



Research Report 2003

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
URL: <http://www.math.ist.utl.pt>*

This document is available at the above URL

Contents

Preface	3
Research Areas	5
Research Centers	7
Research Seminars	9
1 Publications	11
1.1 Publications Appeared in 2003	11
1.1.1 Books (authored or edited)	11
1.1.2 Articles in Serials	11
1.1.3 Articles in International Journals	13
1.1.4 Articles/Communications in Proceedings of International Conferences	17
1.1.5 Other publications	19
1.2 Publications accepted or submitted in 2003	20
2 Academic degrees awarded in 2003	29
2.1 Doutoramentos/Ph.D.'s	29
2.2 Mestrados/M.A.'s/M.S.c.'s	29
3 Research Lectures by Department Members	31
3.1 Invited Lectures	31
3.2 Lectures at Conferences, Workshops, Meetings, etc.	36
4 Guest Program	39
5 Postdoctoral Program	48
5.1 Postdoctoral fellows	48
5.2 Publications	49
6 Research Programs and Sponsorship	53
6.1 Research Projects Coordinated by Department Members	53
6.2 Participation in other Research Projects	54
7 Organization of Conferences, Workshops, Meetings, etc.	57
8 Miscellaneous	61
8.1 New Professors and Promotions	61
8.2 Personal notes	61

Preface

In the thirteenth 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 102 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 within this section 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, acknowledging the high international value of the research performed. The organization of this issue reflects the activities of the centers associated to our department. However, it is only included in this report the research carried out by the department members.

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 Margarida Silva Carvalho for her work in the compilation of information and L^AT_EX processing of this issue.

Lisbon, June, 2004

The Department Chairman,

Prof. José Manuel Ferreira

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 48 Ph.D. members.
URL: <http://www.math.ist.utl.pt/cam/>
- Center for Mathematics and its Applications, coordinated by A. Sequeira, with 48 Ph.D. members and research groups in Operator Theory, Banach Algebras and Applications; Numerical Analysis and Applications in Continuum Mechanics; Statistics and Stochastic Processes; Mathematical Physics; Harmonic Analysis, Operator Theory and Applications.
URL: <http://www.math.ist.utl.pt/cma/>
- Center for Logic and Computation, coordinated by C. Sernadas, with 14 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 Mathematics and Fundamental Applications, CMAF (Lisbon University), coordinated by M. M. Marques.
URL: <http://cmf.lmc.fc.ul.pt/>
- 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 Agent Modelling, coordinated by H. Coelho.
URL: <http://labmag.di.fc.ul.pt/>
- Mathematical Physics Group, Lisbon University, coordinated by J.-C. Zambrini.
URL: <http://gfm.cii.fc.ul.pt/>
- Research Unit of Marine Technology and Engineering, coordinated by C. G. Soares.
URL: <http://mar.ist.utl.pt/uetn/>

Research Areas

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

Dynamical Systems and Differential Equations

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

Geometry and Topology

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

Operator Theory and Integral Equations

The work in this area is focused on 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 Applications in Continuum Mechanics

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

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

Logic and Computation

Research in this area is concentrated on 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 Seminars

During 2003 the Department of Mathematics at Instituto Superior Técnico ran regular sessions of the following seminars:

- Seminar on Algebra (5 sessions).
Organizers: Pedro Ferreira dos Santos, Pedro Resende and Maria Vaz Pinto.
- Seminar on Analysis, Geometry, and Dynamical Systems (46 sessions).
Organizer: Luis Barreira.
- Seminar on Applied Mathematics and Numerical Analysis (10 sessions).
Organizer: Carlos Alves.
- Seminar on Ergodic theory and Dynamical Systems (20 sessions).
Organizer: Luis Barreira.
- Seminar on Functional Analysis and Applications (20 sessions).
Organizer: Frank-Olme Speck.
- Seminar on Logic and Computation (32 sessions).
Organizer: Amílcar Sernadas.
- Seminar on Mathematical Physics (10 sessions).
Organizers: Carlos Florentino, José Natário and João Nunes.
- Seminar on Partial Differential Equations (20 sessions).
Organizers: Diogo Gomes.
- Seminar on Probability and Statistics (7 sessions).
Organizer: Ana M. Pires.
- Seminar on Topological Quantum Field Theory Club (5 sessions).
Organizers: José Mourão and Roger Picken.

During 2003 regular sessions also ran of the following seminars, in collaboration with other institutions:

- Seminar Geometria em Lisboa, in collaboration with Universidade de Lisboa.
Organizers: Miguel Abreu and Maria João Pablo (Universidade de Lisboa).
- Seminar on Mathematical Logic, in collaboration with Universidade de Lisboa.
Organizers: Fernando Ferreira (Universidade de Lisboa) and Narciso Garcia.
- Seminar on Mathematics Systems and Robotics, in collaboration with ISR.
Organizers: Diogo Gomes and João Xavier (ISR).

- Seminar on Quantum Computation and Information (8 sessions), in collaboration with the Department of Physics.

Organizer: Ana Maria Martins (Department of Physics), Jorge Buescu and Paulo Mateus.

Colloquium: the department also runs a Colloquium, jointly sponsored by the Center for Logic and Computation, the Center for Mathematical Analysis, Geometry, and Dynamical Systems, and the Center for Mathematics and its Applications, with 3 sessions in 2003. The organizer was Pedro Resende.

1 Publications

1.1 Publications Appeared in 2003

1.1.1 Books (authored or edited)

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

J. Buescu, S. Castro, A. Dias and I. Labouriau Eds., *Bifurcation, Symmetry and Patterns*, Birkhäuser, 2003.

A. Cannas da Silva, *Introduction to Symplectic and Hamiltonian Geometry*, Publicações Matemáticas do IMPA, IMPA, 2003.

Center for Mathematics and its Applications (CEMAT)

A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Singular Integral Operators, Factorization and Applications*, IWOTA 2000, Faro, Portugal, Operator Theory: Advances and Applications, 142, Birkhäuser, 2003.

I. Gohberg, N. Manojlovic and A. F. dos Santos Eds., *Factorization and Integrable Systems*, Summer School in Faro 2000, Portugal, Operator Theory: Advances and Applications, 141, Birkhäuser, 2003.

C. D. Paulino, M. A. Turkman and B. Murteira, *Estatística Bayesiana*, Fundação Calouste Gulbenkian, 2003.

R. Picken and S. T. Tsou Eds., *Proceedings of the X Oporto Meeting on Geometry, Topology and Physics (2001)*, Oporto, Portugal, International Journal of Modern Physics A, 18 (Supplement), World Scientific, 2003.

S. G. Samko, A. B. Lebre and A. F. dos Santos Eds., *Factorization, Singular Operators and Related Problems*, Proceedings of the Conference in Honour of Professor Georgii Litvinchuk (2002), Funchal, Portugal, Kluwer Academic Publishers, 2003.

1.1.2 Articles in Serials

Center for Logic and Computation (CLC)

C. Caleiro, P. Gouveia and J. Ramos, *Completeness results for fibred parchments: Beyond the propositional base*, in Recent Trends in Algebraic Development Techniques - Selected Papers, M. Wirsing, D. Pattinson and R. Hennicker Eds., Lecture Notes in Computer Science 2755, Springer Verlag, 2003, pp. 277-315.

P. Mateus, J. Mitchell and A. Scedrov, *Composition of cryptographic protocols in a probabilistic polynomial-time process calculus*, in CONCUR 2003 - Concurrency Theory, R. Amadio and D. Lugiez Eds., Lecture Notes in Computer Science 2761, Springer Verlag, 2003, pp. 327-349.

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

M. Abreu, *Kahler geometry of toric manifolds in symplectic coordinates*, in *Symplectic and Contact Topology in Interactions and Perspectives*, Y. Eliashberg, B. Khesin and F. Lalonde Eds., Fields Institute Communications 35, American Mathematical Society, 2003, pp. 1-24.

D. E. Evans and P. R. Pinto, *Modular invariants and their fusion rules*, in *Advances in Quantum Dynamics*, B. M. Baker, P. E. T. Jorgensen, P. S. Muhly, and G. Price Eds., Contemporary Mathematics 335, American Mathematical Society, 2003, pp. 119–130.

Center for Mathematics and its Applications (CEMAT)

M. A. Bastos, A. Bravo and Yu. I. Karlovich, *Singular integral operators with piecewise almost periodic coefficients and Carleman shift*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 29-57.

L. Castro and F.-O. Speck, *Well-posedness of diffraction problems involving n coplanar strips*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 81-93.

A. Conceição, V. G. Kravchenko, F. S. Teixeira, *Factorization of matrix functions and the resolvent of certain operators*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 91-100.

