.10.04.

A. Moura Santos,

- *Oblique derivative boundary-value problem on a strip grating: the two-straight line approach*, Communication, IWOTA 2004, Newcastle, United Kingdom, 12-16.7.04.
- *Regularity of Solutions to a Diffraction Problem with Oblique Derivatives on a Strip*, Seminar on Analysis and Applications, Universidade do Algarve, 26.6.04.

A. Sequeira,

- *Analysis and simulation of non-Newtonian models in hemorheology*, Invited Seminar at CFTC – UL, Portugal, 28.01.04.
- *Análise e simulação numérica de modelos de hemorreologia*, Invited Seminar at CMUC, Univ. Coimbra, Portugal, 29.01.04.
- *Métodos de elementos finitos para o escoamento de fluidos viscoelásticos em tubos curvos*, Invited Lecture, Encontro Nacional da Sociedade Portuguesa de Matemática - ENSPM'04: Sessão de Análise Numérica, Instituto Superior de Engenharia do Porto, Portugal, 5 -8.05.04.
- *Mathematical and numerical modelling in hemorheology*, Invited Plenary Lecture, International Conference on Free Boundary Problems in Biomathematics, Multiscaling, Infinite-Dimensional Dynamical Systems - FBP 2004, Montecatini, Italy, 10-12.06.04.
- *Analysis and numerical simulations of non-Newtonian fluids modelling blood flows in small vessels*, Invited Plenary Lecture, P.D.E. in Mathematical Physics (in memory of Olga A. Ladyzhenskaya), Levico Terme (Trento), Italy, 24 -30.10.04.
- *Mathematical analysis and numerical simulations of Oldroyd-type fluids with shear dependent viscosity in curved pipes*, Invited Seminar, Mechanical Engineering Graduate Seminar, University of Pittsburgh, USA, 12.11.04.
- *Analyse mathématique et simulation numérique de l'écoulement de fluides non-Newtoniens dans des tubes courbes*, Invited Seminar at SIANO – Dept. de Math. Informatique, Univ. Ibn Tofail, Kénitra, Maroc, 3.12.04.

F. Speck,

- *Diffraction by rectangular wedges from the viewpoint of operator theory*, Functional Analysis and Applications Group, Universidade de Aveiro, 5.2.04.
- *Diffraction by rectangular wedges from the viewpoint of operator theory*, Third International Conference on Boundary Integral Methods: Theory and Applications, Reading, England, 16.9.04.

L. Pessoa, *Algebras Generated by a Finite Number of Poly and Anti-Poly-Bergman Projections and by the Multiplication Operators by Piecewise Continuous Functions*, International Workshop in Operator Theory and Applications, New Castle, UK, July 13, 2004.

G. Silva,

- *Modelos espaço-temporais bayesianos*, Seminário, Universidade de Aveiro, 15.12.04.
- *Binomial regression with misclassification*, Seminar, Simon Fraser University, 8.6.04.
- *Added value of integrating spatial statistics in health geomatics*, Invited conference, Gatineau, Canada, 4.7.04.

J. Teixeira, *A hiperfinite approach to a diffusion advection equation in  $R^n$* , Short Communication, Conference in Nonstandard Mathematics, Aveiro, 5-10.7.04.

J. Videman,

- *Equação de Reynolds Modificada*, Short Communication, CMCE-2004, Lisbon, Portugal.
- *Modified Nonlinear Reynolds Equation for Thin Viscous Flows*, Invited Seminar, Czech Academy of Sciences, Prague, Czech Republic, 6.4.04.
- *Modified Nonlinear Reynolds Equation for Thin Viscous Flows*, Invited Seminar, Munich University of Technology, Germany, 21.6.04.
- *Modified Nonlinear Reynolds Equation for Thin Viscous Flows*, Invited Lecture, Nonlinear Elliptic and Parabolic Problems: A Tribute to H. Amann, Zurich, Switzerland, 28.6.04.

• **Other Research Units**

R. Coutinho,

- *Extended circle maps and the Aubry-Mather theorem*, Invited lecture, seminário do Grupo de Física Matemática, GFM-UL, Lisboa, Portugal, 3.3.04.
- *Monotone extended maps - Bistable extended maps*, Plenary lecture, School - Forum on Coupled Map Lattices 2004, Institut Henri Poincaré, Paris, France, 28.6.04.
- *Monotone extended maps - Extended circle maps*, Plenary lecture, School - Forum on Coupled Map Lattices 2004, Institut Henri Poincaré, Paris, France, 1.7.04.

A.B. Cruzeiro

- *Riemannian path space geometry*, invited lecture, XIII Encontro de Outono de Geometria e Física, Múrcia, Spain, 9.04.
- *Some geometrical numerical approximations of stochastic differential equations*, Fc. Sciences Univ. Tunis, Tunisia, 10.04.

J. Félix Costa,

- *Non Standard Methods in Structural Complexity*, Oxford University, 9.04.
- *Analog Computation and Beyond*,
  - University of Maria Curie-Skłodowska (Lublin, Poland), 6.04.
  - Opening of the Complexity Studies Institute, Invited Lecture, Lisbon, 29.4.04.
  - Invited lecture, International Logic and Computer Science Semester at Tel-Aviv (Tel Aviv University, Israel), 3.04.

M.F. Ramalhoto,

- *Reliability Safety and Quality Improvement*, Technical Report of the Work Package 4, Pro-ENBIS Meeting, Newcastle, UK, 1-5.12.04.

- *Statistical Process Control Procedures in Relation with Reliability Engineering*, invited talk, Manufacturing-Process Control Session, PSAM7/ESREL'04 - Probabilistic Safety Assessment and Management, Berlin, 17.6.04.

## 4 Guest program

- **Center for Logic and Computation (CLC)**

Antonio Acín, Institute of Photonic Sciences, Spain, 24-28.11.04. *Lecture:* Secret-key agreement and bound information, 25.11.04.

Arnon Avron, Tel-Aviv U, Israel, 29.3-4.4.04. *Lecture:* Non-deterministic multiple-valued structures, 2.4.04.

Olivier Bournez, LORIA, France, 16-22.3.04. *Lecture:* On the computational power of some continuous time models of computation, 19.3.04.

Juliana Bueno, CLE, Unicamp, Brazil, 1.2.04-31.7.04. *Lecture:* Algebraizing logics via possible-translations semantics, 16.4.04.

Adán Cabello, University of Seville, Espanha, 3-9.12.04. *Lecture:* How much larger than classical correlations are quantum correlations?, 3.12.04.

W. Carnielli, CLE, Universidade de Campinas, Brazil, 1.2.04-31.7.04. *Lecture:* Minimalist modalities, 20.2.04.

Maxime Crochemore, Institut Gaspard-Monge, U Marne-la-Vallée, France, *Lecture:* Sublinear alignment, 27.2.04.

Ulle Endriss, Imperial College London, UK, 1.10.04. *Lecture:* An extended temporal logic based on ordered trees.

Carla Ferreira, Instituto Superior Técnico, Portugal, *Lecture:* Lecture: A process compensation language.

Simon Gay, University of Glasgow, UK, 20-24.7.04. *Lecture:* Communicating quantum processes, 23.7.04.

José Ignacio Latorre, University of Barcelona, Espanha, 18-21.11.04. *Lecture:* Entanglement along quantum computation, 19.11.04.

Pedro Lima, Instituto de Sistemas e Robótica, Portugal, *Lecture:* Models of robotic tasks based on discrete event and hybrid systems, 26.3.04.

Jean-Yves Marion, LORIA, France. *Lecture:* Extracting feasible programs, 20.5.04.

Luís Moniz Pereira, CENTRIA, Universidade Nova de Lisboa, Portugal. *Lecture:* Revised stable models – a new semantics for logic programs, 16.7.04.

João P. Marques-Silva, INESC, Portugal. *Lecture:* Model checking using Boolean satisfiability, 25.6.04.

Luís Fernando Monteiro, FCT, Universidade Nova de Lisboa, Portugal. *Lecture:* Models for spatial logic based on transition systems with spatialstructure, 28.5.04.

Cristopher Moore, University of New Mexico, USA. *Lecture:* A challenge for quantum computing: the non-Abelian hidden subgroup problem, 2.7.04.

Yasser Omar, Instituto Superior Técnico, Portugal. *Lectures:*

- Introduction to quantum cryptography, 5.11.04.

- Quantum walks with two particles, 18.6.04.

K. Ojakian, Carnegie Mellon University, USA. 12-18.2.04. *Lecture:* Probabilistic methods and Ramsey theory in Bounded Arithmetic, 13.2.04.

Alessandra di Pierro, U Pisa, Italy, 1-9.12.04. *Lecture:* Quantitative program analysis of security properties, 2.12.04.

Pedro Ribeiro, École Polytechnique, France. *Lecture:* Quantum walks with two quantum coins, 10.9.04.

Vítor Rocha Vieira, Instituto Superior Técnico, Portugal. *Lectures:*

- Quantum stochastic processes, 10.12.04.
- Várias formulações da mecânica quântica, 28.5.04.
- Várias formulações da mecânica quântica (conclusão), 4.6.04.

Sonja Smets, Free University of Brussels, Belgium, 10-17.11.04. *Lecture:* On Quantum Propositional Dynamic Logics, 12.11.04.

