



## **Research Report 2002**

Department of Mathematics  
Instituto Superior Técnico  
Lisbon, Portugal

*Departamento de Matemática  
Instituto Superior Técnico  
1049-001 Lisboa  
Portugal*

*Telephone: +351 218 417 211  
Fax: +351 218 417 598  
Email: [jferr@math.ist.utl.pt](mailto:jferr@math.ist.utl.pt)  
URL: <http://www.math.ist.utl.pt>*

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## Preface

In the twelfth 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 92 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. For administrative purposes, the Department is organized in four sections: *Algebra and Mathematical Analysis, Applied Mathematics and Numerical Analysis, Statistics and Applications, and Computer Science*. The first section accounts for about two thirds of the Department and includes the part of applied mathematics related to differential and integral equations, linear operator theory, dynamical systems, geometry and topology. In spite of the name of this first section, due to historical reasons related to the courses taught at the institute when the Department was created in 1980, most of the research activity in this section is on mathematical analysis, geometry and mathematical physics, and it is within this section that areas like topology and algebra are developing.

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 in the assessments of 1996 and 1999 acknowledging the high international value of the research performed. The results of the 2002 assessment are expected to be published in 2003.

We would like to thank everyone who was involved in the organization of this issue, especially Prof. Carlos Florentino, who coordinated the production of the report. We are also grateful to Prof. Luis Barreira, Prof. Luis Magalhães, and Prof. Carlos Rocha for their helpful suggestions to the first draft, and to Florbela Carvalho for her work in the compilation of information and L<sup>A</sup>T<sub>E</sub>Xprocessing of this issue.

Lisbon, July 21, 2003

The Department Chairman,

Prof. José Manuel Ferreira



## Research Areas

The main areas of research in the Department of Mathematics of Instituto Superior Técnico are the following:

### *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 singular integral operators and other related classes of linear operators like Toeplitz, Carleman-shift and pseudo-differential operators. The motivation for the work comes mainly from problems of diffraction theory and other applications leading to elliptic boundary-value problems. These problems are formulated in appropriate Sobolev spaces and treated by operator theory methods. The emphasis is on linear operator theory and Banach algebras and their connections with complex analysis, in particular Hardy spaces. Current problems under investigation include factorization of (semi)-almost periodic matrix-valued symbols, diffraction problems with approximate boundary conditions of arbitrary order, operator relations,

normalization problems, and finite section methods for singular equations.

### *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 Mathematical Analysis in Fluid Dynamics*

The research on numerical methods for differential and integral equations is mainly directed towards: i) convergence acceleration techniques for ordinary differential equations with singularities and also for integral equations with singular kernels; ii) integral equation methods applied to problems in material science (elasticity and effective properties of composite materials); iii) spline collocation methods for Volterra integral equations with singular kernels; iv) boundary integral equations methods in acoustic and elastic scattering and related inverse scattering problems. The research on fluid dynamics is concerned with the questions of existence, uniqueness and asymptotic behavior of solutions to the equations modeling the flow of incompressible non-Newtonian fluids of differential type. Situations such as flows in bounded and exterior domains and flows in domains with unbounded boundaries (channels, pipes, aperture domains) have been studied. The numerical study of the Stokes and Navier-Stokes equations by boundary and finite element methods as well as by domain decomposition methods has also been addressed.

### *Logic and Computation*

Research in this area is concentrated on three main topics: i) abstract deduction systems, with emphasis on modal logic, paraconsistent logic, categorical logic and the combination of logic systems, with applications in knowledge representation, software engineering and security; ii) algebraic and geometric models of concurrent computing, including algebras of mobile distributed computation, as well as quantales and links between quantale theory and noncommutative geometry; iii) computability and complexity in digital, analog and hybrid computational systems.

### *Other Areas*

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



## 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 Mathematical Analysis, Geometry, and Dynamical Systems, coordinated by C. Rocha, with 49 Ph.D. members.  
URL: <http://www.math.ist.utl.pt/cam/>
- Centre for Mathematics and its Applications, coordinated by A. Sequeira, with 41 Ph.D. members and research groups in operator theory, Banach algebras, numerical analysis, fluid mechanics, statistics, stochastic processes, and mathematical physics.  
URL: <http://www.math.ist.utl.pt/cma/>
- Center for Logic and Computation, coordinated by A. Sernadas, with 12 Ph.D. members.  
URL: <http://www.math.ist.utl.pt/clc/>

Other Centers, mainly based on researchers of other departments, count with one or two members of the Department of Mathematics, namely: *Center for Plasma Physics*, coordinated by J. T. Mendonça (URL: <http://cfp.ist.utl.pt/>), *Institute for Mechanical Engineering - IDMEC*, *Centro de Projecto Mecânico*, coordinated by C. Mota Soares, *Laboratory of Models and Computational Architectures*, coordinated by H. Coelho. (URL: <http://labmac.di.fc.ul.pt/>), *Mathematical Physics Group*, coordinated by J.-C. Zambrini. (URL: <http://gfm.cii.fc.ul.pt/>). and *Research Unit for Naval Engineering and Technology*, coordinated by C. G. Soares



## Research Seminars

During 2002 the Department of Mathematics at Instituto Superior Técnico ran regular sessions of the following seminars:

- Seminar on Algebra (18 sessions).  
Organizers: Pedro Ferreira dos Santos, Pedro Resende and Maria Vaz Pinto.
- Seminar on Analysis, Geometry, and Dynamical Systems (48 sessions).  
Organizer: Luis Barreira.
- Seminar on Applied Mathematics and Numerical Analysis (9 sessions).  
Organizer: Adélia Sequeira.
- Seminar on Ergodic theory and Dynamical Systems (11 sessions).  
Organizer: Luis Barreira.
- Seminar on Functional Analysis and Applications (26 sessions).  
Organizer: Frank-Olme Speck.
- Seminar on Mathematical Physics (14 sessions).  
Organizers: José Natário and João Nunes.
- Seminar on Probability and Statistics (12 sessions).  
Organizer: Ana Pires Parente.
- Seminar on Theory of Computing (35 sessions).  
Organizer: Amílcar Sernadas.
- Topological Quantum Field Theory Club (12 sessions).  
Organizers: José Mourão and Roger Picken.

During 2002 regular sessions also ran of the following seminars, in collaboration with other institutions:

- Seminar Geometria em Lisboa, in collaboration with Universidade de Lisboa.  
Organizers: Rui Loja Fernandes and Margarida Mendes Lopes (Universidade de Lisboa).
- Seminar on Mathematical Logic, in collaboration with Universidade de Lisboa.  
Organizers: Fernando Ferreira (Universidade de Lisboa) and Narciso Garcia.

**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 Centre for Mathematics and its Applications, with 6 sessions in 2002 (see §4 below for detailed information). The organizer was Pedro Resende.



# 1 Publications

## 1.1 Publications appeared in 2002

### 1.1.1 Books (authored or edited)

#### *Algebra and Mathematical Analysis*

L. Barreira and Ya. Pesin, *Lyapunov Exponents and Smooth Ergodic Theory*, University Lecture Series 23, Amer. Math. Soc., 2002.

A. Galves, J. K. Hale and C. Rocha Eds., *Differential Equations and Dynamical Systems*, Fields Institute Communications, 31, Amer. Math. Soc., 2002.

J. K. Hale, L. T. Magalhães and W. M. Oliva, *Dynamics in Infinite Dimensions*, Applied Mathematical Sciences, 47, Springer Verlag, 2002.

W. M. Oliva, *Geometric Mechanics*, Lect. Notes in Math., 1798, Springer Verlag, 2002.

### 1.1.2 Chapters/Articles in Books with international refereeing

#### *Algebra and Mathematical Analysis*

L. Barreira, *Non-uniform hyperbolicity and invariant manifolds*, in Dynamics in Infinite Dimensions, J. Hale, L. Magalhães and W. Oliva, Applied Mathematical Sciences 47, Springer Verlag, 2002, pp. 123-127.

D. Gomes, *Viscosity solutions and Aubry-Mather theory*, in Geometric Mechanics, W. M. Oliva, Lect. Notes in Math., 1798, Springer Verlag, 2002, pp. 245-257.

J. Natário, *Möbius transformations and the Lorentz group*, in Geometric Mechanics, W. M. Oliva, Lect. Notes in Math., 1798, Springer Verlag, 2002, pp. 195-221.

J. Natário, *Quasi-Maxwell form of Einstein's equation*, in Geometric Mechanics, W. M. Oliva, Lect. Notes in Math., 1798, Springer Verlag, 2002, pp. 223-244.

### 1.1.3 Articles in International Journals and Serials

#### *Algebra and Mathematical Analysis*

M. Abreu and P. Freitas, *On the invariant spectrum of  $S^1$ -invariant metrics on  $S^2$* , Proc. London Math. Soc. **84** (2002), 213-230.

J. Almeida and L. Barreira, *Hausdorff dimension in convex bornological spaces*, J. Math. Anal. Appl. **268** (2002), 590-601.

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M. A. Bastos, Yu. I. Karlovich and A. F. dos Santos, *The invertibility of convolution type operators on a union of intervals and the corona theorem*, Integral Equations Operator Theory **42** (2002), 22-56.

M. C. Câmara, A. F. dos Santos and M. P. Carpentier, *Explicit Wiener-Hopf factorization and non-linear Riemann-Hilbert problems*, Proc. Royal Soc. Ed. **132A** (2002), 45-74.

J. Chabrowski and P.M. Girão, *Symmetric solutions of the Neumann problem involving a critical Sobolev exponent*, Topol. Methods Nonlinear Anal. **19** (2002), 1-27.

R. Cordovil, *A commutative algebra for oriented matroids*, Discrete and Computational Geometry, **27** (2002), 73-84.

F. P. da Costa, M. Grinfeld and J. Wattis, *A hierarchical cluster system based on Horton-Strahler rules for river networks*, Stud. Appl. Math. **109** (2002), 163-204.

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- T. Ehrhardt and F.-O. Speck, *Transformation techniques towards the factorization of non-rational  $2 \times 2$  matrix functions*, Linear Algebra and its Applications **353** (2002), 53-90.
- R. L. Fernandes, *Lie algebroids, holonomy and characteristic classes*, Advances in Mathematics **170** (2002), 119-179.
- R. L. Fernandes and P. Damianou, *From the Toda lattice to the Volterra lattice and back*, Reports on Math. Phys. **50** (2002), 361-378.
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J. E. Nelson and R. F. Picken, *Parametrization of the moduli space of flat  $SL(2, \mathbb{R})$  connections on the torus*, Lett. Math. Phys. **59** (2002), 215-226.

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A. Sernadas, C. Sernadas and A. Zanardo, *Fibring modal first-order logics: Completeness preservation*, Logic Journal of the IGPL **10** (2002), 413-451.

C. Sernadas, J. Rasga and W. A. Carnielli, *Modulated fibring and the collapsing problem*, Journal of Symbolic Logic **67** (2002), 1541-1569.

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A. B. Cruzeiro and P. Malliavin, *Riemannian geometry on the path space, stochastic partial differential equations and applications*, ed. G.da Prato and L.Tubaro, Lecture Notes in Pure and Applied Mathem., vol 227, Marcel Decker, 2002, pp. 133-165.

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N. B. Konyukhova, P. M. Lima and M. P. Carpentier, *Asymptotic and numerical approximation of a nonlinear singular boundary value problem*, in Tendências em Matemática Aplicada e Computacional, 3.2, 2002, pp. 141-150.

*Computer Science*

M. E. Coniglio and C. Sernadas, *A complete axiomatization of higher-order intuitionistic logic*, Presented at X Encontro Nacional de Filosofia, ANPOF, S. Paulo, Brazil, 30.9-3.10.02.

P. Mateus, A. Pacheco and J. Pinto, *Observations and the probabilistic situation calculus*, In D. Fensel, F. Giunchiglia, D. McGuinness and M.-A. Williams, editors, Procs. Eighth International Conference on Principles of Knowledge Representation and Reasoning (KR2002), 2002, pp. 327-338. Morgan Kaufmann.

P. Menezes, A. Costa, L. Machado and J. Ramos, *Nautilus: A concurrent anticipatory programming language*, In D. Dubois, editor, Computing Anticipatory Systems: CASYS'01 - Fifth International Conference, volume 627 of AIP Conference Proceedings, 2002, pp. 553-564. American Institute of Physics.

J. Neto, J. F. Costa, P. Carreira and M. Rosa, *A compiler and simulator for partial recursive functions over neural networks*, 4th International Conference on Recent Advances in Soft Computing, Nottingham, UK, December 12-13, 2002, pp. 49-54.