A. Karlovich, Yu. Karlovich and A. B. Lebre, *Invertibility of functional operators with slowly oscillating non-Carleman shifts*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 147-174.

V. G. Kravchenko, A. B. Lebre and J. S. Rodríguez, *Factorization of singular integral operators with a Carleman shift via factorization of matrix functions*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 189-211.

A. Nogueira, P. Salvador, R. Valadas and A. Pacheco, *Modelling self-similar traffic through Markov modulated Poisson processes over multiple time scales*, in *Proceedings High Speed Networks and Multimedia Communications: VI IEEE International Conference, HSNMC 2003*, Estoril, Portugal, M. M. Freire and P. Lorenz and M. Myung-Ok Lee Eds., *Lecture Notes in Computer Science* 2720, Springer, 2003, pp. 550-560.

P. A. Santos and B. Silbermann, *An axiomatic approach to stability of approximation sequences*, in *Singular Integral Operators, Factorization and Applications, IWOTA 2000*, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., *Operator Theory: Advances and Applications*, 142, Birkhäuser, 2003, pp. 369-381.

Other Research Units

J. Neto, J. F. Costa, P. Carreira, and M. Rosa, *A compiler and simulator for partial recursive functions over neural networks*, in Applications and Science in Soft Computing, A. Lotfi and J. M. Garibaldi Eds., Advances in Soft Computing Series, Springer Verlag, 2003, pp. 39-46.

1.1.3 Articles in International Journals

Center for Logic and Computation (CLC)

C. Caleiro, W. A. Carnielli, M. E. Coniglio, A. Sernadas and C. Sernadas, *Fibring non-truth-functional logics: Completeness preservation*, Journal of Logic, Language and Information **12** (2003), 183-211.

M. E. Coniglio, A. Sernadas and C. Sernadas, *Fibring logics with topos semantics*, Journal of Logic and Computation **13** (2003), 595-624.

F. M. Dionísio and P. Lopes, *Quandles at finite temperatures II*, J. Knot Theory Ramifications **12** (2003), 1041-1092.

C. Hermida and P. Mateus, *Paracategories I: Internal paracategories and saturated partial algebras*, Theoretical Computer Science **309** (2003), 125-156.

D. Kruml, J.W. Pelletier, P. Resende and J. Rosický, *On quantales and spectra of C^* -algebras*, Applied Categorical Structures **11** (2003), 543-560.

P. Mateus, M. C. Morais, C. Nunes, A. Pacheco, A. Sernadas and C. Sernadas, *Categorical foundations for randomly timed automata*, Theoretical Computer Science **308** (2003), 393-427.

A. Ravara, A. G. Matos, V. T. Vasconcelos and L. Lopes, *Lexically scoped distribution: what you see is what you get*, Electronic Notes in Theoretical Computer Science **85** (2003).

P. Resende and S. J. Vickers, *Localic sup-lattices and tropological systems*, Theoretical Computer Science **305** (2003), 311-346.

C. Sernadas, L. Viganò, J. Rasga and A. Sernadas, *Truth-values as labels: A general recipe for labeled deduction*, Journal of Applied Non-Classical Logics **13** (2003), 277-315.

A. Vallecillo, V. T. Vasconcelos and A. Ravara, *Typing the behavior of objects and components using session types*, Electronic Notes in Theoretical Computer Science **68** (2003).

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

J. F. Alves and J. Sousa Ramos, *One-Dimensional semiconjugacy revisited*, Internat. J. Bifur. Chaos Appl. Sci. Engrg., **13** (2003), 1657-1663.

L. Barreira, *Dimension estimates in nonconformal hyperbolic dynamics*, Nonlinearity **16** (2003), 1657-1672.

L. Barreira and C. Wolf, *Measures of maximal dimension for hyperbolic diffeomorphisms*, Comm. Math. Phys. **239** (2003), 93-113.

- R. Cordovil and D. Forge, *Quadratic Orlik-Solomon algebras of graphic matroids*, Matemática Contemporânea **25** (2003), 25-32.
- R. Cordovil and D. Forge, *Diagonal bases in Orlik-Solomon type algebras*, Annals of Combinatorics **7** (2003), 247-257.
- R. Cordovil and D. Forge, *A note on Tutte polynomials and Orlik-Solomon algebras*, European Journal of Combinatorics **24** (2003), 1081-1087.
- D. G. Costa and P. Girão, *Existence and nonexistence of least energy solutions of the Neumann problem for a semilinear elliptic equation with critical Sobolev exponent and a critical lower-order perturbation*, J. Differential Equations **188** (2003), 164-202.
- M. Crainic and R. L. Fernandes, *Integrability of Lie brackets*, Annals of Mathematics **157** (2003), 575-620.
- J. Duarte and J. Sousa Ramos, *Topological entropy as a measure of chaos in forced excitable systems*, Int. J. Pure Appl. Math. **4** (2003), 165-181.
- D. E. Evans and P. R. Pinto, *Subfactor realisation of modular invariants*, Comm. Math. Phys. **237** (2003), 309-363.
- R. L. Fernandes, *Invariants of Lie algebroids*, Differential Geometry and its Applications **19** (2003), 223-243.
- J. M. Ferreira and S. Pinelas, *Oscillatory retarded functional systems*, J. Math. Anal. Appl. **285** (2003), 506-527.
- C. Florentino, J. Mourão and J. P. Nunes, *Coherent state transforms and vector bundles on elliptic curves*, J. Funct. Anal. **204** (2003), 355-398.
- D. Gomes, *Regularity theory for Hamilton-Jacobi equations*, J. of Differential Equations **187** (2003), 359-374.
- D. Gomes, *Perturbation theory for Hamilton-Jacobi equations and stability of Aubry-Mather sets*, SIAM J. Math. Analysis **35** (2003), 135-147.
- C. Grácio and J. Sousa Ramos, *Boundary maps and Fenchel-Nielsen-Maskit coordinates*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 1949-1958.
- M. H. Kobayashi and W. M. Oliva, *On the Birkhoff approach to classical Mechanics*, Resenhas IME-USP **6** (2003), 1-71.
- N. Martins, R. Severino and J. Sousa Ramos, *Bowen-Franks groups of reducible bimodal subshifts of finite type*, J. of Difference Equations and Applications **9** (2003), 423-433.
- N. Martins, R. Severino and J. Sousa Ramos, *Isentropic real cubic maps*, International Journal of Bifurcation and Chaos **13** (2003), 1701-1710.
- N. Martins, R. Severino and J. Sousa Ramos, *K-theory for Cuntz-Krieger algebras arising from real quadratic maps*, International Journal of Mathematics and Mathematical Sciences **34** (2003), 2139-2146.

- N. Martins and J. Sousa Ramos, *Bowen–Franks groups associated with linear mod one transformations*, International Journal of Bifurcation and Chaos **13** (2003), 2005-2010.
- H. Oliveira and J. Sousa Ramos, *Symbolic dynamics of the tangent map*, Int. J. Pure Appl. Math. **8** (2003), 183-208.
- H. Oliveira and J. Sousa Ramos, *On iterated positive Schwarzian derivative maps*, Int. Jour. Bifurcation and Chaos **13** (2003) 1673-1681.
- C. Correia Ramos and J. Sousa Ramos, *Kleinian groups and holomorphic dynamics*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 1957-1967.
- J. L. Rocha and J. Sousa Ramos, *Tilings described by iterated maps*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 1923-1935.
- J. L. Rocha and J. Sousa Ramos, *On iterated maps of the interval with holes*, J. Difference Equations Appl. **9** (2003), 319-335.
- P. Martins Rodrigues and J. Sousa Ramos, *Symbolic representations and T^n automorphisms*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 2005-2010.
- P. F. Santos, *Algebraic cycles on real varieties and $\mathbb{Z}/2$ -equivariant homotopy theory*, Proc. London Math. Soc. **86** (2003), 513–544.
- P. F. Santos, *A note on the equivariant Dold-Thom theorem*, J. Pure Appl. Algebra **183** (2003), 299-312.
- A. Serra, *Interpolating sequences in harmonically weighted Dirichlet spaces*, Proc. Amer. Math. Soc., **131** (2003), 2809-2817.
- L. Silva and J. Sousa Ramos, *A unified renormalization scheme for two-piecewise monotonous maps of the interval*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 1711-1719.