Paulo Veríssimo, Faculdade de Ciências da Universidade de Lisboa, Portugal. *Lecture:* Science, technology, humans, and other stories, 7.5.04.

Luca Vigano, ETH, Switzerland, 28.8.-9.12.04. *Lectures:*

- Handling algebraic equations in the symbolic analysis of security protocols, 3.9.04.
- A formalization of off-line guessing for security protocol analysis, 3.12.04.

Alberto Zanardo, University of Padova, Italy, 8-14.3.04. *Lecture:* Relative closeness relations among histories, 12.3.04.

• **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

B. Andreas, Humboldt Universitaet, Berlin, Germany, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

D. Andrica, University of Clus, Romania, 13-20.03.04.

E. Aldrovandi, Florida State University, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

F. Balibrea, Universidad de Murcia, Spain, 25-30.01.04.

Cristian Barbarosie, Universidade de Lisboa, Portugal, *Lecture:* Shape optimization and inverse homogenization, 27.04.04.

Martino Bardi, Università di Padova, Italy, *Lecture:*The dynamic programming approach to differential games, 5.11.04

C. Bartocci, Università degli Studi di Genova, Italy, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

P. Baum, Pennsylvania State University, USA, 10-15.01.04.

I. van den Berg, University of Évora, Portugal, Conference on Nonstandard Mathematics, UA, 5-10.07.04.

José Bioucas Dias, Instituto Superior Técnico, Portugal, *Lecture:* Absolute phase estimation, 13.12.04

J. de Boer, Universiteit van Amsterdam, Holland, *Lecture:* String Theory and Nonperturbative Gauge Theory, 21-26.06.04.

A. Braverman, Harvard University, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Alberto Calabri, Univ. Bologna, Italy, 14-20.1.04.

Rémi Carles, Université Bordeaux I, France and Centro de Matemática e Aplicações Fundamentais, Lisboa, Portugal, 23.01.04 and 2-10.11.04. *Lecture:*

- Changing blow-up time in nonlinear Schroedinger equations, 23/1/04.
- Schrödinger equations with potential and hyperbolic Hamiltonian, 9/11/04.

Fabio Chalub, Universidade de Lisboa, Portugal, *Lecture:* Kinetic models for chemotaxis, 16.01.04.

N. Chtcherbakova, Scuola Internazionale Superiore di Studi Avanzati, Italy, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

Ciro Ciliberto, Univ. Roma II, Italy, IST Courses on Algebraic Geometry II - Degeneration Techniques in Algebraic Geometry, IST 8-17.9.04.

Luísa Consiglieri, Universidade de Lisboa, Portugal, *Lecture:* Weak and strong solutions for thermoconvective flows, 26.03.04.

Joaquim Correia, Universidade de Évora, Portugal, *Lecture:* Aproximações às leis de conservação hiperbólicas, 30.04.04.

N. Cutland, University of Hull, England, Conference on Nonstandard Mathematics, UA, 5-10.07.04.

Martin Davis, Professor Emeritus, Courant Institute, New York University, USA, *Lecture:* Gödel's legacy, 30.09.04.

Ana Rita Dias Martins, Universidade de Lisboa, Portugal, *Lecture:* Representations of real semisimple Lie groups and D-modules, 30.11.04.

F. Diener, University of Nice, France, Conference on Nonstandard Mathematics, UA, 5-10.07.04.

Ana Rute Domingos, Universidade de Lisboa, Portugal, *Lecture:* Resultados do tipo Liouville para um sistema de quarta ordem em  $\mathbb{R}^n$ , 12.03.04.

R. Donagi, University of Pennsylvania, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

B. Dubrovin, SISSA, Trieste, Italy, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Daniel Dugger, University of Oregon, USA, *Lecture:* The Hurwitz sum-of-squares problem meets motivic cohomology, 21.07.04.

K. Efsthathiou, Universite du Littoral, France, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

Saber Elaydi, Trinity University, USA, San Antonio, USA, 21-28.11.04. *Lectures:*

- Global stability in autonomous and nonautonomous discrete dynamical systems I, 23.11.04.



- Global stability in autonomous and nonautonomous discrete dynamical systems II, 25.11.04.

Barbara Fantechi, SISSA-Trieste, Italy, 1-6.5.04.

J. Fejoz, Institut de mathematiques, Universite P. & M. Curie, France, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

S. Fernandes, Universidade de Évora, Portugal, 29.01.04.

Mário Figueiredo, Instituto Superior Técnico, Portugal, *Lecture*: Iterative algorithms for wavelet-based image restoration, 6.02.04.

Irene Fonseca, Carnegie Mellon University, Pittsburgh, USA, 12-31.07.04. *Lecture*: Second order variational problems, 27.07.04.

D. Forge, LRI, Université Paris XI, Orsay, France, 5-14.09.04.

F. Fucito, INFN, Università di Roma II, Italy, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Andrés García, Institut National de Recherche en Informatique et en Automatique, France, *Lecture*: The concept of controlled eigenvectors for affine nonlinear systems applied to vehicle formations control, 5.03.04

A. Giacobbe, Utrecht University, Netherlands, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

G. Gibbons, University of Cambridge, UK, *Lecture*: Uniqueness and Stability of Black Hole and Brane Metrics, 21-26.06.04.

Philippe Gimenez, Universidad de Valladolid, Spain, 11-15.12.04. *Lecture*: Sparse changes of coordinates for computing the Castelnuovo-Mumford regularity, 14.12.04.

L. Goettsche, ICTP, Italy, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

T. Golinski, University in Bialystok, Poland, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

Paulo Gonçalves, Instituto Superior Técnico, Portugal, *Lecture*: Diverging moments and parameter estimation, 9.01.04.

M. Grandi, Università degli Studi di Genova, Italy, *Lecture*: Directed combinatorial homology and noncommutative geometry, IST, 9-12.02.04.

D. Grunberg, Max Planck Institute, Bonn, Germany, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

J. Guirao, Universidad de Castilla, La Mancha, Spain, 25-30.01.04.

Troels Harmark, Niels Bohr Institute, Denmark, *Lecture*: Phases of Kaluza-Klein black holes, 22.01.04.

Mark Holland, University of Surrey, UK, *Lecture*: Nonuniformly hyperbolic dynamics and Lorenz attractors, 20.01.04.

Godofredo Iommi, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Portugal, *Lecture*: Multifractal analysis for countable Markov shifts, 30.11.04.

- Robert Jerrard, University of Toronto, Canada, *Lecture*: Jacobian estimates for Ginzburg-Landau equations, 23.06.04.
- R. Jin, College of Charleston, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04.
- S. Katz, University of Illinois, USA Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.
- H. Jerome Keisler, University of Wisconsin, Madison, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04.
- Nitu Kitchloo, Johns Hopkins University, USA *Lecture*: Atiyah dual of a loop space and the Witten Genus, 29.06.04.
- B. Kreussler, Mary Immaculate College, Limerick, Ireland, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04
- Jeroen Lamb, Imperial College, UK, 14-19.10.04. *Lecture*: The geometry of Penrose tilings: projection and substitution, 19.10.04.
- D. Lannes, Université Bordeaux I, France, 24-29.10.04. *Lecture*: Well-Posedness of the water-waves equations, 26.10.04.
- Giovanni Leoni, Carnegie Mellon University, Pittsburgh, USA, 19-31.07.04. *Lecture*: Optimal regularity for free boundary problems and a conjecture of De Giorgi, 20.07.04.
- Hui Li, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Portugal, *Lecture*: The fundamental group of symplectic manifolds with rank 1 Hamiltonian Lie group actions, 16.03.04.
- Paulo Lima-Filho, Texas A & M, USA, *Lecture*: Ternary trees, operads and polynomial maps, 6.04.04.
- P. Loeb, University of Illinois, Urbana-Champaign, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04.
- J. Lopes-Dias, Instituto Superior de Economia e Gestão, Portugal, *Lectures*:
- Renormalization of quasi-periodic motion - I, 19.11.04.
  - Renormalization of quasi-periodic motion - II, 10.12.04.
- René Lozi, Université de Nice, Sophia-Antipolis, France, *Lecture*: Giga-periodic orbits for very weakly coupled tent and logistic discretized maps, 26.05.04.
- Jens Marklof, University of Bristol, UK, 31.05-4.06.04. *Lecture*: Ergodic theory and the distribution of  $n^2x$  modulo one, 1.06.04.
- D. Martelli, Imperial College, UK, 20-27.06.04.
- Pierre Martinetti, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Portugal, *Lecture*: Renormalization and Hopf algebras, 29.06.04.
- André T. Martins, Instituto Superior Técnico, Portugal, *Lecture*: Estimating camera orientation from video in a Manhattan world, 5.11.04.
- A. Martins, Universidade de Lisboa, Portugal, 30.11.04.
- João Faria Martins, Instituto Superior Técnico, Portugal, *Lecture*: Observables of the Turaev-Viro invariant and invariants of embedded graphs, 16.11.04.

Pedro Matias, Instituto Superior Técnico, Portugal, *Lecture: Geometric quantization, complex structures and the coherent state transform*, 14.10.04.