A. M. Santos, P. A. Santos, F. M. Dionísio and P. Duarte, *Online assessment in undergraduate mathematics*, in C. Tzanakis, Ed., Procs. 2nd International Conference on the Teaching of Mathematics (ICTM2). University of Crete, 2002.

**1.1.5 Other Publications***Algebra and Mathematical Analysis*

F.-O. Speck, *In memoriam Professor Erhard Meister (1930-2001)*, Math. Methods Appl. Sci., **25** (2002), pp. 1-2.

*Statistics and Applications*

A. M. Pires, *Confidence intervals for a binomial proportion: comparison of methods and software evaluation*, Proceedings of the Conference CompStat 2002 - Short Communications and Posters, in S. Klinke, P. Ahrend and L. Richter, Eds., 2002.

M. F. Ramalhoto, *A survey on SQM in practice*, Pro-ENBIS Meeting, September 22, 2002, Rimini, Italy.

M. F. Ramalhoto, *An initial approach to the SQM Library concept*, Pro-ENBIS Meeting, Rimini, September 22, 2002, Rimini, Italy.

M. F. Ramalhoto, *Pro-ENBIS Notes 1-Working package on reliability and quality improvement*, Kick-off PRO-ENBIS Meeting, February 11-12, 2002, Brussels, Belgium.

M. F. Ramalhoto, *Pro-ENBIS Notes 2-Working package on reliability and quality improvement*, PRO-ENBIS Network Meeting, May 8-10, 2002, Lisboa, Portugal.

### *Applied Mathematics and Numerical Analysis*

G. P. Galdi and A. L. Silvestre, *Strong solutions to the problem of motion of a rigid body in a Navier-Stokes liquid under the action of prescribed forces and torques*, Nonlinear Problems in Mathematical Physics and Related Topics I (In Honour of Professor O. A. Ladyzhenskaya), edited by M. Sh. Birman, S. Hildebrandt, V. A. Solonnikov and N. N. Uraltseva, 2002, Kluwer Academic Publishers.

## 1.2 Publications accepted or submitted in 2002

### *Algebra and Mathematical Analysis*

F. Balibrea, R. Hric and L. Snoha, *Minimal sets on graphs and dendrites*, to appear in Internat. J. Bifur. Chaos Appl. Sci. Engrg.

L. Barreira and C. Wolf, *Measures of maximal dimension for hyperbolic diffeomorphisms*, to appear in Comm. Math. Phys.

L. Barreira and C. Wolf, *Pointwise dimension and ergodic decompositions*, preprint.

M. A. Bastos, A. Bravo and Yu. I. Karlovich, *Singular integral operators with piecewise almost periodic coefficients and Carleman shift*, to appear in A. Böttcher et al., Eds, Singular Integral Operators, Factorization and Applications, volume 142 of Operator Theory: Advances and Applications, Birkhäuser.

M. A. Bastos, Yu. I. Karlovich and A. F. dos Santos, *Oscillatory Riemann-Hilbert problems and the corona theorem*, to appear in J. Funct. Anal.

M. A. Bastos, Yu. I. Karlovich and B. Silbermann, *Toeplitz operators with symbols generated by slowly oscillating and semi-almost periodic matrix functions*, Preprint 31/02.

M. J. Borges, *Heteroclinic and homoclinic solutions for a singular Hamiltonian system*, preprint.

A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Singular Integral Operators, Factorization and Applications*, to appear in the Proceedings of the IWOTA Conference, Portugal 2000, vol. 142 of Operator Theory: Advances and Applications, Birkhäuser.

M. C. Câmara and M. T. Malheiro, *Wiener-Hopf factorization for  $n \times n$  Daniele-Khrapkov class: associate boundary-value problems on a Riemann surface and structure of the factors*, Preprint 33/02.

A. Cannas da Silva, *Symplectic toric manifolds*, to appear in Birkhäuser series Advanced Courses in Mathematics, CRM Barcelona.

J. Canovas and R. Hric, *Distributional chaos of tree maps*, to appear in Topology Appl.

L. Castro, R. Duduchava and F.-O. Speck, *Localization and minimal normalization of some basic mixed boundary value problems*, Preprint 8/02, to appear in the Proceedings of the International Conference on Factorization, Singular Operators and Related Problems at Funchal, Portugal 2002, A.F. dos Santos et al. Eds, Kluwer, Dordrecht.

L. Castro, R. Duduchava and F.-O. Speck, *Finite interval convolution operators with transmission property*, Preprint 1/03.

A. Conceição, V. G. Kravchenko and F. S. Teixeira, *Factorization of matrix functions and the resolvent of certain operators*, to appear in A. Böttcher et al., Eds., Singular Integral Operators, Factorization and Applications, Operator Theory: Advances and Applications, Vol. 142, Birkhäuser, Basel.

A. Conceição, V. G. Kravchenko and F. S. Teixeira, *Factorization of some classes of matrix functions and the resolvent of a Hankel operator*, to appear in A. F. dos Santos, et al., Eds., Proceedings of the International Conference on Factorization, Singular Operators and Related Topics, Funchal 2002, Kluwer, Dordrecht.

R. Cordovil and D. Forge, *Quadratic Orlik-Solomon algebras of graphic matroids*, to appear in Matemática Contemporânea, preprint, arXiv: math.CO/0106136.

R. Cordovil and D. Forge, *A note on Tutte polynomials and Orlik Solomon algebras*, preprint, arXiv: math.CO/0203152.

R. Cordovil, D. Forge and S. Klein, *How is a chordal graph like a supersolvable binary matroid?*, preprint, arXiv: math.CO/0212099.

R. Coutinho and B. Fernandez, *Fronts in extended systems of bistable maps coupled via convolutions*, Preprint 9/02.

R. Coutinho and B. Fernandez, *Iterative construction of fronts in bistable extended systems*, preprint.

M. Crainic and R. L. Fernandes, *Integrability of Poisson brackets*, preprint, arXiv: math.DG/0210152.

M. Crainic and R. L. Fernandes, *Integrability of Lie brackets*, to appear in Annals of Mathematics.

F. M. Dionísio and P. Lopes, *Quandles at finite temperatures II*, Preprint 12/02, to appear in Journal of Knot Theory and its Ramifications.

P. F. dos Santos, *Algebraic cycles on real varieties and  $\mathbb{Z}/2$ -equivariant homotopy theory*, to appear in Proc. London Math. Soc.

P. F. dos Santos, *A note on the equivariant Dold-Thom theorem*, to appear in J. Pure Appl. Alg.

R. L. Fernandes and M. Ricou, *Introdução à Álgebra*, to be published by IST Press.

R. L. Fernandes, *Invariants of Lie algebroids*, to appear in Differential Geometry and its Applications, preprint, arXiv: math.DG/0202254.

J. M. Ferreira and S. Pinelas, *Oscillatory functional retarded systems*, to appear in J. Math. Anal. Appl.

C. Florentino, J. Mourão and J. P. Nunes, *Coherent state transforms and vector bundles over elliptic curves*, Preprint 17/02, to appear in J. of Funct. Anal.

I. Gohberg, N. Manojlovic and A. F. dos Santos Eds., *Factorization and Integrable Systems*, to appear in Operator Theory: Advances and Applications.

D. Gomes, *Perturbation theory for Hamilton-Jacobi equations and stability of Aubry-Mather sets*, to appear in SIAM J. Math. Analysis.

D. Gomes and A. Oberman, *Computating the effective Hamiltonian - a variational approach to homogenization*, preprint.

D. Gomes and C. Valls, *Approximation of ill-posed equations*, preprint.

M. H. Kobayashi and W. M. Oliva, *On the Birkhoff approach to classical mechanics*, to appear in Resenhas do IME- USP.

P. Lopes, *Quandles at Finite Temperatures I*, Preprint 22/01, to appear in J. Knot Theory Ramifications.

M. Mackaay and R. F. Picken, *2-Categories, 4d state-sum models and gerbes*, to appear in Proceedings of the III Forum Jovens Investigadores, Univ. Algarve.

N. Martins, R. Severino and J. Sousa Ramos,  *$K_0$ -groups for Cuntz-Krieger algebras arising from real quadratic maps*, to appear in the International Journal of Mathematics and Mathematical Sciences.

P. Monnier, *A cohomology attached to a fonction*, preprint.

P. Monnier and N. T. Zung, *Levi decomposition for smooth Poisson structures*, preprint.

J. Natário and Tod, *Linking, legendrian linking and causality*, to appear in Proc. London Math. Soc.

L. Oliveira, *Weak\*-closed Jordan ideals of nest algebras*, Preprint 3/02, to appear in Math. Nachr.

L. Oliveira, *On the structure of inner ideals of nest algebras*, Preprint 2/02.

R. Picken and P. Semião, *A classical approach to TQFT's*, preprint, arXiv: math.QA/0212310.

L. Rocha and J. Sousa Ramos, *On iterated maps of the interval with holes*, Preprint 21/02, to appear in Journal of Difference Equations and Applications.

S. G. Samko, A. B. Lebre and A. F. dos Santos Eds., *Factorization, Singular Operators and Related Problems*, to appear in Proceedings of the Conference in Honour of Georgii Litvinchuk, Kluwer Academic Publishers.

R. M. Saramago, *Dieudonné module structures for ungraded and periodically graded Hopf rings*, preprint.

### *Statistics and Applications*

C. Amado and A. M. Pires, *Robust bootstrap with on-random weights based on the influence function*, preprint.

G. Boente, A. M. Pires and I. M. Rodrigues, *General projection-pursuit estimates for the common principal components model: Influence functions and Monte Carlo study*, preprint.

C. Bunea, C. MacCollin and M. F. Ramalhoto, *Analysis approaches to EDA of reliability data: some new directions*, preprint.

F. Ferreira and A. Pacheco, *Analysis of GI/M/s/c queues using uniformization*, preprint.

R. Kenett, M. F. Ramalhoto and J. Shade, *A proposal for managing and engineering knowledge of SQM*, preprint.

M. C. Morais and A. Pacheco, *A note on stochastic ordering criteria in SPC for the case of correlated output*, preprint.

C. D. Paulino and P. Soares, *Analysis of Rates in Incomplete Poisson Data*, to appear in The Statistician.

C. D. Paulino, P. Soares and J. Neuhaus, *Infecção viral pelo papiloma humano - uma análise bayesiana de regressão Binomial com resposta mal classificada*, to appear in Proceedings of 10º Congresso Anual da Sociedade Portuguesa de Estatística, Porto, 2002.

C. D. Paulino, P. Soares and J. Neuhaus, *Binomial Regression with Misclassification*, Preprint 6/02, to appear in Biometrics.

C. D. Paulino, P. Soares and J. Neuhaus, *Infecção viral pelo papiloma humano - uma análise bayesiana de regressão binomial com resposta mal classificada*, preprint.

C. D. Paulino, A. A. Turkman, A. and B. Murteira, *Estatística Bayesiana*, preprint.

A. M. Pires, *Robust discriminant analysis and the projection pursuit approach, practical aspects*, to



appear in *Developments in Robust Statistics, International Conference on Robust Statistics 2001*.

A. E. Pinto, E. Mendonça, S. André and G. L. Silva, *Overall Survival in Advanced Breast Cancer: Relevance of Hormone Receptor Expression and S-Phase fraction on Fine Needle Aspirates*, to appear in *Journal of Biological Markers*.

M. F. Ramalhoto, R. Goeb, A. Pievatolo, E. Oystein and J. Salmikuukka, *A scheme for industry-academia interaction to enhance research and development issues*, preprint.

P. Salvador, R. Valadas and A. Pacheco, *Multiscale fitting procedure using Markov modulated Poisson processes*, to appear in *Telecommunication Systems*.

D. Stewardson, M. F. Ramalhoto and Drewett, *Establishing steel rail reliability by combining fatigue tests, factorial experiments and data*, preprint.

### *Applied Mathematics and Numerical Analysis*

C. J. S. Alves, J. B. Abdallah and M. Jaoua, *Recovery of cracks using a reciprocity gap function*, to appear in *Inverse Problems in Engineering*.

N. Arada and A. Sequeira, *Strong Steady Solutions for a Generalized Oldroyd-B Model with Shear-Dependent Viscosity in a Bounded Domain*, Preprint 32/02, to appear in *Math. Models Methods Appl.Sci*.

A. L. Brinca, F. J. Romeiras and L. Gomberoff, *On wave generation by perpendicular currents*, to appear in *J. Geophys. Res.*

A. B. Cruzeiro and X. Zhang, *Finite dimensional approximation of Riemannian path space geometry*, to appear in *J. Funct. Anal.*

A. B. Cruzeiro and X. Zhang, *A Littlewood-Paley type inequality on the path space*, preprint.

T. Diogo and S. Valtchev, *Collocation methods for a Volterra integral equation with multiple solutions*, to appear in *Fundamental Physico-Mathematical Problems and Modelling of Technological Systems*.