Center for Mathematics and its Applications (CEMAT)

- N. Arada and A. Sequeira, *Strong steady solutions for a generalized Oldroyd-B model with shear-dependent viscosity in a bounded domain*, Mathematical Models & Methods in Applied Sciences **13** (2003), 1303-1323.
- M. A. Bastos, Yu. Karlovich and A. F. dos Santos, *Oscillatory Riemann-Hilbert problems and the corona theorem*, J. Functional Analysis **197** (2003), 347-397.
- R. P. Carpentier, *Topological notions for Kauffman and Vogel's polynomial*, J. Knot Theory Ramif. **12** (2003) 67-78.
- F. M. Dionísio and P. Lopes, *Quandles at finite temperatures II*, J. Knot Theory Ramifications **12** (2003), 1041-1092.
- C. Florentino, J. Mourão and J. P. Nunes, *Coherent state transforms and vector bundles on elliptic curves*, J. Funct. Anal. **204** (2003), 355-398.
- P. M. Lima and A. M. Oliveira, *Numerical solution of a singular boundary value problem for a generalized Emden-Fowler equation*, Appl. Num. Math. **45** (2003), 389-409.

- P. Lopes, *Quandles at finite temperatures I*, J. Knot Theory Ramifications **12** (2003), 159-186.
- P. Mateus, M. C. Morais, C. Nunes, A. Pacheco, A. Sernadas and C. Sernadas, *Categorical foundations for randomly timed automata*, Theoretical Computer Science **308** (2003), 393-427.
- S. Nazarov, A. Sequeira and J. Videman, *Asymptotic modelling of a piston with a completely wetted surface*, Zap. Nauchn. Sem. St. Petersburg POMI **306** (2003), 53-70.
- S. A. Nazarov, M. Specovius-Neugebauer and J. H. Videman, *Nonlinear artificial boundary conditions for the Navier-Stokes equations in an aperture domain*, Math. Nachr. **265** (2004), 24-67.
- A. Nogueira, P. Salvador, R. Valadas and A. Pacheco, *Modelling network traffic with multifractal behavior*, Telecommunication Systems **24** (2003), 339-362.
- C. D. Paulino and P. Soares, *Analysis of rates in incomplete Poisson data*, The Statistician **52** (2003), 87-99.
- C. D. Paulino, P. Soares and J. Neuhaus, *Binomial regression with misclassification*, Biometrics **59** (2003), 670-675.
- A. E. Pinto, S. André, E. Mendonça, G. L. Silva and J. Soares, *Overall survival in advanced breast cancer: Relevance of progesterone receptor expression and DNA ploidy in fine-needle aspirates of 392 patients*, International Journal of Biological Markers **18** (2003), 7-12.
- G. Rodrigues¹, *Homotopy quantum field theories and the homotopy cobordism category in dimension 1+1*, J. Knot Theory Ramifications **12** (2003), 287-319.
- P. Salvador, R. Valadas and A. Pacheco, *Multiscale fitting procedure using Markov modulated Poisson processes*, Telecommunication Systems **23** (2003), 123-148.
- Other Research Units**
- A. L. Brinca, F. J. Romeiras and L. Gomberoff, *On wave generation by perpendicular currents*, J. Geophys. Res. **108** (2003), 1038.
- A. L. Brinca, F. J. Romeiras and L. Gomberoff, *Stimulation of electron Bernstein modes by perpendicular ion beam*, Geophys. Res. Lett. **30** (2003), 2175.
- A. B. Cruzeiro and X. Zhang, *Finite dimensional approximation of Riemannian path space geometry*, J. Funct. Anal. **205** (2003), 206-270.
- D. Graça and J. F. Costa, *Analog computers and recursive functions over the reals*, Journal of Complexity **19** (2003), 644-664.
- M. Mendes Lopes and R. Pardini, *The bicanonical map of surfaces with $p_g = 0$ and $K^2 \geq 7$, II*, Bulletin of the London Math. Soc. **35** (2003), 337-343.
- J. P. Neto, H. T. Siegelmann, and J. F. Costa, *Symbolic processing in neural networks*, Journal of the Brazilian Computer Society **8** (2003), 58-70.

¹FCT supported Ph. D. student.

1.1.4 Articles/Communications in Proceedings of International Conferences

Center for Mathematics and its Applications (CEMAT)

C. J. S. Alves, *Density results on partial differential equations and the derivation of meshless methods*, in Proceedings of the International Conference on Computational and Experimental Engineering & Sciences 2003 (ICCES'03), Corfu, Greece, Tech Science Press (CD-ROM) 2003.

N. Arada and A. Sequeira, *A note on non-Newtonian modelling of blood flow in small arteries*, in Proceedings of the International Conference on Modelling and Numerical Simulation in Continuum Mechanics, CIM, 2003.

L. Castro, R. Duduchava and F.-O. Speck, *Localization and minimal normalization of some basic mixed boundary value problems*, in Factorization, Singular Operators and Related Problems, Proceedings of the Conference in Honour of Professor Georgii Litvinchuk (2002), Funchal, Portugal, S. Samko, A. B. Lebre and A. F. dos Santos Eds., Kluwer, 2003, pp. 73-100.

A. Conceição, V. G. Kravchenko and F. S. Teixeira, *Factorization of some classes of matrix functions and the resolvent of a Hankel operator*, in Factorization, Singular Operators and Related Problems, Proceedings of the Conference in Honour of Professor Georgii Litvinchuk (2002), Funchal, Portugal, S. Samko, A. B. Lebre and A. F. dos Santos Eds., Kluwer, 2003, pp. 101-110.

T. Diogo, P. M. Lima, S. Valtchev and N. Ford, *Numerical methods for a nonuniquely solvable Volterra integral equation*, in Proceedings of CILAMCE XXIV, Ouro Preto, Brazil, (CD-ROM) 2003.

T. Diogo, S. Valtchev and P. M. Lima, *Numerical solution of a singular Volterra integral equation by piecewise polynomial collocation*, in Computational Methods in Engineering and Science, Proceedings of EPMESC IX, V. P. Iu, L. N. Lamas, Y. P. Li and K. M. Mok Eds., Swets & Zellinger, 2003, pp.195-200.

F. Ferreira and A. Pacheco, *Análise de Sistemas GI/M/s/c Utilizando Uniformização*, in Literacia e Estatística, Proceedings of the X Congresso Anual da Sociedade Portuguesa de Estatística, P. Brito, A. Figueiredo, F. Sousa, P. Teles and F. Rosado Eds., SPE, 2003, pp. 261-272.

P. M. Lima and M. P. Pato, *Computational methods for a singular boundary-value problem*, in Computational Methods in Engineering and Science, Proceedings of EPMESC IX, V. P. Iu, L. N. Lamas, Y. P. Li and K. M. Mok Eds., Swets & Zellinger, 2003, pp. 211-217.

P. M. Lima and M. P. Pato, *Análise numérica de problemas de valores de fronteira singulares*, in Actas do VII Congresso de Mecânica Aplicada e Computacional, J. I. Barbosa Ed., Universidade de Évora, 2003, pp. 1908-1915.

A. Nogueira, P. Salvador, R. Valadas, and A. Pacheco, *A hierarchical approach based on MMPPs for modeling self-similar traffic over multiple time scales*, in Proceedings of International Working Conference on Performance Modeling and Evaluation of Heterogeneous Networks - HET-NETs, Ilkley, West Yorkshire, UK, D. Kouvatsos Ed., 2003, Vol. 1, pp. 37/1-13.

R. Oliveira, R. Valadas, A. Pacheco, and P. Salvador, *Cluster analysis of internet users based on hourly traffic utilization*, in Proceedings of International Working Conference on Performance

Modeling and Evaluation of Heterogeneous Networks - HET-NETs, Ilkley, West Yorkshire, UK, D. Kouvatso Ed., Vol.1, pp. 56/1-14.

M. R. Oliveira and J. A. Branco, *Comparison of three robust methods for redundancy analysis*, in Developments in Robust Statistics, Proceedings of the International Conference on Robust Statistics (2001), R. Dutter, P. Filzmoser, U. Gather, P. J. Rousseeuw Eds., Springer Verlag, 2003, pp. 287-295.

C. D. Paulino, P. Soares and J. Neuhaus, *Infecção viral pelo papiloma humano – uma análise bayesiana de regressão binomial com resposta mal classificada*, in Literacia e Estatística, Proceedings of the X Congresso Anual da Sociedade Portuguesa de Estatística, P. Brito, A. Figueiredo, F. Sousa, P. Teles and F. Rosado Eds., SPE, 2003, pp. 491-500.

G. L. Silva, *Modelos de fragilidade para dados de sobrevivência correlacionados: uma abordagem bayesiana*, in Literacia e Estatística, Proceedings of the X Congresso Anual da Sociedade Portuguesa de Estatística, P. Brito, A. Figueiredo, F. Sousa, P. Teles and F. Rosado Eds., SPE, 2003, pp. 619-625.