Dejan Milutinovic, Instituto Superior Técnico, Portugal, *Lecture: Stochastic micro agents*, 19/3/04.

S. Minwalla, Harvard University, Cambridge, UK, *Lecture: Gravitational Phase Transitions in Yang-Mills*, 21-26.06.04.

Rick Miranda, Univ. Colorado, USA, IST Courses on Algebraic Geometry II - Degeneration Techniques in Algebraic Geometry, IST10-18.09.04.

N. Mishachev, Lipetsk Technical University, Russia, V Lisbon Summer Lectures in Geometry, IST, June 15-18.06.04.

P. van Moerbeke, Louvain University & Clay Mathematical Institute, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Philippe Monnier, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Portugal, Portugal, *Lecture: A cohomology associated to a function*, 22.6.04.

A. Morozov, ITEP, Moscow, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

M. Mulase, University of California, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

N. Nekrasov, IHES, France, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

E. Nelson, Princeton University, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04.

J. Nelson, Università degli Studi di Torino, Italy, 17-20.11.04.

R. Nest, University of Copenhagen, Denmark, V Lisbon Summer Lectures in Geometry, IST, June 15-18.06.04.

Jorge Neves, Universidade de Coimbra, Portugal, *Lecture: Surfaces of general type and weighted Grassmannians*, 25.05.04.

F. Ngakeu, Université de Douala, Cameroon, 11-20.01.04.

Sérgio Oliva, Universidade de São Paulo, Brazil, 8.07.04. *Lecture: Discretization of unidimensional functional partial equations*, 8.07.04.

Bruno de Oliveira, University of Miami, USA, *Lecture: Hyperbolicity of nodal hypersurfaces and Kobayashi's conjecture*, 8.07.04.

António Ornelas, Universidade de Évora, Portugal, *Lecture: Existence and regularity for minimizers of nonconvex coercive scalar 1-dimensional integrals with nonlower semicontinuous autonomous Lagrangian*, 13.02.04.

Pablo Padilla, Universidad Nacional Autónoma de México, Mexico, *Lecture: Topological properties of bubble clusters*, 1.10.04.

R. Pandharipande, Princeton University, USA Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

T. Pantev, University of Pennsylvania, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Rita Pardini, Univ. Pisa, Italy, 1-9.05.04.

António M. Pascoal, Instituto Superior Técnico, Portugal, *Lecture*: Dynamical systems and marine robotics: from theory to practice, 2.04.04

C. Pedrini, Università degli Studi di Genova, Italy, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Matthew Perlmutter, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Portugal, *Lecture*: Singular reduction of cotangent bundles, 20.04.04.

Martin Pinsonnault, University of Toronto, Canada, *Lecture*: Hamiltonian S1 and T2 actions on 4-manifolds and J-holomorphic curves, 13.07.04.

Alexander Plahkov, Universidade de Aveiro, Portugal, *Lectures*:

- Newton's problem of minimal resistance: the case of multiple collisions, 20.02.04.
- The problem of minimal resistance of a rotating body and problems of mass transport, 21.5.04.

V. Planas-Bielsa, Institut non Lineaire de Nice, France, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

Fabrice Planchon, Université Paris 13, France, 4-10.05.04., *Lecture*: Dispersion for Schrödinger equations with variable coefficients and applications, 4.05.04.

R. Plymen, Manchester University, UK, 13-17.01.04.

R. Prieto, Consejo Superior de Investigaciones Científicas, Spain, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

A. Ramos, Università degli studi di Padova, Italy, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

Miguel Ramos, Universidade de Lisboa, Portugal, *Lectures*:

- Asymptotic properties of the ground-state solutions of singularly perturbed elliptic Hamiltonian systems, 16.03.04.
- An open problem on the existence of nonzero solutions for a class of superlinear elliptic equations, 28.5.04.

L. Rastelli, Princeton University, Princeton, USA, *Lecture*: General Lessons for Open/Closed Duality from Non-Critical Strings, 21-26.06.04.

R. Reinbacher, Rutgers University, USA, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.

Marc Oliver Rieger, Scuola Normale Superiore, Pisa, Italy, *Lecture*: Young measures - basic ideas and recent applications, 27.01.04.

José Francisco Rodrigues, Universidade de Lisboa, Portugal, *Lecture*: The N-membranes problem for nonlinear degenerate systems, 23.03.04.

M. Rodriguez-Olmos, Instituto Superior Técnico, Portugal, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

- D. Ross, University of Hawaii, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04.
- A. Sagnotti, Università di Roma Tor Vergata, Rome, Italy, *Lecture: Higher Spin Gauge Fields*, 21-26.06.04.
- Isabel Salavessa, Instituto Superior Técnico, Portugal, *Lecture: Angles of minimal submanifolds*, 12.10.04.
- T. Sari, University of Haute-Alsace, France, Conference on Nonstandard Mathematics, UA, 5-10.07.04.
- L. Sbano, University of Warwick, UK, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.
- T. Sauvaget, University of Nottingham, UK, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.
- E. Scheidegger, Institute for Theoretical Physics, Vienna, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.
- T. Schmah, University of Warwick, UK, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.
- U. Serres, Scuola Internazionale Superiore di Studi Avanzati, Italy, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.
- S. Shadrin, Independent Univ. of Moscow and Stockholm University, Workshop on Algebraic Geometry and Physics (WAGP04), IST, 7-12.09.04.
- Alexander Sharkovsky, Institute of Mathematics, Kiev and National Academy of Sciences of Ukraine, *Lecture: Descriptive estimates of sets in dynamical systems theory*, 26.05.04.
- João Luís Sobrinho, Instituto Superior Técnico, Portugal, *Lecture: An algebraic theory of network routing*, 14.05.04
- Bart Van Steirteghem, Columbia University, USA, 5-10.07.04. *Lectures:*
- A classification of affine smooth spherical varieties, 6.07.04.
  - A classification of smooth affine spherical varieties. Why? and how, 14.12.04.
- Hans Peter Stimming, Wolfgang Pauli Institute, Vienna, *Lectures:*
- Introduction to Wigner measures and applications in the mathematical theory of quantum mechanics - I, 30.11.04.
  - Introduction to Wigner measures and applications in the mathematical theory of quantum mechanics - II, 2.12.04.
- C. Stoica, University of Surrey, UK, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.
- K. Stroyan, University of Iowa, USA, Conference on Nonstandard Mathematics, UA, 5-10.07.04
- C. Teitelboim, CECS, Valdivia, Chile, *Lecture: Cosmological Constant Decay and Black Holes*, 21-26.06.04.
- Anca-Maria Toader, Universidade de Lisboa, Portugal, *Lecture: A level-set method for shape optimization*, 13.04.04.

D. Torres, University of Aveiro, Portugal, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

R. Tudoran, Ecole Polytechnique Federale de Lausanne, Switzerland, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

J. M. Urbano, Universidade de Coimbra, Portugal, *Lecture*: Regularity results for doubly nonlinear PDEs, 14.05.04.

Enrico Valdinocci, Università di Roma II, Italy, *Lecture*: Quasi-periodic solutions for the n body problem, 16.04.04.

Orlando Villamayor, Universidade Autonoma de Madrid, Spain, 26-30.9.04. *Lecture*: On constructive resolution of singularities, 28.09.04.

S. Vinagre, Universidade de Évora, Portugal, 23.09.04.

M. Vuk, University of Ljubljana, Slovenia, YERM2004 – Young European Network under the Human Potential Program, IST, 13-17.01.04.

M. Wolff, University of Tübingen, Germany, Conference on Nonstandard Mathematics, UA, 5-10.07.04.

• **Center for Mathematics and its Applications (CEMAT)**

Mohamed Amara, Université de Pau et des Pays de l'Adour, France, 24-30.07.04. *Lecture*: Multi-dimensional approximation of hydrodynamical models, 28.07.04.

Vilius Benetis, Technical University of Denmark. *Lecture*: Capacity management in cellular hierarchical networks, 3.11.04.

Nuno Borralho, Instituto de Investigação da Floresta e Papel, RAIZ. *Lecture*: Determinar o mérito genético de uma árvore.

Franco Brezzi, University of Pavia, Italy, 19-24.05.04. *Lecture*: Recent developments in the numerical approximation of PDEs, 20.05.04.

Peter W. Carpenter, University of Warwick, United Kingdom, 6-12.07.04. *Lecture*: Theoretical modeling of the mechanisms for the pathogenesis of syringomyelia or the perils of coughing and sneezing, 8.07.04.

Torsten Ehrhardt, Technical University of Chemnitz, Germany. *Lecture*: Factorization Theory for Singular Integral Operators with Flip, 26.3.04.

Driss Esselaoui, Université Ibn Tofail – Kenitra, Maroc, 1-13.09.04. *Lecture*: First and second order Galerkin-Lagrange methods for transient viscoelastic flows, 8.09.04.

Reinhard Farwig, Darmstadt University of Technology, Germany. *Lecture*: An  $L^q$ -Analysis of Viscous Fluid Flow Past or Around a Rotating Obstacle, 15.7.04.

Claudio Fernandes, Universidade Nova de Lisboa. *Lecture*: Símbolos para Classes de Álgebras de Operadores de Tipo Não Local, 26.3.04.