P. M. Lima and A. Oliveira, *Numerical solution of a singular boundary value problem for a generalized Emden-Fowler equation*, Preprint 7/02, to appear in *Applied Numerical Mathematics*.

S. Nazarov, M. Specovius-Neugebauer and J. H. Videman, *Nonlinear Artificial Boundary Conditions for the Navier-Stokes Equations in an Aperture Domain*, Preprint 4/02, to appear in *Math. Nachr.*

### *Computer Science*

M. E. Coniglio, A. Sernadas and C. Sernadas, *Fibring logics with topos semantics*, to appear in

Journal of Logic and Computation.

F. M. Dionísio and P. Lopes, *Quandles at finite temperatures II*, Preprint 12/02, to appear in Journal of Knot Theory and Its Ramifications.

S. Gay, V. T. Vasconcelos and A. Ravara, *Session types for inter-process communication*, preprint.

D. Graça and J. F. Costa, *Analog computers and recursive functions over the reals*, to appear in Journal of Complexity.

C. Hermida and P. Mateus. *Paracategories I: Internal paracategories and saturated partial algebras*, to appear in Theoretical Computer Science.

C. Hermida and P. Mateus, *Paracategories II: Adjunctions, fibrations and examples from probabilistic automata theory*, to appear in Theoretical Computer Science.

D. Kruml, J. W. Pelletier, P. Resende and J. Rosický, *On quantales and spectra of  $C^*$ -algebras*, to appear in Applied Categorical Structures.

P. Mateus, M. C. Morais, C. Nunes, A. Pacheco, A. Sernadas and C. Sernadas, *Categorical foundations for randomly timed automata*, to appear in Theoretical Computer Science.

P. Mateus, J. Mitchell and A. Scedrov, *Secure computation in a probabilistic polynomial-time process calculus*, preprint.

A. Ravara, A. G. Matos, V. T. Vasconcelos and L. Lopes, *A lexically scoped distributed pi-calculus*, preprint.

A. Ravara, P. Resende and V. Vasconcelos, *An algebra of behavioural types*, preprint.

P. Resende, *Sup-lattice 2-forms and quantales*, Preprint 27/02.

P. Resende and S. Vickers, *Localic sup-lattices and tropological systems*, to appear in Theoretical Computer Science.

C. Sernadas, L. Viganò, J. Rasga and A. Sernadas, *Truth-values as labels: A general recipe for labelled deduction*, preprint.

## 2 Academic degrees awarded in 2002

### 2.1 Agregações

R. L. Fernandes, Agregação em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, Julho de 2002.

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

M. L. Campagnolo, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 21.2.02. *Thesis:* Computational Complexity of Real Valued Recursive Functions and Analog Circuits. *Supervisors:* J. F. Costa and C. Moore (University of New Mexico).

M. C. Grácio, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 29.05.02. *Thesis:* Sistemas dinâmicos de baixa dimensão e fluxo geodésico no bitoro. *Supervisor:* J. Sousa Ramos.

N. Martins, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 21.01.02. *Thesis:* K-Teoria das álgebras de Cuntz-Krieger associadas a aplicações iteradas no Intervalo. *Supervisor:* J. Sousa Ramos.

M. C. Morais, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 14.2.02. *Thesis:* Stochastic Ordering in the Performance Analysis of Quality Control Schemes. *Supervisor:* A. Pacheco.

J. P. Santos, Ph. D. in Mathematics, Stanford University, USA, 1.02. *Thesis:* Topology of moduli spaces of rank stable instantons and holomorphic bundles. *Supervisor:* R. Cohen.

A. Serra, Ph. D. in Mathematics, University of California at Berkeley, USA, 5.02. *Thesis:* Interpolation Problems in Local Dirichlet Spaces. *Supervisor:* D. Sarason.

L. Silva, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 14.03.02. *Thesis:* Famílias de aplicações unidimensionais com descontinuidades. *Supervisor:* J. S. Ramos.

M. R. Silva, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 27.06.02. *Thesis:* Métodos robustos em análise de correlações canónicas. *Supervisor:* J. Branco.

A. L. Silvestre, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 22.3.02, *Thesis:* Mathematical Analysis of the Motion of a Rigid Body in a Viscous

Liquid. *Supervisors*: A. Sequeira and G. P. Galdi (University of Pittsburgh, USA).

J. Ventura, Ph. D. in Mathematics, Stanford University, USA, 6.02. *Thesis*: Homological algebra for the representation Green functor for abelian groups. *Supervisor*: G. Carlsson.

### 2.3 Mestrados/M.A's/M.Sc.'s

S. Bento, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 14.10.02. *Thesis*: Classificação de fibrados vectoriais sobre superfícies de Riemann através de extensões. *Supervisor*: C. Florentino.

P. Doutor, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 11.10.02. *Thesis*: Análise multifractal de fluxos hiperbólicos. *Supervisor*: L. Barreira.

C. Gavinhos, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 28.10.02. *Thesis*: Factorização Meromorfa e Generalizada numa Álgebra de Funções Matriciais  $2 \times 2$ . *Supervisor*: C. Câmara.

D. Graça, Mestrado em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 6.9.02. *Thesis*: The Analog Purpose Analog Computer and Recursive Functions over the Reals. *Supervisor*: J. Félix Costa.

J. Janela, Mestrado em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 4.7.02. *Thesis*: Métodos de decomposição de domínios para problemas elípticos. *Supervisor*: A. Sequeira.

S. Mendes, Mestrado em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 8.4.02. *Thesis*: Álgebras de Hopf e combinatória. *Supervisor*: J. S. Ramos.

M. R. Reis, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 27.9.02. *Thesis*: Cohomologia em sistemas dinâmicos. *Supervisor*: L. Barreira.

M. S. Rebelo. Mestrado em Matemática Aplicada. Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 18.12.02. *Thesis*: Numerical solution of second kind Abel integral equations, *Supervisor*: T. Diogo.

C. Silva, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal, 4.10.02. *Thesis*: Expoentes de Lyapunov para transformações contínuas. *Supervisor*: L. Barreira.

### 3 Research lectures by Department Members

#### 3.1 Invited Lectures

##### *Algebra and Mathematical Analysis*

M. Abreu,

- *Matemática Simplética: Geometria vs Topologia*, plenary lecture, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02
- *Introduction to Pseudo-Holomorphic Curves and Applications*, (short course) Oberwolfach Seminar on Symplectic Geometry, Mathematisches Forschungsinstitut Oberwolfach, Germany, 17-24.11.02.

L. Barreira,

- *Distribution of frequencies of digits*, Recent Trends in Dynamics III, Universidade do Porto, Portugal, 6-10.5.02.
- *Estabilidade de equações diferenciais e o trabalho esquecido de Lyapunov*, Seminário de Análise Funcional, Equações Diferenciais e Análise Numérica, Universidade de Lisboa, Portugal, 12.12.02.

A. Cannas da Silva,

- *Fold forms for four-folds*, Geometry seminar, University of Geneva, Switzerland, 31.10.02-3.11.02.
- *Introdução à geometria simplética*, (Summer minicourse), IMPA, Rio de Janeiro, Brazil, 18-27.2.02.

R. Cordovil,

- *A Note on Tutte Polynomials and Orlik-Solomon Algebras*, Latin-American Workshop on Cliques in Graphs, Universidade Federal do Rio de Janeiro, Brazil, 17-19.4.02.
- *Complex Arrangements of Hyperplanes*, Pontifícia Universidade Católica, Rio de Janeiro, Brazil, 26.4.02.

F.P. Costa, *A hierarchical cluster system based on Horton-Strahler rules for river networks*, School of Mathematical Sciences, University of Nottingham, UK, 5.02.

P. F. dos Santos, *Introdução às variedades tóricas*, Universidade do Minho, Braga, Portugal, 8.5.02.

C. Florentino,

- *Classical and non-abelian theta functions and the heat equation on Lie groups*, III congress GESTA, Geometría Simpléctica con Técnicas Algebraicas 2002, Universidad Autónoma de Madrid, Spain, 14-16.02.
- *Theta functions and the heat equation on a compact Lie group*, Mathematical-Physics Joint Seminar, SISSA, Trieste, Italy, 4.9.02.
- *Funções Theta e a equação do calor em grupos de Lie compactos*, Seminário de Geometria e Topologia, Porto, Portugal, 4.12.02.

P. Freitas,

- *Invariant spectrum and geometry*, Workshop Spectrum and Geometry, Mittag-Leffler Institute, Djursholm, Sweden, 8.02.
- *Memory driven instability in a diffusion process*, Elie Cartan Institute, Universidade de Nancy, 5.02.

D. Gomes,

- *Truncated Linstead series and uniform approximation of viscosity solutions and Mather sets*, Università di Roma III, Italy, 11.02.
- *Perturbations of Hamilton-Jacobi equations*, University of California at Berkeley, USA, 3.02.
- *A Stochastic Analog of Aubry-Mather Theory*, University of Texas, Austin, USA, 2.02.
- *Stochastic Mather measures and second-order Hamilton-Jacobi equations*, Advances in Calculus of Variations and PDE's, Scuola Normale Superiore di Pisa, Italy, 11.02.
- *A Stochastic Analog of Aubry-Mather theory and Applications*, Workshop on Nonlinear Models and Analysis, Erwin Schrödinger Institute, Viena, Austria, 5.02.

G. Granja, *Homotopy decomposition of a symplectomorphism group of  $S^2 \times S^2$* , Topology Seminar, University of Chicago, USA, 10.02.

R. Hric, *An Introduction to Dynamical Zeta Functions*, 6th Czech-Slovak Workshop on Discrete Dynamical Systems, Prague, Czech Republic, 9-16.06.2002.

R. Loja Fernandes, *Integrability of Lie brackets*, Université de Genève, Switzerland, 6.02.

P. Lopes,

- *Invariantes de Nós Clássicos e de Nós de Superfícies*, Mini-Jornada de Topologia, Universidade Federal Fluminense, Niterói, Brazil, 21-22.2.02.
- *Tranças Bidimensionais I, II, III e IV*, Seminário de Matemática Quântica, Pontifícia Universidade Católica, Rio de Janeiro, Brazil, 7, 14, 28.5.02 and 11.6.02.
- *Colorindo Diagramas de Nós I e II*, Seminário de Topologia, ICMC, Universidade de S. Paulo, S. Carlos, Brazil, 21, 28.8.02.

- *Quandles, Knots, and Explorations in Statistical Mechanics*, Seminário de Processos Estocásticos, IMPA, Rio de Janeiro, Brazil, 30.8.02.

J. Matias, *On a Volume constrained variational problem in  $SBV^2$* , EPFL-Lausanne, 4.02.

J. P. Nunes, *Aspectos Geométricos e Analíticos das Funções Theta*, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 2.02 and Univ. do Minho, Braga, Portugal, 4.02.

L. Oliveira, *Weak\*-closed Jordan ideals of nest algebras*, International Conference on Jordan Structures 2002, Universidad de Málaga, Spain, 11-14.2.02.

R. Picken,

- *Gerbes e Teoria Topológica Quântica do Campo*, Encontro Nacional da Sociedade Portuguesa de Matemática, Coimbra, Portugal, 5-8.2.02.
- *Holonomy and related ideas for bundles and gerbes*, Minicourse, Klausurtagung of SFB 288 Differentialgeometrie und Quantenphysik, St. Marienthal, Ostritz, Germany, 25.2.02-1.3.02.

C. Rocha,

- *Morse-Smale Flows and Order Preserving Semigroups*, Freie Universität Berlin, Germany, 23.10.02.
- *Atractores de Sistemas Dinâmicos Gerados por Problemas de Reação-Difusão Singulares*, Encontro Nacional da Sociedade Portuguesa de Matemática 2002, Universidade de Coimbra, Portugal, 5-8.2.02.

F.-O. Speck,

- *Localization and minimal normalization of some basic mixed boundary value problems*, University of Technology, Darmstadt, Germany, 22.8.02.
- *On the factorization of non-rational matrix functions*, Universidade do Algarve, Faro, Portugal, 28.6.02.

### *Statistics and Applications*

A. Pacheco,

- *A new stochastic modeling approach for next-generation wireless networks*, Georgia Institute of Technology, Atlanta, USA, 29.3.02.
- *Stochastic Ordering and Stochastic Process Control*, Georgia Institute of Technology, Atlanta, USA, 25.1.02.

C. D. Paulino, *Binomial Regression with Misclassification*, I Latin-American Bayesian Meeting, Ubatuba, Brazil, 3-7.2.02.