Other Research Units

S. Coleman, O. Evandt, H. E. Goldstein and M. F. Ramalhoto, *A robust graphical test for binormality*, in Proceedings of the ENBIS/ISI Conference, Barcelona, Spain, (CD-ROM) 2003.

R. S. Kenett, M. F. Ramalhoto and J. Shade, *Six sigma perspectives on stochastics for the quality movement*, in Proceedings of the ENBIS/ISI Conference, Barcelona, Spain, (CD-ROM) 2003.

O. Evandt, R. Göb, A. Pievatolo, M. F. Ramalhoto and D. Stewardson, *Industry academia interaction. Examples and ways of improvement*, in Proceedings of the ENBIS/ISI Conference, Barcelona, Spain, (CD-ROM) 2003.

R. S. Kenett, M. F. Ramalhoto and J. Shade, *A proposal for engineering knowledge of stochastic in the quality movement*, in Safety & Reliability, Proceedings of the ESREL 2002, Maastricht, Netherlands, T. Bedford and P. H. A. J. M. van Gelder Eds., Balkema, 2003, Vol. 1, pp. 881-888.

C. McCollin, C. Buena and M. F. Ramalhoto, *Exploratory data analysis approaches to reliability: some new directions*, in Safety & Reliability, Proceedings of the ESREL 2002, Maastricht, Netherlands, T. Bedford and P. H. A. J. M. van Gelder Eds., Balkema, 2003, Vol. 2, pp. 1105-1112.

M. F. Ramalhoto, R. Göb, A. Pievatolo, O. Evandt and J. Salmikuuka, *A scheme for industry-academia interaction to enhance research and development issues*, in Safety & Reliability, Proceedings of the ESREL 2002, Maastricht, Netherlands, T. Bedford and P. H. A. J. M. van Gelder Eds., Balkema, 2003, Vol. 2, pp. 1289-1294.

D. J. Stewardson, M. F. Ramalhoto, L. Da Silva and L. Drewett, *Establishing steel rail reliability by combining fatigue tests, factorial experiments and data transformation*, in Safety & Reliability, Proceedings of the ESREL 2002, Maastricht, Netherlands, T. Bedford and P. H. A. J. M. van Gelder Eds., Balkema, 2003, Vol. 2, pp. 1497-1502.

1.1.5 Other publications

Center for Logic and Computation (CLC)

A. Sernadas and C. Sernadas, *Combining logic systems: Why, how, what for?*, CIM Bulletin **15** (2003), pp. 9-14.

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

J. Buescu, *Sintomas, diagnósticos, terapêuticas - o olhar de um matemático*, in O Ensino da Matemática: situação e perspectivas, Conselho Nacional de Educação, 2003, pp. 155-204.

J. Buescu, *Da Falsificação de Euros aos Pequenos Mundos*, Gradiva, Lisboa, 2003.

Center for Mathematics and its Applications (CEMAT)

T. Diogo and S. Valtchev, *Collocation methods for a Volterra integral equation with multiple solutions*, in Fundamental Physico-Mathematical Problems and Modelling of Technological Systems, Janus-K, Moscow, **6** (2003), pp. 4-11.

A. Sequeira, *Circulation in Small Vessels and Capillaries: Development and Analysis of non-Newtonian Models*, Initial Task Report: RTN Project HaeMOdel, 2003.

Other Research Units

T. Bedford, A. Di Bucchianico, M. F. Ramalhoto and L. Wallis, *Tutorial Presentations*, Pre-ESREL 2003 Workshop Book Notes.

M. F. Ramalhoto, *Pro-ENBIS Notes on WP4-Reliability, Safety and Quality Improvement*, Pro-ENBIS Mid-Term Meeting, Brussels, October, 2003.

1.2 Publications accepted or submitted in 2003

Center for Logic and Computation (CLC)

P. Gouveia and F. M. Dionísio, *Lógica Computacional*, to appear in Coleção Ensino da Ciência e da Tecnologia, IST Press.

P. Gouveia and J. Ramos, *Multi-agent systems specification and certification: A situation and state calculus approach*, to appear in Annals of Mathematics and Artificial Intelligence.

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

P. Mateus, A. Sernadas, C. Sernadas and L. Viganò, *Modal sequent calculi labelled with truth values: Completeness, duality and analyticity*, to appear in Logic Journal of the IGPL.

C. J. Mulvey and P. Resende, *A noncommutative theory of Penrose tilings*, Preprint 13/03.

P. Resende, *Sup-lattice 2-forms and quantales*, to appear in Journal of Algebra.

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

J. F. Alves, R. Hric and J. Sousa Ramos, *The Artin-Mazur zeta function for graph maps*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

J. F. Alves and J. Sousa Ramos, *Homological Complexity of Markov maps*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

J. F. Alves, J. L. Fachada and J. Sousa Ramos, *On a condition for transitivity of Lorenz maps*, to appear in Proceedings of the ICDEA 2003.

J. F. Alves, J. L. Fachada and J. Sousa Ramos, *Detecting topological transitivity of piecewise monotone interval maps*, preprint.

J. F. Alves and J. Sousa Ramos, *Kneading theory for tree maps*, to appear in Ergodic Theory and Dynamical Systems.

G. E. Andrews and P. Freitas, *Extension of Abel's Lemma with q -series implications*, to appear in the Ramanujan J.

S. Anjos and G. Granja, *Homotopy decomposition of a group of symplectomorphisms of $S^2 \times S^2$* , to appear in Topology.

J. Almeida and J. P. Teixeira, *The space of state vectors: a hyperfinite approach*, preprint.

L. Barreira, *Poincaré recurrence: old and new*, preprint.

L. Barreira and P. Doutor, *Birkhoff averages for hyperbolic flows: variational principles and applications*, to appear in J. Stat. Phys.

L. Barreira, L. Radu and C. Wolf, *Dimension of measures for suspension flows*, to appear in Dynam. Syst.

- L. Barreira and C. Silva, *Lyapunov exponents for continuous transformations and dimension theory*, preprint.
- A. C. Barroso and J. Matias, *Necessary and sufficient conditions for existence of solutions of a variational problem involving the curl*, to appear in Discrete and Continuous Dynamical Systems, Series A, Preprint 9/03.
- J. Buescu, *Positive integral operators on unbounded domains*, preprint.
- J. Buescu, F. Garcia, I. Lourtie and A. Paixão, *Positive definiteness, integral equations and Fourier transforms*, to appear in J. Int. Eq. Appl.
- J. Buescu and A. Paixão, *Eigenvalues of positive definite kernels on unbounded domains*, preprint.
- J. Cerdeira and R. Cordovil, *A note on mixed graphs and matroids*, preprint.
- J. Chabrowski and P. Girão, *On the exterior Neumann problem involving the critical Sobolev exponent*, to appear in Topol. Methods Nonlinear Anal.
- B. Chenaud, P. Duclos, P. Freitas and D. Krejčířík, *Geometrically induced discrete spectrum in curved tubes*, preprint.
- R. Cordovil and D. Forge, *Gröbner and diagonal bases in Orlik-Solomon type algebras*, to appear in Cubo Journal.
- C. Correia Ramos, N. Martins and J. Sousa Ramos, *Noncommutative dimension associated with limit sets of Fuchsian groups*, preprint.
- C. Correia Ramos, N. Martins, R. Severino and J. Sousa Ramos, *Noncommutative topological dynamics*, preprint.
- M. Crainic and R. L. Fernandes, *Secondary Characteristic Classes of Lie Algebroids*, to appear in Lecture Notes in Physics, Springer Verlag.
- M. Crainic and R. L. Fernandes, *Integrability of Poisson brackets*, to appear in J. of Differential Geometry.
- J. Duarte and J. Sousa Ramos, *Topological invariants in forced piecewise-linear FitzHugh-Nagumo systems*, to appear in Chaos Solitons and Fractals.
- P. Exner, P. Freitas and D. Krejčířík, *A lower bound to the spectral threshold in curved tubes*, to appear in R. Soc. Lond. Proc. Ser. A Math. Phys. Eng. Sci.
- R. L. Fernandes and P. Monnier, *Linearization of Poisson brackets*, preprint.
- R. L. Fernandes and M. Ricou, *Introdução à Álgebra*, to appear in Coleção Ensino da Ciência e da Tecnologia, IST Press.
- S. Fernandes and J. Sousa Ramos, *Spectral invariants of iterated maps of the interval*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