Daniel Gianola, University of Wisconsin-Madison, USA. *Lecture*: Quantitative genetic models for describing simultaneous and recursive relationships between phenotypes, 5.2.04.

Alexei Karlovich, Instituto Superior Técnico, U.T. Lisboa. *Lectures*:

- Commutators of Singular Integrals on Variable  $L^p$  Spaces II, 13.2.04.
- On the Invertibility of Functional Operators on Banach Spaces, 23.7.04.

Nikolai Karapetyants, Rostov State University, Russia. *Lecture:* Integral Operators in the Localized Hölder Spaces with Variable Exponent, 24.9.04.

Vakhtang M. Kokilashvili, A. Razmadze Institute, Tbilisi, Georgia. *Lecture:* Weighted Boundedness of Integral Operators in the Variable Exponent Spaces of Homogeneous Type, 17.9.04.

Rainer Kress, University of Goettingen, Germany. *Lecture:* Uniqueness in Inverse Obstacle Scattering, 3.11.04.

Andrei K. Lerner, Bar-Ilan University, Israel. *Lecture:* Commutators of Singular Integrals on Variable  $L^p$  Spaces I, 30.1.04

Maria do Carmo Martins, Instituto Superior Técnico, U.T.L. *Lecture:* Factorization of Triangular Symbols - The Trinomial Case, 12.3.04.

Giuseppe Rosario Mingione, Università degli Studi di Parma, Italy. *Lecture:* Functionals with Non-Standard Growth, Lavrentev Phenomenon and Regularity, 10.12.04.

Jean-Claude Nédélec, École Polytechnique, France. *Lecture:* Helmholtz Problems in a Halfspace with an Impedance Condition, 23.07.04.

Sárka Nečasová, Mathematical Institute of the Academy of Sciences, Czech Republic, 8-14.12.04. *Lecture:* Some remarks on the steady fall of a rigid body in viscous fluids, 10.12.04.

Marcel F. Neuts, Department of Systems and Industrial Engineering, The University of Arizona, USA. *Lectures:*

- A random walk on the unit interval, 16.4.04.
- Exploring finite Markov chains by the systematic computation of descriptors, 27.4.04.

Susana S. Neves, ITQB, Instituto de Tecnologia Química e Biológica, Univ. Nova de Lisboa. *Lecture:* Phylogenetics: discovering the tree of life.

Nikolai Nikolskii, Université de Bordeaux, France, and Steklov Institute of Mathematics, St. Petersburg, Russia. *Lecture:* Some Unsolved Problems around  $H$ -Infinity and Operator Theory, 2.4.04.

Stefano M. Pagnotta, Università degli Studi del Sannio a Benevento, Italy. *Lecture:* Approximation algorithms for the estimate of the MCD and a new proposal, 12.1.04.

Carlos Alberto B. Pereira, Instituto de Matemática e Estatística, Universidade de São Paulo, Brasil, 9.04 e 11.04. *Lecture:* Informação estatística e análise pré-posteriori, 22.11.04.

Vladimir Rabinovich, Instituto Politecnico, New Mexico. *Lecture:* Mellin Pseudodifferential Operator Techniques in the Theory of Singular Integral Operators on Carleson Curves, 24.9.04.

Margarida Rocheta, Susana Tereso, Liliana Marum, Grupo Pinus – Instituto de Biologia Experimental e Tecnológica. *Lecture:* Um olhar sobre o reino vegetal: a biotecnologia aplicada ao pinheiro bravo.

Stefan Samko, Universidade do Algarve, Faro. *Lectures:*

- Hardy-Littlewood-Stein-Weiss Inequality in the Lebesgue Spaces with Variable Exponent, 6.2.04

- Weighted Sobolev Theorems for Spatial and Spherical Potentials in the Lebesgue Spaces with Variable Exponent, 21.5.04
- Boundary Value Problems for Analytic Functions and Singular Operators in the Variable Exponent Spaces with General Weights, 17.9.04.

Evgeny Semenov, Voronezh State University, Russia. *Lecture:* The Banach-Saks Index, 25.6.04.

Michael A. Semenov-Tian-Shansky, Université de Bourgogne, Dijon, France. *Lecture:* Q-Deformed Quantum Toda Lattice: Modular Duality, Separation of Variables, and Baxter Equations, 5.3.04.

Bernd Silbermann, Technische Universität Chemnitz, Germany. *Lecture:* Approximation of Spectra and Numerical Linear Algebra, 1.7.04.

Júlio Singer, Universidade de S. Paulo, Brasil, 10.04.

Keith Smith, University of Wales, UK, 27-30.11.04. *Lecture:* Numerical simulation of viscoelastic flows using brownian configuration fields and spectral element methods, 29.11.04.

Vsevolod Solonnikov, Petersburg Department of Steklov Institute of Mathematics, Russia, 9-17.12.04. *Lecture:* On the linearization principle in the problem of stability of equilibrium figures of rotating viscous incompressible liquid, 15.12.04.

A. Sukov, Moscow Technological University, Russia, 28.2-28.3.04. *Short Course:* Modern applied computational methods for ordinary differential equations, 10-11.3.04.



## 5 Postdoctoral fellows

- **Center for Logic and Computation (CLC)**

Luís Cruz-Filipe, PhD in Mathematics, University of Nijmegen, The Netherlands, since October 2004. Support: FCT SFRH/BPD/16372/2004, Center for Logic and Computation (with Amílcar Sernadas). *Research Areas*: Logic and Computation.

Claudio Hermida, PhD in Computer Science, University of Edinburgh, UK, December 1999 - February 2005 (with several interruptions). Support: FCT PRAXIS XXI/BPD/18976/1998, Center for Logic and Computation (with Amílcar Sernadas). *Research Areas*: Category Theory, Logic and Semantics of Computation.

D. Kruml, Ph.D. in Mathematics, University of Brno, Czech Republic, 2002. Support: FCT SFRH/BPD/11657/2002, Center for Logic and Computation (with P. Resende), 1.9.03-31.8.04. *Research Areas*: Theory of quantales.

- **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

J. Lopes Dias, PhD in Mathematics, University of Cambridge, UK, 2002, 6.03-8.04, *Research areas*: Dynamical systems, renormalization, hamiltonian dynamics. (Supported by FCT).

K. Gelfert, PhD in Mathematics, Technische Universität, Dresden, Germany, 2001, 12.03-12.04, *Research areas*: Dynamical systems, dimension theory, ergodic theory. (Supported by FCT) .

G. Iommi, PhD in Mathematics, University of Warwick, UK, since 1.11.04, *Research areas*: dynamical systems.

N. Jung, PhD in Mathematics, University of Illinois, Urbana-Champaign, USA, since 1.09.03-31.10.04, *Research areas*: nonlinear analysis.

D. Krejčířík, PhD in Mathematics, Université de Toulon et du Var, France, 2001 and PhD in Theoretical Physics, Charles University of Prague, Czech Republic, 2001, 2.03-1.05. *Research areas*: mathematical physics, quantum mechanics, spectral geometry. (Supported by FCT).

H. Li, PhD in Mathematics, University of Illinois, Urbana-Champaign, USA, since 1.09.03-31.08.05, *Research areas*: symplectic geometry.

M. Panthee, PhD in Mathematics, Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil, 15.12.04-14.12.05, *Research areas*: partial differential equations, harmonic analysis.

B. Van Steirteghem, PhD in Mathematics, Columbia University, USA, 1.11.04-31.10.05, *Research areas*: Algebraic groups, symplectic geometry.

- **Center for Mathematics and its Applications (CEMAT)**

N. Arada, Docteur en Mathématiques de l'Université de Toulouse, France, 1997. Support: FCT SFRH/BDP/3506/2000. Center for Mathematics and its Applications (with A. Sequeira), since 1.04.01. *Research Areas*: Partial Differential Equations, Optimal Control Theory, Mathematical Fluid Dynamics.

Z. Khatir, Ph.D. in Engineering, University of Warwick, UK, 2000. Support: European Research Training Network HaeMOdel (Mathematical and Numerical Modelling in Haemodynamics) HPRNCT- 2002-00270, 1.10.02 - 30.09.06. Center for Mathematics and its Applications (with A. Sequeira), since 1.06.03. *Research Areas*: Theoretical and Computational Fluid Dynamics, Non-Newtonian Blood Flow Modelling.

L. Nadau, Docteur en Mathématiques Appliquées, Université de Pau et des Pays de l'Adour (UPPA), Pau, France, 2003. Support: Project FCT POCTI/MAT/41898/2001. Center for Mathematics and its Applications (with A. Sequeira), since 1.11.03. *Research Areas*: Flows in Porous Media, Computational Blood Rheology.

• **Other Research Units**

Marcello Savarese, University of Naples, 1.2-14.4.04 (with F. Ramalhoto). Support: University of Naples.

## 5.1 Publications by postdoctoral fellows <sup>1</sup>

• **Center for Logic and Computation (CLC)**

L. Cruz-Filipe and F. Wiedijk, *Hierarchical reflection*, In K. Slind, A. Bunker, and G. Gopalakrishnan, editors, Theorem Proving in Higher Order Logics (17th International Conference, TPHOLS 2004), volume 3223 of Lecture Notes in Computer Science, pages 66–81. Springer-Verlag, 2004.