M. F. Ramalhoto, *Reliability as a part of a transdisciplinary research area*, MMR'3, Third International Conference on Mathematical Methods in Reliability, University of Trondheim, Norway, 17-20.6.02.

G. L. Silva, *Modelos de Sobrevivência Aditivos numa Perspectiva Bayesiana*, Seminário da Sociedade Portuguesa de Estatística, Universidade de Lisboa, 19.6.02.

### *Applied Mathematics and Numerical Analysis*

C. J. S. Alves, *Control and Shape Optimization Carthage*, PICO'02 - 2nd Conference on Inverse Problems, Tunisia, 10-12.4.02.

A. B. Cruzeiro,

- *An asymptotic estimate for the vertical derivatives of the heat kernel associated with the horizontal Laplacian*, Conference on Stochastic Analysis, Random Fields and Applications, Ascona, Switzerland, 20-24.5.02.
- *Anticipative rotations on the Wiener space*, Conference on The mathematical legacy of Feynman's path integral approach: Analysis, Geometry and Probability, Universidade de Lisboa, Portugal, 25-28.6.02.
- *The heat semigroup on the Riemannian path space*, 1st Sino-German Conference on Stochastic Analysis, (satellite conference of ICM 2002) Beijing, China, 29.08-3.9.02.

A. Sequeira,

- *Modelos Matemáticos e Numéricos do Sistema Cardiovascular*, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02.
- *Non-Newtonian Models for Blood Flow in Microvessels*, Workshop on Cardiovascular System: from Mathematical Modelling to Clinical Applications, Milan, Italy, 6-8.3.02.
- *Pulsatile Flow of Viscoelastic Fluids with a Switching Criterion: Application to Blood Flow in Small Arteries*, CANUM 2002, Anglet, France, 27-31.5.02.
- *Non-Newtonian Models for Blood Flow in Small Arteries*, Workshop on Mathematical and Computational Modeling of Biological Systems, Instituto Superior Técnico, Lisbon, Portugal, 17-21.6.02.
- *Blood Rheology: An Overview*, (Short Course), 5th International School on Biomathematics, Bioengineering and Clinical Aspects of Blood Flow, MSRI, University of California, Berkeley, USA, 23.07-9.8.02.
- *Existence Results for a Generalized Oldroyd-B Model Characterizing the Rheological Behaviour of Blood Flow*, International Conference Navier-Stokes Equations and Applications, NSEQ8, St. Petersburg, Russia, 11-18.9.02.
- *Mathematical Results and Numerical Methods for Fluids with Shear-Dependent Viscosity: Applications to Blood Flow*, Texas A&M University, College Station, USA, 25.11.02.



*Computer Science*

C. Caleiro, *Analysing authentication protocols - a distributed temporal logic based approach*, Ciclo de Seminários do Departamento de Engenharia Informática, Instituto Superior Técnico, Lisbon, Portugal, 30.4.02.

P. Mateus,

- *Protocolos de computação segura*, Encontro Nacional de Matemática da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02.
- *Secure computation in a probabilistic polynomial-time process calculus*, Ciclo de Seminários do Departamento de Engenharia Informática, Instituto Superior Técnico, Lisbon, Portugal, 26.3.02.

J. Rasga, *Labelled first order based logic systems*, Software Engineering Seminar, Institut für Informatik, University of Freiburg, Germany, 15.7.02.

P. Resende,

- *Quantales* (plenary session), Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02.
- *Quantales,  $C^*$ -algebras, and Penrose tilings*, Algebra Seminar, University of Sussex, UK, 15.2.02.
- *Quantales em geometria não comutativa*, Dia Aberto do Centro de Matemática da Universidade do Porto, Portugal, 15-16.11.02.

A. Sernadas, *Topos-theoretic semantics of fibring*, Seminário de Lógica Matemática, joint seminar FCUL/IST, Lisbon, Portugal, 2,16 and 23.4.02.

### 3.2 Lectures at Conferences, Workshops, Meetings, etc.

*Algebra and Mathematical Analysis*

A. Bravo, *Singular integral operators with piecewise almost periodic coefficients and Carleman shift*, FSORP- Madeira 2002 - International Conference on Factorization, Singular Operators and Related Problems, Funchal, 28.01-1.2.02.

A. Cannas da Silva,

- *Fold forms for four-folds*, Symplectic and Contact Geometry Conference, MIT, Cambridge, USA, 19-22.4.02.
- *Fold forms for four-folds*, European Differential Geometry Endeavour (EDGE) Conference, Edinburgh, UK, 29.07-2.8.02.
- *Geometria em dimensão 4*, Dia Aberto do Centro de Matemática da Universidade do Porto, Portugal, 15-16.11.02.

M. C. Câmara, *Factorization of triangular matrix symbols structure of the factors and Riemann-Hilbert problems*, FSORP Madeira 2002, International Conference on Factorization, Singular Operators and Related Problems, Funchal, Portugal, 28.01-1.2.02.

F. P. da Costa, *Um sistema de coagulação baseado nas regras de Horton-Strahler de redes fluviais*, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 2.02.

R. Coutinho, *Existence of fronts in extended bistable models*, ECIT 2002, 14th European Conference on Iteration Theory, Évora, Portugal, 1-7.9.02.

C. Florentino, *Classical and non-abelian theta functions and the heat equation on compact Lie groups*, VBAC 2002, European Conference on Vector Bundles on Algebraic Curves, Luminy, Marseille, France, 1-5.7.02.

P. Girão, *Existência e não-existência de soluções de energia mínima para um problema elíptico semilinear com expoente crítico e um termo subcrítico*, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 2.02.

L. Godinho, *Blowing-up symplectic orbifolds*, Workshop on geometry of momentum maps and Hamiltonian dynamics, Manchester/UMIST, UK, 3-5.7.02.

D. Gomes, *Invariant measures for constrained mechanical systems*, Spring Topology and Dynamics Conference, University of Texas, Austin, USA, 3.02.

G. Granja, *Homotopy decomposition of a symplectomorphism group of  $S^2 \times S^2$* , Barcelona Conference on Algebraic Topology, Barcelona, Spain, 1.7.02.

R. Hric,

- *Topological Characterization of Minimal Sets*, Recent Trends in Dynamics III, Universidade do Porto, Portugal, 6-10.5.2002.
- *On the Milnor-Thurston Zeta Function for Graph Maps*, New Directions in Dynamical Systems, Kyoto, Japan, 5-15.8.2002.
- *The Milnor-Thurston Zeta Function and Kneading Determinant for Graphs Maps*, European Conference on Iteration Theory, Évora, Portugal, 1-7.9.02.

R. L. Fernandes,

- *Symplectic realizations of Poisson manifolds*, International Workshop on Quantum Field Theory and Noncommutative Geometry, Sendai, Japan, 11.02.
- *Integrability of Poisson brackets*, XI Encuentro de Otoño de Geometría y Física, Oviedo, Spain, 9.02.
- *A Geometria do Método de Equivalência de Cartan*, Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 2.02.

- *Invariants of Lie algebroids*, Congreso de la Real Sociedad Matemática Española, Tenerife, Spain, 1.02.

P. Lopes,

- *Knots and Quandles*, XIII Encontro Brasileiro de Topologia, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, 22-26.7.02
- *Knotted Surfaces and Quandles*, Simpósio de Geometria, Universidade Estadual de Maringá, Maringá, Brazil, 25-27.9.02.

A. Moura Santos and P. A. Santos,

- *Presentation of the CAL Project*, Promoção do Sucesso Educativo e da Qualidade/ Empregabilidade no Ensino Superior Instituto Superior Técnico, Lisbon, Portugal, 19.11.02.
- *CAL-assessment based on new technologies*, Technology and Mathematics, Setubal, Portugal, 11-15.11.02.
- *On-line assessment in undergraduate mathematics*, Second International Conference on the Teaching of Mathematics, University of Greece, Heronissos, Greece, 1-6.7.02.

J. Sousa Ramos,

- *On topological and homological entropy of graph maps*, ECIT 2002, European Conference on Iteration Theory, Évora, Portugal, 1-7.9.02.
- *Noncommutative dimension associated with limit sets of Fuchsian groups*, ECIT 2002, European Conference on Iteration Theory, Évora, Portugal, 1-7.9.02.

F.-O. Speck,

- *Localization and minimal normalization of some basic mixed boundary value problems*, International Conference on Factorization, Singular Operators and Related Topics at Funchal, Portugal, 1.2.02.
- *An operator theoretic approach for mixed linear boundary value problems*, Workshop on Inverse Obstacle Problems, Lisbon, Portugal, 5.11.02.

F. S. Teixeira, A. Conceição and V. G. Kravchenko, *On the inverse of a Hankel operator*, FSORP Madeira 2002, International Conference on Factorization, Singular Operators and Related Topics, Funchal, Portugal, 28.01-1.2.02.

J. Teixeira, *The Hyperfinite Approach to a Nonlinear Elliptic Dirichlet Problem*, Joint Meeting of the AMS-IMA, Special Session on Nonstandard Analysis, Pisa, Italy, 11-18.6.02.

### *Statistics and Applications*

M. C. Morais,

- *On the alarm rates of quality control schemes*, Magdeburger Stochastik-Tage 2002, Universität Magdeburg, Germany, 19-22.3.02.

- *Ordenação estocástica na avaliação do impacto da autocorrelação em esquemas de controlo de qualidade*, Encontro Nacional da Sociedade Portuguesa de Matemática 2002, Universidade de Coimbra, Portugal, 5-8.2.02.

A. Pacheco,

- *A queueing network with Markov modulated input*, Second Euro-Japanese Workshop on Stochastic Risk Modelling for Finance, Insurance, Production and Reliability, Chamonix, France, September 18-20, 2002.

C. D. Paulino,

- *Binomial Regression with Misclassification*, 7th Valencia International Meeting on Bayesian Statistics, Tenerife, Spain, 1-06.6.02.
- *New developments on the Bayesian analysis of incomplete categorical data*, 7th Valencia International Meeting on Bayesian Statistics, Tenerife, Spain, 01-06.6.02.
- *Infecção viral pelo papiloma humano - uma análise bayesiana de regressão Binomial com Resposta Mal Classificada*, X Congresso Anual da Sociedade Portuguesa de Estatística, Porto, Portugal, 9.02.

A. M. Pires,

- *Confidence Intervals for a Binomial Proportion: comparison of methods and software evaluation*, COMPSTAT 2002, XV Conference of the International Association for Statistical Computing, Berlin, Germany, 24-28.8.02.
- *Robust Bootstrap: Influence Function Approach*, ICORS2002, International Conference on Robust Statistics, Vancouver, Canada, 12-18.5.02.
- *Métodos estatísticos para avaliação de bioequivalência entre formulações*, X Congresso Anual da Sociedade Portuguesa de Estatística, Porto, Portugal, 25-28.9.02.
- *Detecção de outliers em dados multivariados: um método baseado em análise de clusters e estimadores robustos* (poster), X Congresso Anual da Sociedade Portuguesa de Estatística, Porto, Portugal, 25-28.9.02.

G. L. Silva,

- *Modelos de Fragilidades para Dados de Sobrevida Correlacionado*, X Congresso Anual da Sociedade Portuguesa de Estatística, Porto, 25-28.9.02.
- *Survival Models with Correlated Frailties*, 7th Valencia International Meeting on Bayesian Statistics, Tenerife, Spain, 2-06.6.02.

### *Applied Mathematics and Numerical Analysis*

C. J. S. Alves

- *Recovery of cracks using a reciprocity gap function*, 4th International Conference on Inverse Problems in Engineering, Rio de Janeiro, Brazil, 25-31.5.02.

- *Scattering by cracks: Numerical simulations using a boundary finite element method*, in Boundary Elements XXIV, Sintra, Portugal, 17-19.6.02.
- *Meshless methods based on a dense class of particular solutions*, in Boundary Elements XXIV, Sintra, Portugal, 17-19.6.02.

T. Diogo,

- *Numerical treatment of a class of Volterra integral equations by polynomial spline approximation*, MMA2002, 7th International Conference Mathematical Modelling and Analysis, Kääriku, Estonia, 31.5.02-2.6.02.
- *Numerical methods for a Volterra integral equation with nonsmooth solutions*, 5th International Congress on Mathematical Modelling, Dubna, Russia, 30.9.02-6.10.02.