- S. Fernandes and J. Sousa Ramos, *Second smaller zero of kneading determinant for iterated maps*, to appear in Proceedings of ICDEA 2003.
- B. Fiedler, C. Rocha and M. Wolfrum, *Heteroclinic orbits between rotating waves of semilinear parabolic equations on the circle*, to appear in J. of Differential Equations, Preprint 4/03.
- C. Florentino, J. Mourão and J. P. Nunes, *Coherent State Transforms and Theta Functions*, preprint.
- C. Florentino, P. Matias, J. Mourão, J. P. Nunes, *Coherent State Transforms, complex structures and geometric quantization*, preprint.
- P. Freitas, *Integrals of polylogarithmic functions, recurrence relations and associated Euler sums*, preprint.
- P. Freitas and A. Henrot, *On the first twisted Dirichlet eigenvalue*, to appear in Comm. Anal. Geom.
- D. Gomes, *Aubry-Mather theory for multi-dimension maps*, preprint.
- D. Gomes, *Hamilton-Jacobi methods for vakonomic mechanics*, preprint.
- D. Gomes and A. Oberman, *Computing the effective Hamiltonian - a variational approach to homogenization*, to appear in SIAM Journal of Control and Optimization.
- D. Gomes and E. Valdinoci, *Lack of integrability via viscosity solutions methods*, to appear in Indiana University Mathematics Journal.
- D. Gomes and C. Valls, *Weak KAM theory for multi-dimension maps*, preprint.
- G. Granja, *Self maps of HP^n via the unstable Adams spectral sequence*, preprint.
- C. Grácio and J. Sousa Ramos, *Rigidity and flexibility of surface groups*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- M. H. Kobayashi and W. M. Oliva, *A note on the conservation of energy and volume in the setting of nonholonomic mechanical systems*, to appear in Qualitative Theory of Dynamical Systems.
- D. Karagueuzian, B. Oliver and J. Ventura, *The components of a variety of matrices with square zero and submaximal rank*, preprint.
- J. P. Lampreia, R. Severino and J. Sousa Ramos, *Symbolic product of bimodal kneading invariants*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- J. P. Lampreia, R. Severino and J. Sousa Ramos, *Irreducible complexity of iterated symmetric bimodal maps*, to appear in Discrete Dynamics in Nature and Society.
- R. Lozi, A. Sharkovsky and J. Sousa Ramos, *One-dimensional dynamics generated by boundary value problems for the wave equation*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

- N. Martins, R. Severino and J. Sousa Ramos, *Bowen-Franks groups of reducible bimodal subshifts of finite type*, preprint.
- N. Martins, R. Severino and J. Sousa Ramos, *Bowen-Franks groups associated with iterated maps on the interval*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- D. Mendes and J. Sousa Ramos, *Kneading theory for triangular maps*, to appear in Int. J. Pure Appl. Math.
- D. Mendes and J. Sousa Ramos, *Computing topological entropy of triangular maps of the real plane*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- M. Mercês Ramos, C. Correia Ramos, R. Severino and J. Sousa Ramos, *Topological invariants of a chaotic pendulum*, to appear in Int. J. Pure Appl. Math.
- P. Martins Rodrigues and J. Sousa Ramos, *Bowen-Franks groups as conjugacy invariants for T^n automorphisms*, to appear in Aequationes Mathematicae.
- P. Martins Rodrigues and J. Sousa Ramos, *Some properties of the Jacobi-Perron algorithm*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- J. Natário, *Linking, Legendrian linking and causality*, to appear in Proc. London Math. Soc.
- H. Oliveira and J. Sousa Ramos, *Dynamics of the tangent map*, to appear in Proceedings of the ICDEA 2001.
- H. Oliveira and J. Sousa Ramos, *Iterates of the tangent map - the bifurcation schemes*, to appear in Proceedings of the ICDEA 2003.
- H. Oliveira and J. Sousa Ramos, *Iterates of transcendent meromorphic maps*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- M. Perlmutter, M. Rodríguez-Olmos and E. Sousa Dias, *On the geometry of reduced cotangent bundles at zero momentum*, Preprint 21/03.
- C. Rocha, *Transversality in semilinear parabolic equations on the circle*, to appear in Proceedings of Equadiff 2003.
- J. L. Rocha and J. Sousa Ramos, *Weighted kneading theory of unidimensional maps with a hole*, to appear in International Journal of Mathematics and Mathematical Sciences.
- J. L. Rocha and J. Sousa Ramos, *Computing conditionally invariant measures and escape rates*, preprint.
- J. L. Rocha and J. Sousa Ramos, *IFS with overlaps and Hausdorff dimension*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

- J. P. Santos, *Blowups of surfaces and moduli of holomorphic vector bundles*, preprint.
- J. P. Santos, *Dirac operator coupled to instantons on positive definite 4-manifolds*, preprint.
- J. P. Santos, *Framed holomorphic bundles on rational surfaces*, preprint.
- R. Severino, A. Sharkovsky, J. Sousa Ramos and S. Vinagre, *Symbolic dynamics in boundary value problems*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- L. Silva and J. Sousa Ramos, *Renormalization and topological invariants of 2pcm maps*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.
- J. Ventura, *Homological algebra for the representation of the Green functor for abelian groups*, to appear in Transactions of AMS.
- S. Vinagre and J. Sousa Ramos, *Symbolic dynamics generated by a idealized time-delayed Chua's circuit*, to appear in Proceedings of ICDEA 2003.

Center for Mathematics and its Applications (CEMAT)

- C. J. S. Alves and A. L. Silvestre, *Density results using Stokeslets and a method of fundamental solutions for the Stokes equations*, to appear in Engineering Analysis with Boundary Elements.
- C. J. S. Alves and A. L. Silvestre, *On the determination of point-forces on a Stokes system*, to appear in Mathematics and Computers in Simulation.
- C. J. S. Alves and P. Serranho, *On the identification of the flatness of a sound-hard acoustic crack*, to appear in Mathematics and Computers in Simulation.
- C. J. S. Alves and C. S. Chen, *Approximating functions and solutions of non homogeneous partial differential equations using the method of fundamental solutions*, to appear in Adv. Comp. Math.
- C. Amado and A. M. Pires, *Robust bootstrap with non-random weights based on the influence function*, to appear in Comm. Statist. Simulation Comput.
- N. Arada and A. Sequeira, *Steady flows of shear-dependent Oldroyd-B fluids around an obstacle*, to appear in J. of Mathematical Fluid Mechanics.
- N. Arada and A. Sequeira, *Existence results for steady flows of quasi-Newtonian fluids using weak monotonicity*, preprint.
- M. A. Bastos, Y. Karlovich and B. Silbermann, *Toeplitz operators with symbols generated by slowly oscillating and semi-almost periodic matrix functions*, to appear in Proceedings London Math. Soc.
- M. A. Bastos, A. Bravo and Yu. Karlovich, *Convolution type operators with symbols generated by slowly oscillating and piecewise continuous matrix functions*, to appear in Operator Theory, Advances and Applications, Preprint 6/03.
- M. A. Bastos, A. Moura Santos and A. F. dos Santos, *Wave diffraction by a strip grating: the two-straight line approach*, to appear in Math. Nachr., Preprint 16/03.

- M. A. Bastos, A. Bravo and Yu. Karlovich, *Convolution type operators with symbols generated by slowly oscillating and piecewise continuous matrix functions*, to appear in Operator Theory, Advances and Applications.
- M. A. Bastos, A. Bravo and Yu. Karlovich, *Symbol calculus and Fredholmness for algebras of convolution type operators with slowly oscillating and piecewise continuous data*, to appear in Math. Nachr., Preprint 7/03.
- J. Bojarczuk and P. Lopes, *Quandles at finite temperatures III*, to appear in J. Knot Theory Ramifications.
- 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.
- J. A. Branco, C. Croux, P. Filzmoser e M. R. Oliveira, *Robust canonical correlations: a comparative study*, to appear in Computational Statistics.
- J. Cannas da Silva, R. G. Schauberger, H. Kuemper, M. R. Oliveira, S. Segão and W. Baumgartner, *Does the weather influence the occurrence of abomasal displacement in dairy cows?*, to appear in Deutsche Tierärztliche Wochenschrift.
- L. P. Castro and A. Moura Santos, *An operator approach for an oblique derivative boundary-transmission problem*, to appear in Math. Methods Appl. Sci.
- L. P. Castro, F.-O. Speck and F. S. Teixeira, *Explicit solution of a Dirichlet-Neumann wedge diffraction problem with a strip*, to appear in Journal of Integral Equations and Applications.
- L. P. Castro, F.-O. Speck and F. S. Teixeira, *On a class of diffraction problems posted by Erhard Meister*, to appear in Operator Theoretical Methods and Applications to Mathematical Physics, Erhard Meister Memorial Volume, I. Gohberg et al. Eds., Operator Theory, Advances and Applications, Preprint 10/03.
- L. P. Castro, F.-O. Speck and F. S. Teixeira, *A direct approach to convolution type operators with symmetry*, to appear in Math. Nachr., Preprint 11/03.
- T. Diogo, N. B. Franco and P. M. Lima, *High order product integration methods for a Volterra integral equation with logarithmic singular kernel*, to appear in Communications on Pure and Applied Analysis.
- F. Ferreira and A. Pacheco, *Análise de sistemas $GI^B/M/s/c$ via ordenação estocástica*, preprint.
- C. Florentino, J. Mourão, J. P. Nunes, *Coherent state transforms and theta functions*, preprint.
- C. Florentino, P. Matias, J. Mourão, J. P. Nunes, *Coherent state transforms, complex structures and geometric quantization*, preprint.
- G. Jacinto, A. Pacheco, and N. Antunes, *Modelo adaptativo de partilha de largura de banda em cenário de auto-estrada*, preprint.
- A. Y. Karlovich and P. A. Santos, *On asymptotics of Toeplitz determinants with symbols of non-standard smoothness*, Preprint 15/03.