L. Cruz-Filipe, H. Geuvers, and F. Wiedijk, *C-CoRN, the Constructive Coq Repository at Nijmegen*, In A. Asperti, G. Bancerek, and A. Trybulec, editors, Mathematical Knowledge Management, volume 3119 of Lecture Notes in Computer Science, pages 88–103. Springer-Verlag, 2004.

C. Hermida, *Fibrations for abstract multicategories*, In G. Janelidze, B. Pareigis, and W. Tholen, editors, Galois theory, Hopf algebras, and semiabelian categories, volume 43 of Fields Institute Communications, pages 281–293. American Mathematical Society, 2004.

C. Hermida, *Descent on 2-fibrations and strongly 2-regular 2-categories*, Applied Categorical Structures, 12(5-6):427–459, 2004.

C. Hermida and P. Mateus, *Paracategories II: Adjunctions, fibrations and examples from probabilistic automata theory*, Theoretical Computer Science, 311:71–103, 2004.

• **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

L. Barreira and C. Valls, *Stable manifolds for nonautonomous equations without exponential dichotomy*, to appear in Comm. Math, Phys.

G. Carron, P. Exner and D. Krejčířík, *Topologically nontrivial quantum layers*, J. Math. Phys. 45 (2004), 774-784.

P. Freitas and D. Krejčířík, *Instability results for the damped wave equation in unbounded domains*, to appear in J. Differential Equations.

K. Gelfert, *Dimension estimates beyond conformal and hyperbolic dynamics*, to appear in Dyn. Syst.

K. Gelfert, *Lower bounds for the topological entropy*, to appear in Discrete Cont. Dyn. Systems

R. Jerrard and N. Jung, *Strict convergence and minimal liftings in BV*, Proc. Roy. Soc. Edinburgh Sect. A 134 (2004), 1163-1176.

H. Kantz, W. Just, N. Baba, K Gelfert and A. Riegert, *Fast chaos versus white noise: entropy analysis and a Fokker Planck model for the slow dynamics*, Phys. D 187 (2004), 200-213.

<sup>1</sup>Including publications in 2004 resulting from work carried out by post-docs in previous years.

D. Krejčířík and R. Tiedra de Aldecoa, *The nature of the essential spectrum in curved quantum waveguides*, J. Phys. A 37 (2004), 5449-5466.

J. Llibre and C. Valls, *Integrability of the Lorenz system*, to appear in J. Phys. A.

J. Lopes Dias, *Brjuno condition and renormalisation for Poincaré flows*, to appear in Discrete Contin. Dyn. Syst.

J. Lopes Dias, *Renormalization and reducibility of Brjuno skew-systems*, preprint.

A. Pumariño and C. Valls, *On the double pendulum: an approach to double resonant situations*, Discrete Contin. Dyn. Syst. 11 (2004), 413-448.

C. Valls, *The Boussinesq system: dynamics on the center manifold*, Discrete Contin. Dyn. Syst. 11 (2004), 413-448.

• **Center for Mathematics and its Applications (CEMAT)**

M. Amara, L. Nadau and D. Trujillo, *Adaptive Method for Finite Volume Schemes*, Proceedings of the 4th European Congress on Computational Methods in Applied Sciences and Engineering, ECCOMAS, July 24-28, Jyväskylä, Finland, 2004 (CD-ROM).

N. Arada and A. Sequeira, *Steady flows of shear-dependent Oldroyd-B fluids around an obstacle*, in J. Math. Fluid Mech., Vol. 7, nr 3, (2005), 1-33.

N. Arada and A. Sequeira, *Existence results for steady flows of quasi-Newtonian fluids using weak monotonicity*, in J. Math. Fluid Mech., Vol. 7, sup. 2, (2005), 273-288.

N. Arada, P. Correia and A. Sequeira, *Analysis and Finite Element Simulations of a Second-Grade Fluid Model in a Bounded Domain*, submitted to Numerical Methods for Partial Differential Equations.

N. Arada, P. Correia and A. Sequeira, *Escoamento de Fluidos de Rivlin-Ericksen de Grau 2 em Tubos Curvos*, Actas do Congresso de Métodos Computacionais em Engenharia, C. A. Mota Soares et al. (eds), LNEC May 31 - June 2, 2004.

Z. Khatir, *A boundary element method for the numerical investigation of near-wall fluid flow with vortex method simulation*, Eng. Analysis with Boundary Elements, vol. 28, Issue 11, pp. 1405 – 1416, 2004.

Z. Khatir and A. Sequeira, *Towards numerical simulation of blood flow in small vessels*, Proceedings of the Third International Conference on Computational Fluid Dynamics (ICCFD3), Toronto, July 2004, pp. 157 – 165.

L. Nadau, *Numerical modelling of blood flow in small vessels: A finite volume method applied to the Oldroyd-B model*, 2004, preprint.

• **Other Research Units**

F. Ramalhoto and M. Savarese, *A Fuzzy Logic Approach to the Total Quality Queue Management Framework*, technical report.

## 6 Research programs and sponsorship

### 6.1 Research projects coordinated by department members

- **Center for Logic and Computation (CLC)**

A. Sernadas, FibLog: Fibring Logics. FCT Project FEDER POCTI/2001/MAT/37239 (January 1, 2002 - December 31, 2004)

- **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

R. L. Fernandes, Symplect Topology and Related Geometries, Projecto POCTI/MAT/57888/2004, 2005-2008.

M. Mendes Lopes, Classification of algebraic complex surfaces, FCT POCTI/MAT/44068/2002, 10/09/2003 to 9/09/2006

J. P. Nunes, Moduli Spaces, Integrability and String Theory, POCTI/33943/MAT/2000

J. S. Ramos, Low-dimensional and Infinite-dimensional Discrete Dynamical Systems, POCTI/MAT/60380/2004

P. Resende, Quantalic aspects of quasiperiodic tilings, CRUP/British Council (Treaty of Windsor) No. B-22/04, 1 April 2004 - 30 April 2006.

P. Resende, Groupoids and quantales in geometry and analysis, FCT POCTI/MAT/55958/2004, 14.7.05 - 13 Jul. 2008

C. Rocha, Nonlinear Analysis and Dynamical Systems, POCTI MAT/199/94-20199 (Phase II), 1.02-12.04.

P. F. dos Santos, Homotopy Theoretic Methods in Geometry and Algebra, POCTI/MAT/58497/2004, 01/2005-01/2008.

- **Center for Mathematics and its Applications (CEMAT)**

C. Alves,

- Inverse problems and numerical analysis in wave scattering, FCT - POCTI/MAT/34735/2000, 2001-2004.
- Problemas inversos de identificação de obstáculos, inclusões, falhas e não-homogeneidades em materiais, CAPES-GRICES (with H. Orlande), 2004-2006.
- Boundary meshless methods for solving large scale problems, NATO Collaborative Linkage Grant - PST.CLG.980398 (with C. S. Chen), 2004-2005.

M. Amélia Bastos, Non-local operator algebras, related operator corona problems and applications, IST-UTL [2005-2008], FCT/FEDER/POCTI/MAT /59972/2004.

P. Lima, Computational Methods for Singular Problems, POCTI/MAT/45700/2002, September 2003 - September 2005.

R. Picken, Categorical ideas in gauge theory and applications in low-dimensional topology, POCTI/35175/MAT/2000, 1.7.00 - 30.6.03, extended to 30.6.04.

A. Sequeira,

- HaeMModel: Mathematical and Numerical Modelling in Haemodynamics, Research Training Network, HPRN-CT-2002-00270, 1.10.02 - 30.9.06.
- Mathematical and Numerical Modelling of the Human Cardiovascular System, POCTI/MAT/41898/2001, 15.1.02 - 31.12.05.
- Mathematical Analysis and Numerical Simulation of Non-Newtonian Fluid Models with Applications to the Technology of Polymer Liquid Crystals, POCTI/MAT/380/2001, II phase, 1.09.00 - 31.08.04.
- Numerical Solution of Complex Non-Newtonian Fluid Flow Problems, Project GRICES/CNRST - Bilateral Project Portugal-Maroc, 1.03.04 - 31.12.05.
- Blood Flow Modelling in the Vascular System, Bilateral project Portugal/Tunisia, 1.03.04 - 31.12.05.

- **Other Research Units**

M.F. Ramalhoto, PRO-ENBIS - Contract No. G6RT/CT/2001/05059, European Union, January 2002 - December 2004.

## 6.2 Participation in other research projects

- **Center for Logic and Computation (CLC)**

F. M. Dionísio, MAGO2 - Modelling AGents and Organizations, POSI/SRI/39351/2001, 01.03.2002 - 01.03.2005.

P. Gouveia, ConTComp: Continuous Time Computation and Complexity, FCT FEDER POCTI/MAT/45978/2002, 1.9.03 - 31.08.06.

P. Mateus, Fibring Logics FCT Project FEDER POCTI/2001/MAT/37239 (January 1, 2002 - December 31, 2004)

J. Ramos, FibLog: Fibring of Logics, FCT FEDER POCTI/2001/MAT/37239, 1.02-31.04.

J. Rasga, Fibring Logics, FCT POCTI/2001/MAT/37239, 1.02-12.04.

A. Ravara,

- Models and Infra-structures for Mobile Computing, POSI/CHS/39789/2001, January 1, 2002 - December 31, 2004.
- Mikado: Mobile Calculi based on Domains, IST-2001-32222, January 1, 2002 - December 31, 2004.
- Profundis: Proofs of Functionality for Mobile Distributed Systems, IST-2001-33100, January 1, 2002 - December 31, 2004.