P. M. Lima,

- *Numerical methods and error estimates for a singular boundary-value problem*, in XIII Crimean Autumn Mathematical School-Symposium, Laspi, Ucraina, 17-28.9.02
- *Numerical solution of a singular boundary value problem for a generalized Emden-Fowler equation*, International Conference on Mathematical Modelling and Analysis, Tartu, Estonia, 5.02.
- *Numerical methods and error estimates for a generalized Emden-Fowler equation*, 5th International Congress on Mathematical Modeling, Dubna, Russia, 30.09-6.10.02.

A. L. Silvestre,

- *Strong solutions to the problem of motion of a rigid body in a Navier-Stokes liquid under the action of prescribed forces and torques*, AMIF 2002-Applied Mathematics for Industrial Flow Problems, Lisbon, 17-20.4.02.
- *Identifying point-forces on a Stokes system*, Workshop on Inverse Obstacle Problems, Instituto Superior Técnico, 4-6.11.02.

J. H. Videman,

- *Steady flows of Jeffrey-Hamel type in a Navier-Stokes fluid*, International Workshop 3rd Singular Days, Le Tronchet, France, 29-31.8.02.
- *Steady flows of Jeffrey-Hamel type in a Navier-Stokes fluid*, International Seminar *Diffraction Days*, St. Petersburg, Russia, 5-8.6.02.
- *On the steady flows of Jeffrey-Hamel type for the Navier-Stokes equations*, Third ESF International Conference on Applied Mathematics for Industrial Flow Problems, Lisbon, Portugal, 17-20.4.02.

*Computer Science*

C. Caleiro,

- *Lógica para especificação e verificação de protocolos de segurança*, Mikado-Profundis Meeting, Instituto Superior Técnico, Portugal, 14.2.02.
- *Completeness results for fibred parchments - Beyond the propositional base*, 16th WADT, Frauenchiemsee, Germany, 24-27.9.2002.

P. Mateus,

- *Álgebra de processos probabilísticos para computação segura*, Mikado-Profundis Meeting, Instituto Superior Técnico, Portugal, 14.2.02.
- *Observations and the probabilistic situation calculus*, KR2002 Eighth International Conference on Principles of Knowledge Representation and Reasoning, Toulouse, France, 22-25.4.02.

A. Ravara,

- *A lexically scoped distributed pi-calculus*, Mikado General Meeting, INRIA, Sophia Antipolis, France, 19-20.2.02.
- *A lexically scoped distributed pi-calculus*, BRICS Seminar, Department of Computer Science, Aalborg University, Denmark, 26.3.02.
- *Behavioural types for mobile calculi with labels*, Profundis General Meeting, INRIA, Sophia Antipolis, France, 25-27.4.02.
- *Typing the behaviour of objects and components using session types*, FOCLASA 2002 (Satellite Event of CONCUR 2002), Brno, Czech Republic, 24.8.02.

P. Resende,

- *How quantum are quantales?*, International Conference on Quantum Structures, TU Vienna, Austria, 1-7.7.02.
- *Quantales,  $C^*$ -algebras, and Penrose tilings*, Workshop on Sheaves and Topoi in Physics, Imperial College, UK, 11-12.7.02.
- *Sub-lattice 2-forms and quantales*, Meeting on the Theory and Applications of Quantales, Instituto Superior Técnico, Portugal, 16-18.7.02.
- *Quantales that classify Penrose tilings*, Meeting on the Theory and Applications of Quantales, Instituto Superior Técnico, Portugal, 16-18.7.02.
- *From algebras to quantales and back*, Workshop on Categorical Structures for Descent and Galois Theory, Hopf Algebras and Semiabelian Categories, Fields Institute, Toronto, Canada, 23-28.9.02.

## 4 Guest Program

### *Algebra and Mathematical Analysis*

E. Aldrovandi, Florida State University, USA, 7-11.7 and 15-27.7.02.

M. T. Alzugaray, Universidade do Algarve, Faro, 24.5.02. *Lecture:* Singularidades de Funções Geradoras de Sucessões Frecuenciais de Pólya.

K. Andersen, Centre de Recerca Matemàtica, Barcelona, Spain, 16.1.02. *Lecture:* The classification of  $p$ -compact groups for odd primes  $p$ .

I. Anderson, Utah State University, USA, 15-18.7.02. *Lecture:* The variational bicomplex and its applications in differential geometry and the calculus of variations, 16.7.02.

V. Araújo, Universidade do Porto, Portugal, 28.1-1.2.02. *Lecture:* Sobre hiperbolicidade uniforme em sistemas não uniformemente hiperbólicos, 31.1.02.

M. Audin, Institut de Recherche Mathématique Avancée, Strasbourg, France, 28-30.10.02.

D. Auroux, Ecole Polytechnique, Paris, France, 7-12.12.02. *Lecture:* Branched coverings, Luttinger surgery and non-isotopy, 10.12.02.

F. Balibrea, Universidad de Murcia, Spain, 19-22.3.02. *Lecture:* On the periodic structure of delayed difference equations and  $I$  and  $S^1$ , 21.3.02.

A. Batkai, Technische Universität Wien, Austria, 26.1-2.2.02. *Lecture:* Hyperbolicity of delay equations and the effect of small delays, 29.1.02.

J. Burgos Gil, Universitat de Barcelona, Spain, 30.10-3.11. *Lecture:* Arakelov theory of non compact Shimura varieties, 31.10.02.

H. Bursztyn, MSRI, Berkeley, USA and Université Libre de Bruxelles, Belgium, 11-16.5.02. *Lecture:* Dirac geometry, 14.5.02.

L. F. Castro, Universidade de Aveiro, 18.10.02. *Lecture:* Existência, Unicidade e Diferenciabilidade de Soluções de Equações Integrais Não Lineares por via de Teoremas de Ponto Fixo.

J. Coffey, Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France, 26.10-2.11.02. *Lecture:* Spaces of positive sections, 29.10.02.

P. Collet, Ecole Polytechnique, Palaiseau, France, 4-23.2.02. *Lecture:* Concentration phenomena in dynamical systems - *Colloquium of the Department of Mathematics*, 14.2.02.

A. Corso, University of Kentucky, USA, 8-14.7.02. *Lecture:* Hilbert-Samuel coefficients of normal ideals, 12.7.02.

D. Costa, University of Nevada, Las Vegas, USA, 1-31.5.02. *Lecture:* The jumping nonlinearity problem revisited, 7.5.02.

G. Del Magno, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal. 5.11.02. *Lecture:* Hyperbolic billiards.

J. P. Dias, Universidade de Lisboa, Portugal, 15.1.02. *Lecture:* Existência e unicidade de soluções fracas para um sistema hiperbólico quasilinear com um termo de fonte singular.

P. Doutor, Universidade Nova de Lisboa, Lisbon, Portugal, 25.11.02. *Lecture:* Análise multifractal e princípio variacional.

C. M. Edwards, The Queen's College, Oxford, UK, 4-11.4.02. *Lectures:*

- Algebraic Structure of Complex Banach Spaces, 5.4.02.
- The algebraic structure of bounded symmetric domains, 10.4.02.

D. Evans, Cardiff University, UK, 29.3-14.4.02 and 4-10.12.02. *Lectures:*

- Modular invariants and subfactors, 9.4.02.
- Operator algebras and mathematical physics: from XY to ADE - *Colloquium of the Department of Mathematics*, 11.4.02.

V. Fedorenko, Institute of Mathematics, National Academy of Sciences of Ukraine, Ukraine, 7-11.9.02. *Lecture:* Dynamics of a class of multi-valued interval maps, 10.9.02.

B. Fiedler, Freie Universität Berlin, Germany, 10-22.3.02. *Lecture:* Global Sturm attractors with circle symmetry, 12.3.02.

P. J. Freitas, Universidade de Lisboa, Portugal, 16.4.02. *Lecture:* The dynamics of the Siegel upper half plane, 16.4.02.

H. Frid, Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil, 5.2.02. *Lecture:* A quasilinear parabolic system for three-phase capillary flow in porous media.

G. Fusco, Università degli Studi L'Aquila, Italy, 22-31.5.02. *Lecture:* Crystalline energy as  $\Gamma$ -limit of a constrained perimeter functional, 28.5.02.

I. Gohberg, Tel Aviv University, Israel, 10.3.-16.3.02. *Lectures:*

- Infinite Systems of Linear Equations, 12.3.02.
- Orthogonal Systems and Convolution Equations - *Colloquium of the Department of Mathematics*, 14.3.02.



M. Gordon, Universidade da Madeira, Funchal, Portugal, 26.11.02. *Lecture:* Um novo espaço de ultradistribuições.

P. Gothen, Universidade do Porto, Portugal, 26.3.02. *Lecture:* Homological algebra of quiver bundles.

J. Greenberg, Office of Naval Research, USA, 3-6.11.02. *Lecture:* Congestion on multilane highways, 3.11.02.

M. Grinfeld, University of Strathclyde, Glasgow, UK, 3-16.1.02.

M. Gyllenberg, University of Turku, Finland 17-22.10.02. *Lecture:* The inverse problem of linear age-structured population dynamics, 18.10.02.

S. Hayes, Technische Universität München, Germany, 15-20.11.02. *Lecture:* Detecting chaos using time series, 19.11.02.

R. Hric, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 21.3.02. *Lecture:* Topological characterization of minimal sets and its applications.

C. Ingalls, University of New Brunswick, Canada, 11-16.5.02. *Lecture:* Noncommutative surfaces, 15.5.02.

G. Janelidze, Georgian Academy of Sciences, Tbilisi, Georgia, 5.4-5.6.02. *Lectures:* Course on Category Theory, 24.5, 29.4, 6.5, 13.5, 20.5, 27.5 and 3.6.02.

T. Kahl, Universidade do Minho, Portugal, 16-17.4.02. *Lecture:* Introduction to rational homotopy theory, 22.5.02.

N. Kamran, McGill University, Canada, 15-17.7.02. *Lecture:* A multi-dimensional method of Laplace, with applications to hyperbolic systems rich in conservation laws, 16.7.02.

Yu. Karlovich, Universidad Autónoma del Estado de Morelos, Mexico, 19.1.-11.2.02, 23.7.-6.8.02 and 14.12.-23.12.02. *Lectures:*

- Perturbed Toeplitz Operators with Oscillating Symbols, 7.2.02.
- An Index Formula for Toeplitz Operators with Oscillating Symbols, 26.7.02.
- Pseudodifferential Operators and Their Applications, 17.12.02.

M. Kobayashi, Instituto Superior Técnico, Lisbon, Portugal. *Lecture:* On the Birkhoff approach to mechanics I and II, 7.2 and 21.2.02.

V. Kokilashvili, Razmadze Mathematical Institute, Academy of Sciences, Tbilisi, Georgia, 8.3.02. *Lecture:* The Boundary Value Problems for Analytic and Harmonic Functions.

P. Lambrechts, Université Catholique de Louvain, Belgium, 18-19.10.02. *Lecture:* On the rational homotopy type of blow-up of submanifolds, 18.10.02.

R. Laureano, Instituto Superior de Ciências do Trabalho e da Empresa, Lisbon, Portugal, 16.12.02. *Lecture:* Cohomologia e teorema de Livschitz.

J. Lopes Dias, University of Cambridge, UK, 2.4.02. *Lecture:* Renormalizations of vector fields.

K. Mackenzie, University of Sheffield, UK, 6-14.1.02. *Lecture:* The duality of double structures, 10.1.02.

E. Makover, Connecticut College, USA, 3-11.6.02. *Lecture:* Random construction of Riemann surfaces, 6.6.02.

N. Manojlovic, Universidade do Algarve, Faro, 5.7.02. *Lecture:* Trigonometric osp (1|2) Gaudin Model.

M. Mariño, Harvard University, USA, 26.7-3.8.02. *Lecture:* Counting strings with knots and links, 31.7.02.

G. Mikhalkin, University of Utah, USA, 23-27.11.02.

J. Mendes, Universidade de Aveiro, Portugal, 15.10.02. *Lecture:* Efeito do crescimento acelerado no crescimento de redes.

C. Mira, TLSE-INSA, Toulouse, France, 28-31.5.02 and 31.8-1.9.02. *Lecture:* Qualitative behavior of two-dimensional maps with a vanishing denominator, 29.5.02.

D. Martinez, Universidad Carlos III de Madrid, Spain, 28.5.02.

S. Moroianu, Universität Hamburg, Germany, 9-21.2.02. *Lectures:*

- Introduction to a global analysis, 18.2.02;
- Adiabatic limits of eta and zeta functions, 19.2.02.

S. Mueller-Stach, University of Essen, Germany, 11-16.11.02. *Lecture:* Motivic geometry, 12.11.02.

P. Negrini, Università di Roma La Sapienza, Italy, 24.5-3.6.02. *Lecture:* Chaotic behaviour in the n center problem (negative energy levels), 28.5.02.