- P. Lopes and C. Morales, *The knot group and the fundamental group of the embedding 3-manifold*, to appear in J. Knot Theory Ramifications.
- M. Mackaay and R. Picken, *State-sum models, gerbes and holonomy*, to appear in the Proceedings of the XII Fall Workshop on Geometry and Physics (2003), Coimbra, Portugal.
- H. Mascarenhas and B. Silbermann, *Convolution type operators on cones and their finite sections*, to appear in Math. Nachr.
- M. C. Morais and A. Pacheco, *A note on stochastic ordering criteria in SPC for the case of correlated output*, to appear in Frontiers in Statistical Quality Control.
- M. C. Morais and A. Pacheco, *A note on the ageing character of the run length of Markov-type quality control schemes*, preprint.
- M. C. Morais and A. Pacheco, *Taxas de alarme sem esquemas de controlo markovianos*, to appear in Actas do XI Congresso Anual da Sociedade Portuguesa de Estatística (2003), Faro, Portugal.
- S. Nazarov, M. Specovius-Neugebauer, A. Sequeira and J. Videman, *Artificial Boundary Conditions for Viscoelastic flows in Exterior Domains*, preprint.
- S. A. Nazarov and J. H. Videman, *Reynolds type equation for a thin flow under intensive transverse percolation*, to appear in Math. Nachr.
- A. Nogueira, P. Salvador, R. Valadas, and A. Pacheco, *Fitting self-similar traffic by a superposition of MMPPs modeling the distribution at multiple time scales*, to appear in IEICE Transactions.
- C. Nunes and A. Pacheco, *Cadeias Markov moduladas*, preprint.
- M. R. Oliveira, J. A. Branco, C. Croux and P. Filzmoser, *Robust redundancy analysis by alternating regression*, to appear in Theory and Applications of Recent Robust Methods, M. Hubert, G. Pison, A. Struyf and S. Van Aelst Eds., Series: Statistics for Industry and Technology, Birkhäuser.
- R. Picken, *TQFT's and gerbes*, to appear in Algebraic and Geometric Topology.
- R. Picken, *A cohomological description of Abelian bundles and gerbes*, to appear in the Proceedings of the XX Workshop on Geometrical Methods in Physics (2001), Bialowieza, Poland.
- A. M. Pires, *Confidence intervals for a binomial proportion: comparison of sixteen methods*, preprint.
- A. M. Robertson and A. Sequeira, *A director theory approach for modelling blood flow in the arterial system: An alternative to classical 1-D Models*, Preprint 12/03.
- P. Salvador, A. Pacheco and R. Valadas, *Modeling IP traffic: Joint characterization of packet arrivals and packet sizes using BMAPs*, to appear in Computer Networks.
- C. M. Santos-Pereira and A. M. Pires, *Método de classificação com rejeição por indecisão e observações atípicas*, preprint.
- G. L. Silva and M. A. Turkman, *Bayesian analysis of an additive survival model with frailty*, to appear in Communications in Statistics, Theory and Methods.

A. L. Silvestre, *On the the existence of steady flows of a Navier-Stokes liquid around a moving rigid body rigid body in a viscous incompressible fluid*, to appear in *Mathematical Methods in the Applied Sciences*.

Other Research Units

S. Coleman, O. Evandt, H. Goldstein, M. F. Ramalhoto and M. F. C. van Lottum, *A little known robust estimator of the correlation coefficient in the bivariate normal and its robust graphical test*, to appear in *Quality and Reliability Engineering International*.

R. Coutinho and B. Fernandez, *Fronts in extended systems of bistable maps coupled via convolutions*, to appear in *Nonlinearity*.

R. Coutinho and B. Fernandez, *Iterative construction of fronts in bistable extended systems*, to appear in *Iteration Theory (ECIT 02)*, J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., *Grazer Mathematische Berichte*.

R. Coutinho, B. Fernandez, *Spatially extended circle maps: Monotone periodic dynamics of functions with linear growth*, to appear in *J. Nonlinear Sci.*, Preprint 14/03.

A. B. Cruzeiro and K.-N. Xiang, *On metrics for tangent processes on the path space*, to appear in *Stochastic Analysis and Related Topics VIII*, U. Capar and A. S. Ustunel Eds., *Birkhäuser*.

A. B. Cruzeiro and X. Zhang, *Ornstein-Uhlenbeck semigroups on Riemannian path spaces*, to appear in *Proceedings of the Sino-German Conference on Stochastic Analysis (2002)*, Beijing, China.

L. Dominguez, *A bisimilarity logical relation for the object calculus S , in fixed points in computer science*, to appear in *Proceedings of the FICS Workshop of the European Conference on Theory and Practice of Software - ETAPS 2003*, Warsaw, Poland, Z. Esik and I. Walukiewicz Eds.

M. Mendes Lopes and R. Pardini, *A new family of surfaces with $p_g = 0$ and $K^2 = 3$* , to appear in *Annales de l'École Normale Supérieure*.

M. Mendes Lopes, *A note on a theorem of Xiao Gang*, to appear in *Collect. Math.*

M. Mendes Lopes and R. Pardini, *The classification of surfaces with $p_g = 0$ and $K^2 = 6$ and non birational bicanonical map*, preprint.

J. Mycka and J. F. Costa, *The computational power of continuous dynamic systems*, to appear in *Unconventional Models of Computation (UMC 2004)*, *Lecture Notes in Computer Science 2509*, Springer Verlag.

J. Mycka and J. F. Costa, *Real recursive functions and their hierarchy*, to appear in *Journal of Complexity*.

J. Mycka and J. F. Costa, *What lies beyond the mountains? Computational systems beyond the turing limit*, to appear in *Logic Journal of the IGPL*.

M. F. Ramalhoto, R. Göb, O. Evandt and A. Pievatolo, *Statistical Process Control Procedures in Relation with Reliability Engineering*, to appear in *Probabilistic Safety Assessment and Management*, C. Spitzer, U. Schmockler and V. N. Dang Eds., Springer Verlag.

2 Academic degrees awarded in 2003

2.1 Doutoramentos/Ph.D.'s

A. Bravo, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 17.10.03. *Thesis*: Operadores de tipo convolução com símbolos matriciais fracamente oscilantes e semi-quase periódicos. *Supervisor*: M. A. Bastos.

M. Kobayashi, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 23.06.03. *Thesis*: Sobre a Geometria e a Dinâmica de Sistemas Mecânicos. *Supervisor*: W. M. Oliva.

P. Lopes, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 17.12.03. *Thesis*: Quandle Cohomology and Embedded Surfaces in Four Dimensions. *Supervisor*: R. Picken (co-supervised by L. Crane and L. H. Kauffman).

C. N. Philippart, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 5.09.03. *Thesis*: Markov Modulated Chains. *Supervisor*: A. Pacheco.

J. Rasga, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 28.7.03. *Thesis*: Fibring Labelled First-order Based Logics. *Supervisor*: C. Sernadas.

G. Rodrigues, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 28.11.03. *Thesis*: Homotopy Quantum Field Theories. *Supervisor*: R. Picken (co-supervised by L. Crane).

I. Rodrigues, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 05.12.03. *Thesis*: Métodos Robustos em Análise de Componentes Principais Comuns. *Supervisor*: A. M. Pires.

P. M. Rodrigues, Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 26.09.03. *Thesis*: Classificação Topológica dos Automorfismos do Toro. *Supervisor*: J. Sousa Ramos.