- **Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)**

A. Cannas da Silva,

- EDGE - European Differential Geometry Endeavour, Research Training Network HPRN-CT-2000-00101, 2000-2004.
- Geometric Analysis, Research Training Network HPRN-CT-1999-00118, 2000-2004.

R.L. Fernandes,

- MISGAM: Methods of Integrable Systems, Geometry, Applied Mathematics – European Science Foundation, 2004-2008.
- ENIGMA – European Network in Geometry, Mathematical Physics and Applications, Marie Curie Research Training Network, FP6-2002-Mobility 1 Proposal 005652 (2004-2009).

P. Freitas, ESF Programme in Spectral Theory and Partial Differential Equations (SPECT), 2002-2006.

M. Mendes Lopes, EAGER (european project - contract HPRN-CT-2000-00099), 2001-2004)

J. S. Ramos, Heterogeneous Agents, Learning and Complexity in Optimal Monetary Policy and Asset Pricing, POCTI/ECO/48628/2002.

P. Resende, coordinator of the participation of UTL/IST in GAMAP: Geometric and Algebraic Methods of Physics and Applications, SOCRATES IP 103466-IC-1-2003-1-BE-ERASMUS-IPUC-3 (coordinated by Univ. Antwerp).

• **Center for Mathematics and its Applications (CEMAT)**

C. Carvalho, Pionier Project Klaas Landsman: Quantization, noncommutative geometry, and symmetry, NWO 616.062.384, 9.03-9.05.

T. Diogo, Computational Methods for Singular Problems, POCTI/MAT/45700/2002, September 2003 - September 2005.

C. Florentino, Moduli Spaces, Integrability and String Theory, Research Project in Exact Sciences, POCTI/33943/MAT/2000, FCT, 1.2001 - 1.2004.

P. Lopes, Categorical Ideas, POCTI/MAT/35175/99.

H. Mascarenhas, Non-local operator algebras, related operator corona problems and applications, FCT/FEDER/POCTI/MAT/59972/2004, 1.2005 - 12.2008.

M. Morais, Internet Traffic Measurements, Modelling and Statistical Analysis, POSI/EIA/60061/2004.

A. Pacheco Pires,

- EURO-NGI, Design and Engineering of the Next Generation Internet, Towards Convergent Multi-Service Networks, 2003/12/01-2006/11/30.
- Traffic Modelling and Performance Evaluation of Multiservice Network, Instituto de Telecomunicações, POSI/42069/CPS/2001, 2002/03/01-2004/12/31.

R. Picken, Nonperturbative Aspects of Fields and Strings, POCTI/FNU/49529/2002.

A. Sequeira,

- Multiscale Models of Blood Flow in the Cerebral Vasculature, NSF – 0104680 project of international cooperation, 1.09.01 - 31.08.05.
- Analysis of mathematical models for the motion of rigid bodies in incompressible fluids, POCTI/MAT/61792/2004, 2005 - 2007.

F.O.-Speck, Operator Theoretical Methods in Boundary Value Problems, FCT POCTI/34222/MAT/2000, 1.02-12.05.

J. Videman, Mathematical Methods Applied to the Environmental Problems, Programa Pessoa, GRICES-EGIDE, March 2004 - March 2005.

• **Other Research Units**

A. B. Cruzeiro,

- Functional Integration and Applications, FEDER POCTI/MAT/55977/2004, 1.1.05 - 31.12.07.
- A.B. Cruzeiro, Logic in Quantum Computation, FEDER POCTI/MAT/55796/2004, 1.1.05 - 31.12.07.

M.F. Ramalhoto, European Masters and Research Program on Total Quality Management, since 1994.

## 7 Organizations of scientific events

### 7.1 Events which took place in 2004

- **Center for Logic and Computation (CLC)**

L. Cruz-Filipe, co-organizer, Dutch Proof Tools Day, Nijmegen, Netherlands, 9.7.2004

F. M. Dionísio, co-organizer of the VII Concurso/Encontro Nacional de Programação em Lógica, Lisbon, Portugal, 16-18.04.2004.

J. Ramos, Member of the Programme Committee of CAiSE'04, Riga, Latvia, 7-11.7.2004.

P. Mateus, Co-organizer, Workshop on Combination of Logics: Theory and Applications CLC, Department of Mathematics, IST, Lisbon, Portugal July 28-30, 2004

A. Sernadas, Co-organizer. Workshop on Combination of Logics: Theory and Applications (CombLog'04), IST, Lisboa, July 28-30, 2004.

- **Center for Mathematical Analysis, Geometry and Dynamical System (CAMGSD)**

A. Cannas Silva,

- Co-organizer of the V Lisbon Summer Lectures in Geometry, IST, 15-18.06.04.
- Co-organizer of the Mathematics Undergraduate Summer School Novos Talentos em Matemática, Gulbenkian Foundation, Portugal, 6-10.9.04.

M. M. Lopes,

- Organizer of the short course: Techniques of Algebraic Geometry, IST, Lisboa, 3-5 May 2004.
- Organizer of the short course: Degeneration techniques in Algebraic Geometry, IST, Lisboa, 13-17.9.04.
- Member of the organizing committee of the Workshop on Algebraic Geometry and Physics, IS, Lisbon, Portugal, 7-12.9.04.

J.P. Nunes, co-organizer, Workshop on Algebraic Geometry and Physics, IST, September 7-12.9.04.

J.S. Ramos,

- Member of the Scientific Committee ECIT2004, European Conference on Iteration Theory, 29.8-4.9.04, Batschuns, Austria.
- Member of the Scientific Committee NDES04, 12th International IEEE Workshop on Nonlinear Dynamics of Electronic Systems, 9-13.5.04, Évora.

- **Center for Mathematics and its Applications (CEMAT)**

C. Alves,

- Organizer of the Session: Meshless Methods, International Conference on Computational & Experimental Engineering and Sciences (ICCES'04), Madeira - Portugal, 26-29.7.04.
- Local organization and scientific committee, 5th International Conference on Boundary Elements Techniques (BETEQ 2004), Lisbon, 21-23.7.04
- Co-organizer of the Session: Matemática Computacional, Congresso de Métodos Computacionais em Engenharia, Laboratório Nacional de Engenharia Civil, Lisboa, 31.5- 2.6.04.



- Member of the International Advisory Committee, Inverse Problems Design and Optimization Symposium, Rio de Janeiro, Brazil, 17-19.3.04.

T. Diogo, Co-organizer of International Workshop on Analysis and Numerical Approximation of Singular Problemas, Instituto Superior Técnico, 10-12.11.04.

C. Florentino, Workshop on Algebraic Geometry and Physics, WAGP04, Matrix models and algebraic geometry, IST, Lisbon, Portugal, 7-12.9.04.

P. Lima, Co-organizer of International Workshop on Analysis and Numerical Approximation of Singular Problems (IWANASP2004), Instituto Superior Técnico, Lisbon, Portugal, 10-12.11.04.

J. Mourão,

- Member of the Organizing Committee of the V Lisbon Summer Lectures in Geometry, Lisbon, IST, 15-18.6.04.
- Member of the Organizing Committee of the XIIIth Oporto Meeting on Geometry, Topology and Physics, Oporto University, 16-19.7.04.
- Member of the Organizing Committee of the 2004 Workshop on Algebraic Geometry and Physics: Matrix Models and Algebraic Geometry, Lisbon, IST, 7-12.9.04.

C.D. Paulino,

- Organizer of the Course: Bayesian Analysis with Applications in Quantitative Genetics), Lisbon, IST, 2-4.2.04.
- Member of the Scientific Committee, 12<sup>o</sup> Congresso Anual da Sociedade Portuguesa de Estatística, Évora, 29.9-2.10.04.

R. Picken,

- Member of the Organizing Committee, XIII Oporto Meeting on Geometry, Topology and Physics, Oporto, Portugal, 16-19.7.04.
- Member of the Scientific Committee, XIII Fall Workshop on Geometry and Physics, Murcia, Spain, 20-22.9.04.

J. Teixeira, Coorganizer of the Conference in Nonstandard Mathematics, Aveiro, 5-10.7.04.

J. Videman,

- Coordinator of the CIM Thematic Term on Mathematics and the Environment, Oporto-Coimbra-Lisbon, Portugal, May-July 2004.
- Main Organizer of the School on Atmospheric Sciences and Climate Dynamics, Lisbon, Portugal, July 12-16, 2004.
- Main Organizer of the School and Workshop on Oceanography, Lakes and Rivers, Lisbon, Portugal, July 19-24, 2004.

• **Other Research Units**

J. Félix Costa, Co-organizer of the *Workshop on Language and Complexity* (Calouste Gulbenkian and Oriente Foundations), Convento da Arrábida, 5-7.7.05.