J. Neunh userer, Technische Universit t Clausthal, Germany, 16-30.3.02. *Lecture:* A result on overlapping self-similar measures and its applications, 19.3.02.

P. Newstead, University of Liverpool, UK, 5-16.1.02. *Lectures:* Vector bundles on algebraic curves (short course), 7-11.1.02.

J. Nunes da Costa, Universidade de Coimbra, Portugal, 9.4.02. *Lecture:* Jacobi manifolds and Lie algebroids.

P. Olver, University of Minnesota, USA, 5-9.6.02. *Lecture:* Moving frames for pseudogroups, 6.6.02. Colloquium of the Department of Mathematics.

R. Pandharipande, Princeton University, 7-15.12.02. *Lecture:* Gromov-Witten theory and integrable systems, 10.12.02.

S. Paul, Columbia University, USA, 30.11-6.12.02. *Lecture:* Bott-Chern classes and generalised resultants, 4.12.02.

A. Pereira, Universidade de São Paulo, Brazil, 1.12.02-31.02.03.

M. Perlmutter, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal. 5.3.02. *Lecture:* Dual pairs and conformal Hamiltonian systems.

J. C. S. Rodriguez, Universidade do Algarve, Faro, 7.6.02. *Lecture:* Sobre a Factorização de Algumas Classes de Funções Matriciais.

S. V. Rogosin, Belarussian State University, Minsk, 23.1.-26.1.02. *Lecture:* Newton-Kantorovich Method for Conformal Representation of Plane Domains, 25.1.02.

S. Samko, Universidade do Algarve, Faro, 22.3., 15.11., 29.11. and 16.12.-17.12.02 *Lectures:*

- The Singular Type Operators in the Lebesgue Spaces with Variable Exponent, 22.3.02.
- Sonine Integral Equations of the First Kind, 15.11.02
- Periodization of Two-Dimensional Fractional Riesz Operators, 29.11.02.

R. Shafikov, State University of New York, Stony Brook, 5-20.6.02. *Lecture:* Holomorphic equivalence of domains in  $\mathbb{C}^n$ , 18.6.02.

A. Sharkosky, Institute of Mathematics, National Academy of Sciences of Ukraine, Ukraine, 7-27.9.02. *Lecture:* Ideal turbulence: definition and models, 17.9.02.

B. Silbermann, Technische Universität Chemnitz, Germany, 5.9.-19.9.02. *Lecture:* Collocation Matrices and Computation of Partial Indices of Regular Matrix Functions, 13.9.02.

C. Silva, Universidade da Beira Interior, 28.10 and 4.11.02. *Lectures:*

- Expoentes de Lyapunov e teorema ergódico multiplicativo, 28.10.02;
- Construções geométricas e teoria de dimensão, 4.11.02.

J. Smítal, Silesian University, Opava, Czech Republic, 11-17.11.02. *Lecture:* Various kinds of chaos in compact metric spaces: recent results and open problems, 12.11.02.

L. Snoha, Matej Bel University, Banská Bystrica, Slovakia, 19-22.3 and 7-8.9.02. *Lecture:* Topological entropy of Devaney chaotic maps, 21.3.02.

I. Spitkovsky, College of William and Mary, Williamsburg, VA, USA, 16.12.-25.12.02. *Lectures:*

- Factorization of Almost Periodic Matrix Functions and its Applications, 17.12.02.
- Beautiful and mysterious properties of the numerical range, old and recent - Colloquium of the Department of Mathematics, 18.12.02.

B. Steinberg, Universidade do Porto, Portugal, 29.1.02. *Lecture:* Some semigroup theoretic techniques in topology.

J. Tafel, Institute of Theoretical Physics, University of Warsaw, Poland, 8-13.9.02. *Lecture:* Solutions of the Einstein equations with 2 Killing vectors, 10.10.02.

G. Terra, Universidade de São Paulo, Brazil, 4.11-23.12.02.

C. Valls, University of Chicago, USA, 30.9-12.10.02. *Lecture:* Stability near appropriate oscillations for some ill-posed partial differential equations, 8.10.02.

L. Vandembroucq, Universidade do Minho, Braga, Portugal, 16-17.4.02. *Lecture:* Embeddings up to homotopy of a CW-complex in a sphere, 17.4.02.

P. Vanhaecke, Université de Poitiers, France, 13-27.1.02 *Lecture:* Integrable systems and projective embeddings, 22.1.02.

F. Van Oystaeyen, University of Antwerp, 28.10-3.11.02. *Lectures:*

- Mathematical methods of technology, 30.10.02. Colloquium of the Department of Mathematics;
- Noncommutative topology and geometry, 31.10.02.

J. Vázquez, Universidad Autónoma de Madrid, Spain, 30.10-2.11.02.

M. Vergne, Ecole Polytechnique, Paris, France, 29.4-8.5.02. *Lecture:* Arrangement of hyperplanes, and number of points on convex polytopes, 30.4.02.

R. Vilela Mendes, Universidade Técnica de Lisboa, Lisbon, Portugal, 21.5.02. *Lecture:* Expoente de Lyapunov em Mecânica Clássica e Quântica. Uma abordagem tomográfica.

J. Wattis, University of Nottingham, UK, 8-19.7.02. *Lecture:* The kinetics of vesicle formation, 11.7.02.

C. Wolf, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 22.10.02. *Lectures:*

- Dynamics of polynomial diffeomorphisms of  $\mathbb{C}^n$ , 22.10.02;

- Measures of maximal dimension for hyperbolic diffeomorphisms, 2.12.02.

M. Wolfrum, Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany, 3-12.6.02. *Lecture:* Heteroclinic connectios and order structures for scalar parabolic PDE, 11.6.02.

S. Yakubovich, Universidade do Porto, 19.7.02. *Lecture:* Recent Results on Some Integral Operators Associated with the Kontorovich-Lebedev Transformation.

S. Zarzuela, Universitat de Barcelona, Spain, 24.2-2.3.02. *Lecture:* Arrangements of linear varieties,  $D$ -modules and local cohmology, 27.2.02.

### *Statistics and Applications*

G. Boente, Universidad de Buenos Aires, Argentina, 22.1.02-1.2.02, 8-15.7.02.

F. Critchley, The Open University, UK, 9-23.1.02. *Lecture:* Salience diagnostics: the influence curve revisited, 16.1.02.

R. Maronna, Universidad de La Plata, Argentina, 7-10.2.2002. *Lecture:* Métodos Robustos en Análisis Multivariado.

W. Schmid, Europa-Universitat Viadrina, Germany, 12-17.2.02. *Lecture:* Simultaneous and multivariate control charts for time series data, 15.2.02.

J. Achcar, Universidade de S. Paulo, Brazil, 3.7.02-3.8.02. *Lecture:* Uso de métodos MCMC em análise Bayesiana de dados de sobrevivência, 11.7.02.

P. Filzmoser, Vienna University of Technology, 27.10.02-3.11.02. *Lecture:* Robust estimation of the parameters in the FANOVA model, 30.10.02.

C. Cardoso-Suárez, Universidad de S. Tiago de Compostela, 29.11.02. *Lecture:* Nonparametric estimation of the odds-ratios assuming generalized additive models.

H. Ekblom, Lulea University of Technology, 17.12.02. *Lecture:* Statistical computing and robust regression.

### *Applied Mathematics and Numerical Analysis*

L. Berselli, University of Pisa, Italy, 21-27.4.02. *Lecture:* On the coupling of the Stokes and the porous media equations: G-convergence and domain decomposition methods, 24.4.02.

D. Bresch, CNRS - Université Blaise Pascal, France, 21-28.9.02. *Lecture:* Low Mach and Rossby limit for fluids, 27.9.02.

F. Dias D'Almeida, Universidade do Porto, Portugal, 23.5.02. *Lecture:* Comparação das propriedades de minimização dos métodos CG e GMRES.

G. M. Gomes, Department of Biological Sciences, University of Warwick, UK, 11.1.02. *Lecture:* Dinâmica das doenças infecciosas.

S. Nazarov, St. Petersburg University, Russia, 1.10-31.12.02.

M. S.-Neugebauer, Universität Kassel, Germany, 17.11-24.11.02. *Lecture:* The pressure stabilization method for viscous flow problems, 21.11.02.

H. Orlande, Universidade Federal do Rio de Janeiro, Brazil, 15.7.02. *Lecture:* Problemas Inversos em transferência de calor e Massa.

K. Rajagopal, University of Texas, USA, 15-20.2.02. *Lecture:* Constitutive models for blood flow, 18.2.02.

A. I. Sukov, Moscow State Technological University, Stankin, Russia, 5.2-4.3.02. *Lectures:* Numerical Methods for Nonlinear Differential Equations and Applications Physics (short course), 28.2.02.

M. Tomé, Universidade São Paulo, Brazil, 20-25.6.02. *Lecture:* A numerical method for solving Viscoelastic Free Surface Flows, 24.6.02.

### *Computer Science*

C. Areces, University of Amsterdam, The Netherlands, 2-10.11.02. *Lecture:* A gentle introduction to hybrid logics, 8.11.02.

L. Caires, Universidade Nova de Lisboa, Portugal, 25.1.02. *Lecture:* Lógica espacial para cálculos de processos: semântica e teoria da prova.

M. Campagnolo, Instituto Superior de Agronomia, Lisboa, Portugal, 1.2.02. *Lecture:* Analyticity and iteration.

A. Carbone, Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France, 19-26.10.02. *Lecture:* Computations in groups and formal proofs, 25.10.02.

W. Carnielli, Universidade de Campinas, Brazil, 21.7-3.8.02. *Lecture:* Tableau methods for non-standard logics: making sense of proof reasoning, 26.7.02.

M. Coniglio, Universidade de Campinas, Brazil, 14.7-3.8.02. *Lecture:* Combining valuations with society semantics, 19.7.02.

L. Cruz Filipe, University of Nijmegen, Netherlands. *Lectures:*

- Formalizing Mathematics in Coq, 4.1.02.
- Towards the automation of proofs in real analysis, 12.7.02.

M. Finger, Universidade de São Paulo, Brazil, 9-14.12.02. *Lecture:* Approximate reasoning, 13.12.02.

D. Graça, Universidade do Algarve, Portugal. *Lectures:*

- Some considerations about the GPAC model, 5.4.02.
- Recursion theory over the reals, 3.5.02.

H. Guerra, Universidade dos Açores, Portugal, 18.10.02. *Lecture:* Operational semantics of guarded quiescent processes.

G. Janelidze, Georgian Academy of Sciences, Tbilisi, Georgia, 5.4-5.6.02. *Course:* Category theory.

P. Lopes, Centro de Matemática e Aplicações, Instituto Superior Técnico, Lisboa, Portugal. *Lectures:*

- Counting colorings of knots, 15.11.02.
- Listing colorings of knots: Burau matrices and Gauss codes, 29.11.02.

C. Lourenço, Faculdade de Ciências da Universidade de Lisboa, Portugal. *Lecture:* Computação dinâmica em redes neuronais caóticas, 17.5.02.

J. Marcos, RU Ghent, Belgium, 13-20.1.02. *Lecture:* Internalizing consistency, 18.1.02.

A. Martins, Dep. Física, Instituto Superior Técnico, Lisboa, Portugal, 7.6.02. *Lecture:* Quantum teleportation - a new channel for telecommunication.

F. Van Oystaeyen, University of Antwerp, Belgium, 28.10-3.11.02. *Lectures:*

- Mathematical methods of technology - *Colloquium of the Department of Mathematics*, 30.10.02.
- Noncommutative topology and geometry, 31.10.02.

A. Scedrov, University of Pennsylvania, USA, 14-21.7.02. *Lecture:* Logical foundations of security protocol analysis, 18.7.02.

V. Vasconcelos, Faculdade de Ciências da Universidade de Lisboa, Portugal. *Lectures:*

- Secure information flow as typed process behaviour, 8.3.02.
- Session types for inter-process communication, 20.12.02.

L. Viganò, Freiburg Universität, Germany, 1-14.9.02. *Lecture:* An on-the-fly model-checker for security protocol analysis, 13.9.02.

A. Zanardo, Università di Padova, Italy, 5-12.5.02. *Lecture:* Topological aspects of branching-time semantics, 10.5.02.





## 5 Postdoctoral fellows

### *Algebra and Mathematical Analysis*

G. Del Magno, Ph.D. in Mathematics, Georgia Institute of Technology, Atlanta, USA, 2002. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 10.02. *Research areas:* dynamical systems.

G. Farkas<sup>†</sup>, Ph.D. in Mathematics, Technical University of Budapest, Hungary, 2001. Support: Project FCT POCTI/32931/MAT/2000. Center for Mathematical Analysis, Geometry, and Dynamical Systems, 10.01-2.02. *Research areas:* dynamical systems, numerical dynamics.