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

G. Bettencourt, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 10.1.03. *Thesis*: Teorema Ergódico Multiplicativo e Curvatura Não-Positiva. *Supervisor*: L. Barreira.

E. Luís, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 19.5.03. *Thesis*: Aproximação Numérica das Equações de Navier-Stokes Bidimensionais em Regime Não-estacionário. *Supervisor*: J. Videman.

B. Maia, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 26.5.03. *Thesis*: Geometria Hiperbólica e Dimensão de Conjuntos Limite. *Supervisor*: L. Barreira.

N. Martins, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 8.1.03. *Thesis*: A Transformação Índice. Aplicação a Operadores de Toeplitz. *Supervisor*: M. A. Bastos.

M. Pato, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 29.5.03. *Thesis*: Análise Numérica de Problemas de Valores de Fronteira Singulares. *Supervisor*: P. M. Lima.

C. Rodrigues, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 11.3.03. *Thesis*: Aplicações da Dinâmica Simbólica ao Estudo do DNA. *Supervisor*: J. Sousa Ramos.

H. Tavares, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 3.10.03. *Thesis*: Cohomologia Racional do Espaço dos Ciclos Algébricos de Grau 2. *Supervisor*: P. F. dos Santos.

P. Torres, Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 29.9.03. *Thesis*: Iterated Function Systems. *Supervisor*: J. Sousa Ramos.

3 Research Lectures by Department Members

3.1 Invited Lectures

Center for Logic and Computation (CLC)

C. Caleiro, *Cryptofibring*, Seminário de Álgebra, Centro de Matemática da Universidade de Coimbra, Portugal, 17.6.03.

P. Mateus, *Composition of cryptographic protocols in a probabilistic polynomial-time process calculus*, Penn Security Seminar, University of Pennsylvania, Philadelphia, USA, 29.4.03.

A. Ravara,

- *Session types for inter-process communication*, Ny-Meetings, BRICS, Department of Computer Science, University of Aalborg, Denmark, 4.3.03.
- *Controlling migration in distributed pi-calculus*, BRICS Seminar, Department of Computer Science, University of Aalborg, Denmark, 6.3.03.
- *Lexically scoped distribution - What you see is what you get*, Mikado/Myths Joint Meeting, School of Cognitive and Computing Sciences, University of Sussex, UK, 5-6.6.03.

P. Resende,

- *Uma introdução à teoria dos quantales*, Seminário de Álgebra, Centro de Álgebra da Universidade de Lisboa, Portugal, 31.10.03.
- *A quantale that classifies Penrose tilings*, European Category Theory Meeting, Haute-Bodeux, Belgium, 7-13.9.03.
- *Quantales = 1/2-quantization?*, Workshop on Sheaves and Topoi in Theoretical Physics, Imperial College, UK, 17-18.7.03.

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

M. Abreu, *Topological decomposition of a symplectomorphism group, invariants in low dimensional topology*, Alfred Renyi Institute of Mathematics, Budapest, Hungary, 16-20.6.2003.

L. Barreira,

- *Distribution of frequencies of digits*, Recent Trends in Dynamics III, Departamento de Matemática Pura, 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,

- *Geometria em dimensão quatro*, Colóquios do Departamento de Matemática, Faculdade de Ciências da Universidade de Lisboa, 27.2.03.
- *Folded tangent bundles*, Alanfest - Conference dedicated to Alan Weinstein, Erwin Schrödinger Institute, Wien, Austria, 4-8.8.03.

R. L. Fernandes,

- *Integrability of Poisson brackets*, École Normale Supérieure, Paris, France, 4.03.
- *Integrability of Lie brackets*, Université de Poitiers, France, 4.03.
- *The geometry of deformation and linearization*, International Euroschool and Euroconference PQR2003, Université Libre de Bruxelles, Belgium, 6.03.
- *Linearization of Poisson Brackets*, Poisson Geometry and Moment Maps, workshop of the Erwin Schrödinger International Institute for Mathematical Physics, Wien, Austria, 9.03.

P. Freitas,

- *O espectro do Laplaciano*, Dia aberto do CMUP, Oporto, Portugal, 11.03.
- *An outsider in the q-series maze*, Pennsylvania State University, USA, 3.03.
- *A Matemática como simulador do mundo*, II Encontro Nacional da Fundação da Juventude "Os jovens e a Matemática", Universidade Católica do Porto, Portugal, 10.4.03.

D. Gomes, *Stochastic Mather measures and second-order Hamilton-Jacobi equations*, Waseda University, Tokyo, Japan, 1.03.

G. Granja,

- *Homotopy decomposition of a group of symplectomorphisms of $S^2 \times S^2$* , Topology Seminar, Hebrew University, Jerusalem, Israel, 6.03.
- *Symplectomorphism groups of rational ruled surfaces*, Topology Seminar, University of Chicago, USA, 10.03.
- *Symplectomorphism groups of rational ruled surfaces*, Topology Seminar, University of Illinois at Urbana-Champaign, USA, 10.03.

N. Martins, *Interval maps, C^* -algebras and K -theory*, One-day Meeting on Discrete dynamical systems, PDE and countable state Markov shifts, Instituto Superior Técnico, Lisbon, Portugal, 9.5.03.

W. M. Oliva, *Non holonomic systems and the geometry of constraints*, Workshop on Dynamics, University of Torino, Italy, 19.11.03, University of Campinas, Brazil, 7.03, University of São Paulo, Brazil, 7.03 and Università degli Studi di L'Aquila, Italy, 11.03.

C. Rocha,

- *Global attractors for semilinear parabolic equations on the circle*, Università degli Studi di Roma - La Sapienza, Rome, Italy, 4.10.03.

- *Global attractors of semilinear parabolic equations on S^1 : Ten examples*, International Conference on Differential Equations - Equadiff 2003, Hasselt, Belgium, 21-27.7.03.
- *Attractors for scalar reaction-diffusion problems*, Workshop on Infinite Dimensional Dynamical Systems, L'Aquila, Italy, 27.9.03-9.10.03.
- *Order preserving semiflows*, Dynamics of Structured Systems, Mathematisches Forschungsinstitut Oberwolfach, Germany, 13-20.12.03.

M. Vaz Pinto,

- *On the Sally module*, Algebra Seminar, Rutgers University, USA, 9.10.03.
- *On the multiplicity of the special fiber of an ideal*, Algebra Seminar, CAUL, Lisbon, Portugal, 21.11.03.

Center for Mathematics and its Applications (CEMAT)

C. J. S. Alves,

- *Density results on partial differential equations and the derivation of meshless methods*, International Conference on Computational & Experimental Engineering and Sciences, Corfu, Greece, 25-29.7.03.
- *On the identification of cracks by acoustic scattering*, Workshop on Geometry and Analysis in Inverse Problems, Helsinki University of Technology, Finland, 25-29.8.03.
- *Acoustic obstacle detection using a point-source reciprocity gap function*, Session on New Methods in Inverse Scattering, SIAM/EMS Conference on Applied Inverse Problems: Theoretical and Computational Aspects, UCLA, Los Angeles, USA, 18-23.5.03.
- *Identifying the flatness of a crack by acoustic scattering*, Session on Recovery Methods for Cracks and Interfaces, SIAM/EMS Conference on Applied Inverse Problems: Theoretical and Computational Aspects, UCLA, Los Angeles, USA, 18-23.5.03.
- *Mathematical and numerical problems in wave scattering by cracks*, MTPT'03: Advanced School and Workshop on Mathematical Techniques and Problems in Telecommunications, Tomar, Portugal, 8-12.9.03.
- *Recovery of cracks using a reciprocity gap function*, NAM Oberseminar, University of Göttingen, Germany, 3.03.

P. Lopes,

- *Counting colorings and knotted surfaces*, Seminário de Processos Estocásticos, IMPA, Rio de Janeiro, Brazil, 29.8.2003.
- *Como distinguir nós?*, Laboratório Nacional de Computação Científica, Petrópolis, Brazil, 13.8.03.
- *Colorindo diagramas para distinguir nós I e II*, Colóquio dos Alunos, Pontifícia Universidade Católica, Rio de Janeiro, Brazil, 27.6-4.7.03.
- *Colorings of Knotted Surfaces*, Jornada de Topologia, Universidade Federal Fluminense, Niterói, Brazil, 17-18.2.03.

M. C. Morais, *Ordenação estocástica na avaliação do desempenho de esquemas de controlo de qualidade*, Faculdade de Ciências da Universidade de Lisboa, Portugal, 26.2.03.

J. Mourão,

- *Coherent state transforms and generalized theta functions*, V ABC-KLM Network Meeting, Warwick, UK, 30.1-2.2.03.
- *Lectures on aspects of the connections between path integrals, quantum field theory, topology and geometry*, XII Fall Workshop on Geometry and Physics, Universidade de Coimbra, 8-10.9.03.