M. F. Ramalhoto,

- Member of the Scientific Program Committee of PSAM7/ESREL'04-Probabilistic Safety Assessment and Management, Berlin, 14-18.6.04.
- Chairperson and organizer of the Session *Manufacturing-Process Control*, PSAM7 /ESREL'2004-Probabilistic Safety Assessment and Management, Berlin, 17.6.04.

## 7.2 Events taking place after 2004

### • Center for Logic and Computation (CLC)

P. Gouveia, Member of the program committee of the 15th European–Japanese Conference on Information Modeling and Knowledge Bases, Tallinn, Estonia, 16-20.5.05

P. Mateus, Comissão científica, 3rd Workshop on Quantitative Aspects of Programming Languages QAPL'05 2-3.4.05, Edinburgh, Scotland.

A. Ravara, The 32nd International Colloquium on Automata, Languages and Programming and Satellite Workshops, FCG and IST, Lisboa, July 11-15.7.05 and 10, 16-17.7.05.

### • Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD)

R. Cordovil, (Co)Organizer of Géométries Combinatoires et Applications: Matroides Orientés, Matroides, C.I.R.M. (Luminy, France), 7-11 November of 2005.

F. Costa, Member of the Organizing Committee of the Workshop on Coagulation-Fragmentation Equations: Theory and Application, ICMS, Edinburgh, UK, 4-8.8.05

L. Godinho, co-organizador, VI Lisbon Summer Lectures in Geometry, IST, Portugal, 14-17.6.05.

### • Center for Mathematics and its Applications (CEMAT)

C. Alves,

- Member of the Organizing Committee, ECOMMAS Thematic Conference on Meshless Methods, Lisbon, Portugal, July 11-14, 2005.
- Member of the Scientific Committee, ICCES Special Symposium on Meshless Methods Stara Lesna, Slovakia, June 8-10, 2005.
- Member of the Organizing Committee, Workshop on Optimization in Medicine, CIM, Coimbra, Portugal, July 20-22, 2005.
- Member of the Scientific Committee, 5th International Conference on Inverse Problems in Engineering: Theory and Practice (5th ICIPE), Cambridge, UK, July 11-15, 2005.

R. Picken,

- Member of the Organizing Committee, XIV Oporto Meeting on Geometry, Topology and Physics, Oporto, Portugal, 21-24.7.05.
- Member of the Scientific Committee, XIV Fall Workshop on Geometry and Physics, Bilbao, Spain, 14-16.9.05.

A. Sequeira,

- Chairman of the Organizing Committee and Member of the Scientific Committee of the Second International Symposium on Modelling of Physiological Flows – MPF 2005, Sesimbra, Portugal, 31.03.05 – 02.04.05.

- Chairman of the Organizing Committee, International Workshop on Currents Topics in Mathematical Fluid Mechanics - MFM-05, IST, Lisbon, Portugal, 17-18.06.05.
- Chairman of the Organizing Committee, International Workshop on Modelling, Analysis and Numerical Simulations of Viscollastic Fluids, - VF 2005, IST, Lisbon, Portugal, 22.07.05.
- Member of the Scientific Committee, International Symposium on Mathematical Fluid Dynamics and related Topics, within the 3<sup>rd</sup> IASME/WSEAS International Conference on Fluid Mechanics and Aerodynamics (Fluid's05), Carfu, Greece, 20-22.08.05.

F. Speck, Member of the Scientific Committee of the International Conference on Analytic Methods of Analysis and Differential Equations, Minsk, Belarus, September 2006.

A. Moura Santos, Member of the Organizing Committee of OTFUSA 2005, Aveiro, Portugal, 7-9.07.05

• **Other Research Units**

A. B. Cruzeiro, Co-organizer and Member of the Scientific Committee, International Conference on Mathematical Analysis of Random Phenomena, Hammamet, Tunisia, 12-17 September 2005.

M.F. Ramalhoto,

- Member of the International Technical Program Committee of ESREL 2005 Conference, Tri City, Poland.
- Organizer of the Invited Session *Integrated Maintenance, Reliability and Quality Improvement Concepts*, ESREL 2005.
- Member of the International Advisory Committee for the International Conference on Operations Research Applications in Infrastructures Development (ICORAID-2005-ORSI), India Institute for Bangalore, 27-29 December, 2005.
- Member of the Scientific Program Committee of the International Symposium on Stochastic Models in Reliability, Safety, Security and Logistics, SMRSSL'05, February 15-17, 2005 Beer Sheva, Israel.

## 8 Other information

### 8.1 Editorial boards

C. Alves, Associate Editor of *Computers, Materials and Continua*.

L. Barreira,

- Executive Editor of *Portugaliae Mathematica*.
- Member of the Editorial Board of *Dynamical Systems*.

R. Cordovil, Executive Editor of *Portugaliae Mathematica*.

M. F. Ramalhoto,

- Associate Editor of *Quality Technology and Quantitative Management*.
- Member of the Editorial Board of *European Journal of Engineering Education*.

A. Sernadas, Member of the Editorial Board of *Formal Aspects of Computing*.

F. Speck, Member of the Advisory Board of *Mathematische Nachrichten*.

F. Speck, Member of the Editorial Board of *Mathematical Methods in the Applied Sciences*.

### 8.2 Scientific management positions

A. Cannas Silva, Member of the Scientific Committee for the Gulbenkian undergraduate excellency prize *Novos Talentos em Matemática*.

A. B. Cruzeiro,

- Member of the Comitee for Meetings of the European Mathematical Society.
- Member of the Conselho Consultivo da Faculdade de Ciências e Tecnologia da Universidade do Algarve.

D. A. Gomes, Vice-president of the Sociedade Portuguesa de Matemática.

M. F. Ramalhoto,

- Member of the George Box Medal Award Committee of the European Network for Business and Industrial Statistics in 2004/05.
- Leader of the Pro-ENBIS Work Package on Reliability, Quality Improvement and Safety, January 2002-December 2004.
- Nominated member of the International Advisory Board of Reliability Conferences of ISI.

A. Sequeira,

- Member of the ECCOMAS Computation Fluid Dynamics Committee.
- A. Sequeira, Member of the Scientific Board of SAEN, Instituto Superior Técnico.

A. Sernadas, Member of the Conselho Científico do Centro Internacional de Matemática, Coimbra, Portugal.

### 8.3 New Positions

Miguel Abreu: Professor Associado

Conceição Amado: Professor Auxiliar

Luis Barreira: Professor Catedrático

Catarina Carvalho: Professor Auxiliar

Diogo Gomes: Professor Associado

Helena Mascarenhas: Professor Auxiliar

Henrique Oliveira: Professor Auxiliar

Paulo Soares: Professor Auxiliar

### 8.4 Personal notes by department members

#### • Center for Logic and Computation (CLC)

C. Caleiro,

- Visited the Information Security Group of the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, from March to July 2004, while on sabbatical leave from IST.
- Member of the Ph.D. jury of M. Martins, Universidade de Lisboa, Portugal, September 17, 2004.
- Co-supervisor of the M.Sc. thesis of J. Bueno, Possible-translations algebraic semantics, Univ. Estadual de Campinas, Brazil, August 31, 2004.
- Observer of IFIP Working Group 1.3 - Foundations of System Specification.

F. M. Dionisio, Cooperation with the National University of East-Timor, June-July 2004.

A. Ravara, The 32nd International Colloquium on Automata, Languages and Programming and Satellite Workshops, FCG and IST, Lisboa, July 11-15 and July 10, 16-17, 2005.

A. Sernadas,

- Concurso de Professor Associado de Matemática, Universidade do Minho, Junho de 2004 (relator).
- Concurso de Professor Associado de Informática - Metodologia e Tecnologia da Programação, Instituto Superior Técnico, Universidade Técnica de Lisboa, Fevereiro de 2004.
- Concurso de Professor Associado de Informática - Sistemas de Informação, Instituto Superior Técnico, Universidade Técnica de Lisboa, Fevereiro de 2004.
- Concurso de Professor Catedrático de Matemática, Faculdade de Ciências e Tecnologia, Universidade de Coimbra, Janeiro de 2004.
- Nuno João Neves Mamede, Agregação em Engenharia Informática e de Computadores, Instituto Superior Técnico, Universidade Técnica de Lisboa, Setembro 27-28, 2004.
- Luís Silveira, Agregação em Engenharia Electrotécnica e de Computadores, Instituto Superior Técnico, Universidade Técnica de Lisboa, Julho 8-9, 2004 (arguente).
- Pedro Guerreiro, Agregação em Engenharia Informática, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Julho 1-2, 2004 (arguente).

- João Paulo Marques da Silva, Agregação em Engenharia Informática e de Computadores, Instituto Superior Técnico, Universidade Técnica de Lisboa, Fevereiro 12-13, 2004.
- Ricardo Lopes de Saldanha, Doutoramento em Engenharia Informática, Instituto Superior Técnico, Universidade Técnica de Lisboa, Abril 1, 2004.
- Alexandre Francisco, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Dezembro 7, 2004 (Presidente e co-orientador).

C. Sernadas,

- Concurso de Professor Associado de Matemática, Universidade de Coimbra, Fevereiro de 2004.
- Presidente do Centro de Lógica e Computação, desde Janeiro de 2003.