R. Hric, Ph.D. in Mathematics, Comenius University, Bratislava, 1999. Center for Mathematical Analysis, Geometry, and Dynamical Systems, 12.01-12.03. *Research areas:* dynamical systems.

A. Karlovich, Ph.D. in Mathematics, South Ukrainian State Pedagogical University, Odessa, Ukraine, 1998. Support: Project FCT SFRH/BPD/11619/2002. Centre for Mathematics and its Applications. *Research areas:* Singular Integral Operators, Operator Theory, Interpolation Theory.

David Martinez, Ph. D. in Mathematics, Universidad Carlos III, Madrid, Spain, 4-7.02. *Research areas:* Poisson geometry.

P. Monnier, Ph.D. in Mathematics, University of Montpellier, France, 2001. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 9.02. *Research areas:* Poisson geometry, singularities.

M. Perlmutter, Ph.D. in Mathematics, University of California, Berkeley, 1999. Center for Mathematical Analysis, Geometry, and Dynamical Systems, 12.01-12.03. *Research areas:* geometric mechanics, symplectic and Poisson geometry, geometric integrators.

C. Wolf, Ph.D. in Mathematics, Technical University of Munich, 1999. Center for Mathematical Analysis, Geometry, and Dynamical Systems, 12.01-12.02. *Research areas:* dynamical systems, dimension theory, ergodic theory, complex analysis.

### *Applied Mathematics and Numerical Analysis*

N. Arada, Docteur en Mathématiques, Université de Toulouse, France, 1999. Centre for Mathematics and its Applications (with A. Sequeira) since 1.4.01. *Research areas:* control theory, mathematical fluid dynamics.

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<sup>†</sup> Deceased on February 27, 2002

Xicheng Zhang, Ph.D. in Mathematics, University of Huazhong, Wuhan, China, 9.01. *Research areas:* Stochastic analysis and geometry in infinite dimensions.

### *Computer Science*

C. Hermida, Ph.D. in Mathematics, University of Edinburgh, Scotland, UK, 1993. Support: Project FCT PRAXIS XXI/BPD/18976/98, Center for Logic and Computation (with A. Sernadas), 12.99-10.02. *Research areas:* Higher order category theory.

M. Coniglio, Ph.D. in Mathematics, Universidade de São Paulo, Brazil, 1997. Support: FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo) postdoctoral grant 01/1045-0, Center for Logic and Computation (with A. Sernadas), 7.01-2.02. *Research areas:* Categorical logic.

## 6 Research Programs and Sponsorship

### 6.1 Research Units

The research centers mentioned at the beginning are funded under grants of the “Programa de Financiamento Plurianual”, of the Science and Technology Foundation - Portugal.

### 6.2 Research Projects Coordinated by Department Members

M. Abreu, Invariants in Symplectic and Related Geometries, FCT POCTI/1999/MAT/33081, 1.01-12.02.

C. J. S. Alves,

- Inverse Problems and Numerical Analysis in Wave Scattering, FCT POCTI/MAT/34735/99.
- The method of fundamental solutions for non-homogeneous problems, NATO Collaborative Linkage Grant PST.CLG.977633 with C. S. Chen (USA) and B. Sarler (Slovenia).

M. A. Bastos, Algebras of Operators of Non Local type and Factorization of Oscillatory Symbols, FCT POCTI 34222/99, 2000-2002.

A. B. Cruzeiro, Mathematical Physics, FCT POCTI/MAT/10028/98, 2000-2002.

F. P. da Costa, Analysis of Cluster-Formation Equations in the Physical and Environmental Sciences, Conselho de Reitores das Universidades Portuguesas/Ações Integradas Luso-Britânicas, B 14/02, 2002.

P. Freitas, Qualitative Theory of Differential Equations, FCT POCTI/32931/MAT/2000, 9.00-8.03.

J. P. Nunes, Moduli Spaces, Integrability and String Theory, FCT POCTI/33943/MAT/2000, 1.00-12.03.

M. Paluch, Connections between homotopy theory and algebraic geometry, FCT POCTI/34015/MAT/99, 2000-2003.

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

M. F. Ramalhoto, PRO-ENBIS - Contract No. G6RT/CT/2001/05059, 2002-2006 (with Spain, UK, Norway, Sweden, Italy, Germany).

P. Resende, Quantales, FCT POCTI/1999/MAT/33018, 1.10.00-30.9.02.

C. Rocha, Nonlinear Analysis and Dynamical Systems, FCT POCTI/MAT/199/94-20199 (2nd phase of Project Praxis XXI 2/2.1/MAT/199/94).

A. Sequeira,

- Mathematical and Numerical Modelling of the Human Cardiovascular System, FCT POCTI/MAT/41898/2001, 2002-2005.
- Mathematical and Numerical Modelling in Haemodynamics - HaeMOdel, European Contract of the Fifth Framework Programme - Research Training Network, coordinator for Portugal, 2002-2006 (with Italy, Switzerland, France, UK, Austria).
- Mathematical Analysis and Numerical Simulation of Non-Newtonian Fluids with Applications in Liquid-Crystalline Polymers, FCT FEDER POCTI/MAT/380/94 (2nd phase of Project Praxis XXI 2/2.1/MAT/380/94, 2001-2003).
- Numerical Simulation of Direct and Inverse Problems in Wave Propagation and in Fluid Flows, in collaboration with ENIT/LAMSIN, Tunis, Tunisia, ICCTI/Tunisia 1999-2002.

A. Sernadas, FibLog: Fibring Logics, FCT FEDER POCTI/2001/MAT/37239, 1.1.00-31.12.04.

M. E. Sousa Dias, Bifurcations and Dynamics of the Affine-rigid Bodies, European Research Training Network MASIE (Mechanics and Symmetry in Europe), MASIE-HRPN-CT-2000-00113, 6.00-5.04.

### 6.3 Participation in other Research Projects

M. Abreu, EDGE - European Differential Geometry Endeavour, European Contract Human Potential Programme, Research Training Network HPRN-CT-2000-00101, 6.00-5.04.

A. B. Cruzeiro,

- Mathematical methods in classical and quantum dynamics, FCT POCTI/1999/MAT/34924
- Stochastic Analysis and Mathematical Physics, Luso-Chilean cooperation project.

A. Cannas da Silva,

- EDGE -European Differential Geometry Endeavour, European Contract Human Potential Programme, Research Training Network HPRN-CT-2000-00101, 6.00-5.04.
- Geometric Analysis, Research Training Network HPRN-CT-1999-00118, 2000-2004.

R. Cordovil,

- Applications of oriented matroids to convexity and arrangements of hyperplanes, FCT SAPIENS/36563/99, 2000-2003.

- DONET - Discrete Optimization: Theory and Applications, European Union Contract ERBFMRX-CT98-0202, 1998-2003.

C. Florentino,

- *Higgs bundles and holomorphic triples*. Acções Integradas Luso-Espanholas, CRUP, 2002-2003.
- EDGE - European Differential Geometry Endeavour, European Contract Human Potential Programme, Research Training Network HPRN-CT-2000-00101, 6.00-5.04.

P. Freitas, Member of the Steering Committee of the European Science Foundation project Programme in Spectral Theory and Partial Differential Equations (SPECT), 2002-2006.

R. Hric, Chaos in Discrete Dynamics and Related Questions, Slovak Grant Agency VEGA 1/7424/20, 2000-2002.

R. Loja Fernandes, EDGE - European Differential Geometry Endeavour, European Contract Human Potential Programme, Research Training Network HPRN-CT-2000-00101, 6.00-5.04.

J. Mourão, Nonperturbative aspects of fields and strings, FCT CERN/P/FIS/40108/2000, 2001-2002. FCT CERN/P/FIS/43717/2001, 2002-2003.

A. Pacheco,

- SCALE: Statistical Characterization of Telecommunications Traffic, POSI/34826/CPS/2000, 1.01-6.02.
- Traffic Modeling and Performance Evaluation of Multiservice Networks, POSI/42069/CPS/2001, 2002-2004.

R. Picken, FCT CERN/P/FIS/40108/2000, 2001-2002. FCT CERN/P/FIS/43717/2001, 2002-2003.

M. F. Ramalhoto,

- European Union Expert for two Research Programs of the Fifth Framework Programme.
- European Masters and Research Program on Total Quality Management (with Denmark, France, Greece, Ireland, Italy, Spain, Sweden and UK), European Foundation for Quality Management.

A. Ravara,

- Mikado: Mobile Calculi based on Domains, EU FET Global Computing IST-2001-32222, 1.1.02-31.12.04.
- MIMO: Models and Infra-structures for Mobile Computing, FCT POSI/CHS/39789/2001, 1.1.02-31.12.04.

- Profundis: Proofs of Functionality for Mobile Distributed Systems, EU FET Global Computing IST-2001-33100, 1.1.02-31.12.04.

A. Sequeira, Multiscale Models of Blood Flow in the Cerebral Vasculature - NSF project of international cooperation, (with A. Quarteroni and coordinated by A. M. Robertson), 2001-2004.

J. H. Videman, Nonlinear PDEs and Interface Problems, FCT POCTI/34471/MAT/2000, 2001-2003.

## 7 Organization of Conferences, Workshops, Meetings, etc.

M. Abreu, Co-organizer of the Poisson 2002 - Conference on Poisson Geometry, Instituto Superior Técnico, Lisbon, Portugal, 2-7.9.02.

C. J. S. Alves,

- Member of the Scientific Committee of the 4th International Conference on Inverse Problems in Engineering, Rio de Janeiro, Brazil, 25-31.5.02.
- Co-chair of the organizing committee of the Workshop on Inverse Obstacle Scattering, Instituto Superior Técnico, Lisbon, Portugal, 4-6.11.02.

L. Barreira, Organizer of the sessions of Dynamical Systems of Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02.

A. Cannas da Silva, Co-organizer of the Poisson 2002 - Conference on Poisson Geometry, Instituto Superior Técnico, Lisbon, Portugal, 2-7.9.02.

R. L. Fernandes,

- Member of the Scientific Committee of the Conference Geometry and Topology of Manifolds, Krynica, Polónia, 29.05-5.6.02.
- Co-organizer of the Poisson 2002 - Conference on Poisson Geometry, Instituto Superior Técnico, Lisbon, Portugal, 2-7.9.02.

C. Florentino,

- Co-organizer of the Third IST Lecture Series in Algebraic Geometry and Physics, *Vector bundles on algebraic curves*, Instituto Superior Técnico, Lisbon, Portugal 7-11.1.02.
- Co-organizer of the Lisbon Summer Lectures on Geometry III, Instituto Superior Técnico, Lisbon, Portugal, 8-11.7.02.

A. B. Lebre, Co-organizer of the International Conference FSORP - Factorization, Singular Operators and Related Problems, Universidade da Madeira, Funchal, Portugal, 28.1-1.2.02.

N. Martins, Member of the Organizing Committee of the European Conference on Iteration Theory, ECIT 2002, Évora, 2-7.9.02.

A. Moura Santos, Co-organizer of the International Conference FSORP - Factorization, Singular Operators and Related Problems, Universidade da Madeira, Funchal, Portugal, 28.1-1.2.02.

J. Mourão,

- Co-organizer of the Third IST Lecture Series in Algebraic Geometry and Physics, *Vector bundles on algebraic curves*, Instituto Superior Técnico, Lisbon, Portugal 7-11.1.02.
- Co-organizer of the Lisbon Summer Lectures on Geometry III, Instituto Superior Técnico, Lisbon, Portugal, 8-11.7.02.
- Co-organizer of the XIth Oporto Meeting on Geometry, Topology and Physics, *Geometry of Differential Equations*, Universidade do Porto, Portugal, 12-15.7.02.

J. P. Nunes,

- Co-organizer of the Third IST Lecture Series in Algebraic Geometry and Physics, *Vector bundles on algebraic curves*, Instituto Superior Técnico, Lisbon, Portugal 7-11.1.02.
- Co-organizer of the Lisbon Summer Lectures on Geometry III, Instituto Superior Técnico, Lisbon, Portugal, 8-11.7.02.

C. D. Paulino, Co-organizer of the course on Human and Molecular Genetics for Statisticians, Universidade de Lisboa, Portugal, 14.10.02-16.12.02.

R. Picken,

- Co-organizer of the Vector bundles on algebraic curves Third IST Lecture Series in Algebraic Geometry and Physics, Instituto Superior Técnico, Lisbon, 7-11.1.02.
- Co-organizer of the Lisbon Summer Lectures on Geometry III, Lisbon, 8-11.7.02.
- Co-organizer of the XIth Oporto Meeting on Geometry, Topology and Physics, *Geometry of Differential Equations*, Universidade do Porto, Portugal, 12-15.7.02.