• **Center for Mathematical Analysis, Geometry and Dynamical System (CAMGSD)**

L. Barreira,

- Associate Member of the Center for Dynamics and Geometry, The Pennsylvania State University, University Park, USA.
- Member of the Executive Commission of the Center for Mathematical Analysis, Geometry, and Dynamical Systems, Lisbon, Portugal.
- Organizer of the Seminar on Analysis, Geometry, and Dynamical Systems.
- Member of the Jury ("arguente" for the lesson) for the Agregação of J. Alves, Universidade do Porto, Portugal, 9-10.12.04.

R. L. Fernandes,

- Júri de Doutoramento: Olivier Brahic, *Caractérisation du voisinage d'une feuille symplectique dans une structure de Poisson*, (rapporteur) Doctorat Mathématique, Université Montpellier, Novembro 2004
- Júri de Mestrado: Paulo dos Santos Antunes, *Algebróides de Lie e Geometria de Poisson*, Mestrado em Matemática, FCTUC, Fevereiro de 2004.

P. Freitas,

- External examiner, MSc thesis of Eduardo Sousa, *Grupóides e sincronização em sistemas de células acopladas*, University of Porto, October 2004
- External examiner, PhD thesis of Carla Alves Pinto, *Coupled Oscillators*, University of Porto, January 2004.

M. M. Lopes,

- Other talks: *Pitágoras, Fermat e os racionais*, Universidade Lusófona, 9 /11/2004.
- Orientation of external thesis (concluded in 2004):
  - Maria Marti Sanchez, *Sobre o número máximo de nodos de quinticas e sexticas de  $\mathbb{P}^3$* , M.Sc. thesis, FCUL.
  - Pedro Macias Marques, *Alguns problemas clássicos de Geometria projectiva*, M.Sc. thesis, FCUL.
  - Maria Clementina Timoteo, *A classificação das cúbicas planas*, M.Sc. thesis, FCUL.
- Jurys:

- Member of the jury for the M.Sc. of Maria Marti Sanchez, Faculdade de Ciencias da Universidade de Lisboa, 29/01/2004.
- Member of the jury for the M.Sc. of Pedro Macias Marques, Faculdade de Ciencias da Universidade de Lisboa, 25/03/2004.
- Member of the jury for the M.Sc. of Maria Clementina Timoteo, Faculdade de Ciencias da Universidade de Lisboa, 2/09/2004.
- Reporting member of the jury for the M.Sc. of Violante de Jesus Pericão, Faculdade de Ciencias da Universidade de Lisboa, 2/09/2004.
- President of the jury of the Ph.D. (dottorato) thesis of Francesco Polizzi, Universita di Roma II(Tor Vergata), Italia, 4/03/2004.

J. Matias, Visita à E.P.F.Lausanne em Março de 2004, a convite do Prof. Bernard Dacorogna.

J.S. Ramos, New PhD students:

- *Sistemas Dinâmicos Discretos em Baixa Dimensão* (com co-orientação M. Clara Grácio), Cristina Januário, assistente do Dep. Eng. Química do Instituto Superior Engenharia de Lisboa.
- *Comportamento Caótico em Sistemas Fisiológicos*, (com co-orientação Luis Silva), Jorge Duarte, assistente do Dep. Eng. Química do Instituto Superior Engenharia de Lisboa.
- *Teoria dos Números e Sistemas Dinâmicos Discretos*, Sandra Vaz, assistente do Departamento de Matemática, Universidade da Beira-Interior.
- *Dinâmica Complexa*, João Cabral, assistente Departamento de Matemática, Universidade dos Açores.
- *Sistemas Dinâmicos Algébricos*, António Patrício Alexandre, assistente do Departamento de Matemática, FCT, Universidade Nova de Lisboa.

P. Resende,

- External examiner, D.Phil. of James McNaughton, Univ. Sussex, November 21, 2004.
- Principal examiner, Doutoramento em Matemática of Ana Helena Roque, Univ. Aveiro, June 21, 2004.

• **Center for Mathematics and its Applications (CEMAT)**

M. Amélia Bastos, Relatora de PhD thesis: H. Mascarenhas, *Convolution type operators on cones and asymptotic spectral theory*, Technischen Universität Chemnitz, 2004. Supervisor: B. Silbermann.

P. Lopes,

- Visiting Assistant Professor, Spring Semester 2004, The University of Iowa, Iowa City, IA, USA.
- Doctoral Student: Luis Camacho (joint advisor with F. M. Dionisio).

R. Picken was external examiner for the MSc thesis *Teoria de Feixes Aplicada ao Estudo de Gerbes Muniados de Conexão*, by Ana Cristina Castro Ferreira, supervised by Peter Gothen (Univ. Porto) 3.12.04.

A. Moura Santos,

- Orientação da Dissertação de Mestrado do licenciado Nuno Bernardino com o título *Normalização da imagem de operadores de Wiener-Hopf em problemas de difracção no plano com descontinuidades*. As provas tiveram lugar no IST a 20 de Maio de 2004.

- Arguente nas seguintes provas de Mestrado:
  - Dissertação intitulada *Relações Matriciais e Invertibilidade de Operadores do Tipo de Convolação em Espaços de Lebesgue*, do Licenciado Alberto Manuel Tavares Simões. As provas tiveram lugar na Universidade de Aveiro a 14 de Junho de 2004.
  - Dissertação intitulada *O Problema de Carleman Generalizado*, do Licenciado Jorge Nélio Marques Ferreira. As provas tiveram lugar no IST a 27 de Julho de 2004.

P. Santos, Assistant-Director of Instituto Superior Técnico for new information technologies in teaching and learning Coordinator of the e-learning content production supporting office, GAEL, Instituto Superior Técnico.

F. Speck, Reporting member of the juri for the agregação of Luís Castro, Universidade de Aveiro, 25-26.11.04.

A. Sequeira,

- Member of the FCT panel for the evaluation of Postdoctoral, PhD and Master grants in Mathematics.
- Member of the FCT panel for the intermediate evaluation of projects POCTI/2000 and POCTI/2001 in Mathematics.
- Visiting Professor at University of Pittsburgh, Department of Mechanical Engineering, USA, 7-19.11.04.
- Visiting Professor at SIANO – Dept. de Math. Informatique, Univ. Ibn Tofail, Kénitra, Maroc, 1-8.12.04.
- Reporting member of the jury for the Habilitation Universitaire en Mathématiques Appliquées de l'Université de Tunis of Hédia Chaker, École Nationale d'Ingénieurs de Tunis, Tunisia, 1.03.04.
- Reporting member of the Ph.D jury of Mourad Ismail, Laboratoire Jacques Louis Lions, Université Pierre et Marie Curie, Paris, France, 26.05.04.
- Reporting member of the M.Sc jury of Fabiano Silva, Faculdade de Ciências da Universidade do Porto, 17.02.04.
- Scientific reviewer research projects submitted to the Academy of Sciences of the Czech Republic.
- Reporting member of the jury for Professor Coordinator at Escola Superior de Tecnologia e Gestão de Leiria, Leiria, Portugal, 17.12.04.
- Guest editor (with G.P. Galdi) of the special issue on Nonlinear Partial Differential Equations: Theory and Applications (dedicated to Hugo Beirão da Veiga), of the Journal of Mathematical Fluid Mechanics.

G. Silva, Participação em júri de Mestrado (Relator), Dissertação: *Modelos de tempo de vida acelerado em análise de sobrevivência*, Faculdade de Ciências da Universidade de Lisboa, 26/11/2004.

J. Teixeira, Gave a talk in the Seminar of Partial Differential Equations of the DMIST. Title: *A hiperfinite approach to a diffusion advection equation in  $\mathbb{R}^n$* .

#### • Other Research Units

A. B. Cruzeiro,

- Arguente no doutoramento de Maria Joana O. Torres, FCUL, Julho de 2004.



- Co-orientador do bolsheiro Pós-Doutoramento Liu Jicheng, bolsheiro do GFM, Março-Agosto 2004.

J. Félix Costa,

- Luís Miguel Mendes Gomes, from Azores University, is working under my supervision, towards a dissertation on *Continuous-time Automata with Oracles*.
- Hélia Marília Guerra got her PhD under my supervision with a dissertation entitled *Algebraic Theory of Sequential Processes with Liveness Requirements*, October 8, 2004.
- José Daniel Dias Pacheco got his MSc under my supervision with a dissertation entitled *Computational Power of Killers and Helpers in the Immune System*, Faculdade de Ciências da Universidade de Lisboa, July 21.
- Member of the jury of the PhD examination of Elisabete Maria da Silva Raposo Freire, supervised by Luís Fernando Monteiro, Azores University, November 19, 2004.

M.F. Ramalhoto,

- SEFI Fellow.
- Expert for two Research Programs of the Sixth European Framework, of the European Commission.
- Member of the Scientific Committee to award the "Doutoramento" (Ph.D.) Degree, in the area of Statistics-Statistical Process Control, Universidade de Évora, Mathematics Department, January 16, 2004.
- Guest Editor, jointly with a colleague from Carnegie Mellon University, USA, of a special issue on Industry, Engineering Education and Globalization of the European Journal for Engineering Education, EJEE (in preparation).
- Guest-Editor, jointly with a colleague from Rutgers University, USA, of a special issue on New Trends and Directions in Reliability of the Quality Technology and Quantitative Management, QTQM (in preparation).