M. F. Ramalhoto,

- Member of the Scientific Committee of MMR' 2002 - Mathematical Methods in Reliability, University of Trondheim, Norway, 17-20.6.02.
- Organizer of the Pro-ENBIS Internal Network Meeting, Lisbon/Cascais, Portugal, 8-10.5.02.

A. Ravara, Organizer of the Meeting Mikado-Profundis, Instituto Superior Técnico, Lisboa, Portugal, 14.2.02.

P. Resende, Co-organizer of the Meeting on the Theory and Applications of Quantaes, Instituto Superior Técnico, Lisboa, Portugal, 16-18.7.02.

A. Sequeira,

- Chairman of the Organizing Committee of the Third International Conference on Applied Mathematics for Industrial Flow Problems - AMIF/ESF, AMIF 2002, Lisbon, Portugal, 17-20.4.02, <http://www.math.ist.utl.pt/AMIF2002>.



- Member of the Organizing Committee of the International School on Biomathematics, Bio-engineering and Clinical Aspects of Blood Flow, MSRI, University of California, Berkeley, USA, 23.07-9.8.02, [http://zeta.msri.org/calendar/programs/ProgramInfo/71/show\\_program](http://zeta.msri.org/calendar/programs/ProgramInfo/71/show_program).

A. Sernadas, Organizer of the sessions of Logic and Computation of Encontro Nacional da Sociedade Portuguesa de Matemática, Universidade de Coimbra, Portugal, 5-8.2.02.

A. L. Silvestre, Member of the Organizing Committee of the Workshop on Inverse Obstacle Problems, Instituto Superior Técnico, Lisbon, Portugal, 4-6.11.02.

J. Sousa Ramos, Member of the Scientific Committee and of the Organizing Committee of the European Conference on Iteration Theory, ECIT 2002, Évora, 2-7.9.02.



## 8 Personal notes

### A. New Professors and Promotions

N. Martins, Professor Auxiliar

M. C. Morais, Professor Auxiliar

J. P. Santos, Professor Auxiliar

A. Serra, Professor Auxiliar

R. Silva, Professor Auxiliar

A. L. Silvestre, Professor Auxiliar

J. Ventura, Professor Auxiliar

### B. Other Notes

M. Abreu, Co-organizer of the Geometry in Lisbon Seminar. (<http://data.math.ist.utl.pt/sem/geolis/>).

C. J. S. Alves,

- Guest editor of a special issue of the IMACS Journal: Mathematics and Computers in Simulation.
- Co-chair of the Organizing Committee, International Workshop on MeshFree Methods, Instituto Superior Técnico, Lisbon, Portugal, 21-23.7.03.

L. Barreira,

- Associate Member of the Center for Dynamical Systems, The Pennsylvania State University, University Park, USA.
- Executive Editor of Portugaliae Mathematica.
- Member of the Editorial Board of Dynamical Systems.
- Member of the Executive Commission of the Center for Mathematical Analysis, Geometry, and Dynamical Systems, Lisbon, Portugal.

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

R. Cordovil,

- Executive Editor of *Portugaliae Mathematica*.
- Member of the Scientific Council of Centro Internacional de Matemática, Coimbra, Portugal, 2000-2004.
- Member of the Editorial Board of *Europ. J. Combinatorics*.
- Visited the IMPA, Rio de Janeiro, 4-5.02.

J. F. Costa,

- Supervisor of the Ph.D. thesis in Informatics, “Construção Modular de Redes Neurais Recorrentes Analógicas”, by J. P. Neto, Faculdade de Ciências, Universidade de Lisboa, Portugal, 23.2.02.
- Member of the Jury for the Agregação of F. Moura Pires, Departamento de Engenharia Informática, Universidade de Évora, Portugal, 18-19.06.02.
- Editor of the (Science) Series “A Máquina do Mundo”, published by Bizâncio, Lisbon, Portugal.
- Supervisor of the Diploma Thesis in Mathematics, “Finite Automata over Continuous-time”, by A. P. Francisco, Instituto Superior Técnico, Portugal, 2002. An improved version of part of this work, *Circuits of finite memory retrospective operators*, was accepted for presentation in the Second St. Petersburg Days of Logic and Computability, Saint-Petersburg, Russia.

A. B. Cruzeiro,

- President of Sociedade Portuguesa de Matemática.
- Member of the local Organizing Committee of the International Congress of Mathematical Physics, Lisbon, Portugal, 2003.
- Member of the local Organizing Committee of the EMS-Mathematical Weekend, Lisbon, Portugal, 9.03.
- Supervisor of the Master thesis in Stochastic Analysis of Ana Brito, Universidade de Lisboa, Portugal.

A. F. dos Santos, President for Scientific Affairs, Instituto Superior Técnico, 2001-2002.

C. Florentino, Member of the Organizing Committee of the Euroconference Vector Bundles on Algebraic Curves - VBAC 2003, Porto, Portugal, 1-5.7.03.

P. Freitas,

- Vice-president of Sociedade Portuguesa de Matemática.

- Member of the National Commission for Mathematics.
- Invited Professor at the Institut Élie Cartan, Université de Nancy, France, 5.02.
- Member of the local Organizing Committee of the International Congress of Mathematical Physics, Lisbon, Portugal, 2003.
- Co-organizer of the Conference Mathematical Problems in Quantum Mechanics, Lisbon, Portugal, 21-24.7.03.
- Member of the local Organizing Committee of the EMS-Mathematical Weekend, Lisbon, Portugal, 9.03.

D. Gomes, *A Stochastic Analog of Aubry-Mather theory*, *Nonlinearity* **15** (2002), 581-603, article selected for inclusion in *Institute of Physics Select*.

A. B. Lebre, Vice-President for Scientific Affairs, Instituto Superior Técnico, 2001-2002.

P. M. Lima, Supervisor of the Ph. D. thesis in Mathematics, “Numerical methods for Emden-Fowler equations” by António Oliveira, Universidade Nova de Lisboa, Portugal, 2002.

P. Lopes,

- visited IMPA, Rio de Janeiro, Brazil, January-September, 2002.
- visited ICMC, Universidade de S. Paulo, São Carlos, Brazil, 19-23.8.02.

L. T. Magalhães,

- President of FCT, Fundação para a Ciência e a Tecnologia, Portugal, 7.08.97-1.07.02.
- Manager of the Operational Program Science Technology Innovation of the Community Support Framework III (2000-2006), up to 1.7.02.
- Member of the Science and Technology Policy Committee (STPC) and of the Megascience Forum of OECD, up to 1.7.02.
- Member of the European Science Foundation (ESF) Governing Board.
- Member of the Luso American Foundation for Development Advisory Board.
- President of the Scientific and Technological Council of the Science and Technology Park of Oeiras, Taguspark, Portugal.
- Associate Editor of *Portugaliae Mathematica*.
- Member of the Editorial Council of *Boletim da Sociedade Portuguesa de Matemática*.

P. Mateus, Visited Andre Scedrov, University of Pennsylvania, USA, 9.01-2.02. Support: FCT postdoctoral grant SFRH/BPD/5625/2001.

J. Matias, visited EPFL Lausanne, Switzerland, 4.02.

J. Mourão,

- Co-organizer of the XIIth Oporto Meeting on Geometry, Topology and Physics, *Mathematics and String Theory*, Universidade do Porto, Portugal, 17-20.7.03.
- Co-organizer of the 4th IST Lecture Series in Algebraic Geometry and Physics, “Vector bundles on curves and generalized theta functions”, Instituto Superior Técnico, Lisbon, Portugal, 10-14.3.03.

J. P. Nunes, Co-organizer of the “Diagonal” Seminar, Instituto Superior Técnico, Lisbon, Portugal.  
<http://www.math.ist.utl.pt/diagonal>.

A. Pacheco, Visiting Professor at the School of Operations Research and Industrial Engineering of the Georgia Institute of Technology, Atlanta, USA, January 2002 - June 2002.

R. Picken,

- Coordinator of the Mathematical Physics Group of the Centre for Mathematics and its Applications (CEMAT).
- Co-organizer of the XIIth Oporto Meeting on Geometry, Topology and Physics, *Mathematics and String Theory*, Universidade do Porto, Portugal, 17-20.7.03.

M. F. Ramalhoto,

- Member of the Technical Program Committee, ESREL 2003 - Annual Conference of the European Safety and Reliability Association, Maastricht, Holland, 16-19.6.03.
- Nominated member of the International Advisory Board of Reliability Conferences of the International Statistical Institute.
- Co-Organizer of the Pre-ESREL 2003 Workshop, Maastricht, Holland.
- Associate Editor of the international journal *Quality Technology and Quantitative Management*.
- Member of the Editorial Board of the *European Journal of Engineering Education*.

J. Ramos, Member of the Jury for 5th Concurso/Encontro Nacional de Programação em Lógica, 11-13.4.02.

A. Ravara, Visited the INRIA, Sophia-Antipolis, France, 1.3.02-31.8.02.

P. Resende, Received ex aequo the José Anastácio da Cunha Prize 2nd edition, Sociedade Portuguesa de Matemática, 31.10.02.

P. A. Santos,

- Member of the Directive Board of Instituto Superior Técnico, in charge of the Academic affairs and the Informatic affairs.

- Represents Instituto Superior Técnico at APIET - Associação para a Permuta Internacional de Estudantes de Tecnologia. (Portuguese branch of IAESTE - International Association for the Exchange of Students of Technology and Engineering).
- Member of the working group for the development of e-learning at Universidade Técnica de Lisboa.
- Coordinator of the e-learning content production supporting office GAEL, Instituto Superior Técnico.

A. Sernadas,

- Vice-president of CIM - Centro Internacional de Matemática, Coimbra, Portugal.
- Member of the Scientific Committee of the journal Formal Aspects of Computing.
- Member of the Jury for the Agregação of J. Jorge, Departamento de Engenharia Informática, Instituto Superior Técnico, Lisbon, Portugal, 21-22.11.02.

A. Sequeira

- Scientific reviewer of GBOU projects of the Institute for the Promotion of Innovation by Science and Technology, IWT- Flanders, Brussels.
- Visiting Researcher at the Department of Mechanical Engineering, University of Pittsburgh, USA, 21-31.10.02.
- Visiting Researcher at the Department of Mathematics and Mechanical Engineering, University of Texas A&M at College Station, USA, 21.11-6.12.02.
- Member of the Scientific Committee of the VII Congresso de Mecânica Aplicada e Computacional, Évora, Portugal, 14-16.4.03.
- Member of the Organizing Committee of the International Conference on Trends in Partial Differential Equations of Mathematical Physics, Óbidos, Portugal, 7-10.6.03.
- Member of the Program Committee of the Workshop on “Partial Differential Equations and Applications”, Évora, Portugal, 23-24.6.03.
- Chairman of the Organizing Committee of the “International Workshop on Partial Differential Equations: Theory and Applications - IWPDE03”, Madeira, Portugal, 26-28.6.03, <http://www.math.ist.utl.pt/iwpde03>.
- Member of the Scientific Committee and Lecturer of a Short Course at the Summer School on Modelling of the Cardiovascular System: Mathematical Theory, Modelling and Applications, EPFL, Lausanne, Switzerland, 25-29.8.03.
- Member of the Scientific Committee of the International Symposium on Modelling of Physiological Flows - MPF2003, EPFL, Lausanne, Switzerland, 1-3.9.03.

A. L. Silvestre, Member of the Organizing Committee of the International Workshop on Nonlinear Partial Differential Equations, University of Madeira, Portugal, June 26-28, 2003.

F.-O. Speck,

- Member of the Advisory Board of *Mathematische Nachrichten*.
- member of the Editorial Board of *Mathematical Methods in the Applied Sciences*.
- Co-organizer of the Workshop on Operator Theory in Analysis and Engineering in Honour of Professor Erhard Meister, Darmstadt, June 17 and 18, 2003.

F. S. Teixeira, President of the Department of Mathematics.

J. Teixeira

- visited the Department of Mathematics of the University of Wisconsin - Madison, 20.1-30.5.02.
- Member of the Organizing Committee of Nonstandard Mathematics 2004, Aveiro, Portugal, 7.04.

M. Vaz Pinto, Co-organizer of the Lisbon Conference on Commutative Algebra, Instituto Superior Técnico, Lisbon, 23-27.6.03.

J. H. Videman, Co-organizer of the CIM Advanced School and Workshop on Modelling and Numerical Simulation in Continuum Mechanics, Coimbra, Portugal, 14-18.7.03.