M. R. Oliveira, *Como resolver o problema das associações entre dois grupos de variáveis?*, Novos Doutores em Estatística, Sociedade Portuguesa de Estatística, Lisbon, Portugal, 28.05.03.

R. Picken, *Topological quantum field theories and gerbes*, I Joint Meeting RSME/AMS, Seville, Spain, 18-21.6.03.

A. M. Pires,

- *Estimadores robustos para a localização e dispersão multivariadas ponderados com pesos suaves*, XI Congresso Anual da Sociedade Portuguesa de Estatística, Faro, Portugal, 24-27.9.03.
- *Delineamento experimental e análise estatística de resultados*, Seminar of Departamento de Biotecnologia-INETI, Lisbon, Portugal, 24.11.03.
- *A Closer look at confidence intervals for a binomial proportion*, Statistics Seminar, Department of Statistics, Open University, Milton Keynes, UK, 2.5.03.
- *Contributions towards a robust bootstrap*, International Conference on Robust Statistics (ICORS2003), Antwerp, Belgium, 13-18.7.03.

I. M. Rodrigues,

- *Robustez em componentes principais comuns*, XI Congresso Anual da Sociedade Portuguesa de Estatística, Faro, Portugal, 24-27.9.03.
- *Robustness in principal and common principal components*, International Conference on Robust Statistics (ICORS2003), Antwerp, Belgium, 13-18.7.03.

G. L. Silva, *Modelos de regressão logística para dados binários*, Seminário, Universidade Portucalese, Oporto, Portugal, 7.4.03.

A. Sequeira,

- *Numerical analysis of blood flow*, IV International Workshop of the Engineering Sciences - Group of IIT Madras, Madras, India, 11-15.1.03.
- *Steady flows of viscoelastic fluids with shear dependent viscosity*, Nečas Seminar on Continuum Mechanics, Charles University, Faculty of Mathematics and Physics, Mathematical Institute, Praha, Czech Republic, 31.3.03.
- *Mathematical and numerical modelling of fluid-structure interaction problems: applications to blood rheology*, Workshop on Analysis and Numerics of Non-Newtonian Fluids, Kirchzarten (Black Forest), Germany, 15-17.4.03.

- *Blood circulation in small vessels and capillaries: development and analysis of non-newtonian models*, Plenary Lecture, First Workshop of the HaeMOdel EU Project, Bergamo, Italy, 2-3.5.03.
 - *Fluid dynamics of blood circulation*, Oeiras Mathematical and Computational Biology Workshop, IGC, Oeiras, Portugal, 20.6.03.
 - *On the analysis of flows of fluids with shear-dependent viscosities*, International Workshop on Partial Differential Equations and Applications – dedicated to the 60th birthday of Christian Simader, Universidade de Évora, Portugal, 23-24.06.03.
 - *Analysis and simulation of non-newtonian models for blood flow*, Workshop on Modelling and Numerical Simulation in Continuum Mechanics, Universidade de Coimbra, Portugal, 17-18.7.03.
 - *Strong solutions for an oldroyd-B fluid with shear-thinning viscosity modeling blood flow in small arteries*, XXIV Colóquio Brasileiro de Matemática - Sessão Especial de EDP, IMPA, Rio de Janeiro, Brazil, 27.7-1.8.03.
 - *Analysis and simulation of non-newtonian models in blood circulation*, Summer School on Modelling of the Cardiovascular System: Mathematical Theory, Modelling and Applications, EPFL, Lausanne, Switzerland, 25-30.8.03.
- A. Silvestre, *On the slow motion of a self-propelled rigid body in a viscous liquid*, International Workshop on Partial Differential Equations and Applications, Évora, Portugal, 23-24.6.03.

F.-O. Speck,

- *On a class of wedge diffraction problems posted by Erhard Meister*, University of Stuttgart, Germany, 20.3.03 and Darmstadt University of Technology, Germany, 18.6.03.
- *An operator theoretic approach for mixed linear boundary value problems*, Symposium on the occasion of the 100th anniversary of the birth of Wolfgang Haack, GAMM conference, Padova, Italy, 24.3.03.
- *An operator theoretical approach to wedge diffraction problems*, Brunel University, London, UK, 1.7.03.
- *Diffraction by wedges with different face impedances*, Conference on Potential Theory: Applications in Solid Mechanics and Acoustic and Electromagnetic Scattering Theory-dedicated to the memory of Professor Victor Kupradze on the occasion of the 100th anniversary of his birth, Plenary Lecture, Tbilisi, Georgia, 28.10.03.

J. H. Videman, *Artificial boundary conditions for viscoelastic flows*, Universität Kassel, Germany, 10.12.03.

Other Research Units

J. F. Costa,

- *O futuro do uso - Os usos do futuro*, Bienal de Lisboa 2003 (Experimenta Design), Lisbon, Portugal, 25.9.03

- *Computing from Nature*, Workshop Quantum Information, Control and Computing, Funchal, Portugal, 5-7.10.03.
- *Analog computation*, Advanced School and Workshop on Soft Computing and Complex Systems, Coimbra, Portugal, 23-27.6.03.

A. B. Cruzeiro, *Finite dimensional approximation of Riemannian path space geometry*, Journées de Probabilité, Université de Toulouse, France, 9.03.

M. Mendes Lopes,

- *Surfaces of general type with $p_g = 0$* (short course), Institute Simon Stoilow, Bucharest, Romania, 31.1.03-28.4.03.
- *The canonical ring of surfaces with $p_g = 0$* , Lisbon Conference on Commutative Algebra, Instituto Superior Técnico, Lisboa, 25.6.03.
- *Algebraic surfaces with $p_g = 0$* (short course), Korean Institute for Advanced Study, Seoul, South Korea, 25.8-4.9.03.
- *Surfaces with no global 1-forms and 2-forms*, Seminar “Geometria em Lisboa”, Lisbon, Portugal, 15.3.03.

3.2 Lectures at Conferences, Workshops, Meetings, etc.

Center for Logic and Computation (CLC)

C. Caleiro,

- *Cryptofibring - Avoiding collapses when combining logics*, IFIP WG 1.3 Meeting, Menorca, Spain, 1-4.6.03
- *Suszko’s thesis and dyadic semantics*, III World Congress on Paraconsistency, IRIT, Toulouse, France, 28-31.7.03.

P. Mateus,

- *Internal paracategories*, Portuguese Category Seminar 03, Coimbra, Portugal, 23.5.03.
- *Composition of cryptographic protocols in a probabilistic polynomial-time process calculus*, Dagstuhl Seminar 03411 - Language-Based Security, Schloss Dagstuhl, Germany, 5-10.10.03.

J. Ramos, *Combining logics versus Grothendieck institutions*, Portuguese Category Seminar 03, Coimbra, Portugal, 23.5.03.

A. Ravara, *Lexically scoped distribution - What you see is what you get*, Workshop on Foundations of Global Computing, Eindhoven, Netherlands, 28-29.6.03.

P. Resende, *A survey of quantale theory*, Lattices, Universal Algebra and Applications, Centro de Álgebra da Universidade de Lisboa, Portugal, 28-30.5.03.

A. Sernadas, *Exogeneous probabilistic logic*, Portuguese Category Seminar 03, Coimbra, Portugal, 23.5.03.

C. Sernadas, *A new algebraic semantics for modal sequent calculi*, Portuguese Category Seminar 03, Coimbra, Portugal, 23.5.03.

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

S. Anjos, *Homotopy decomposition of a group of symplectomorphisms of $S^2 \times S^2$* , IV Gesta Meeting-Symplectic Geometry with Algebraic Techniques, Universidad Carlos III de Madrid, Spain, 20-22.2.03 and EMS Mathematical Weekend, Lisbon, Portugal, 12-14.9.03.

A. Cannas Silva, *Folded tangent bundles*, Alanfest -Conference Dedicated to Alan Weinstein, Erwin Schroedinger Institute, Wien, Austria, 4-8.8.03.

D. Gomes,

- *Viscosity solutions of Hamilton-Jacobi equations and classical mechanics*, Nonlinear Partial Differential Equations and Free Boundary Problems, Universidade do Minho, Braga, Portugal, 2.03.
- *Perturbation theory for Hamilton-Jacobi equations*, Trends in Partial Differential Equations, Óbidos, Portugal, 6.03.
- *Partial differential equations and non integrability of hamiltonian systems*, Workshop in Geometric and Global Properties in PDE with Applications, Royal Institute of Technology (KTH), Stockholm, Sweden, 6.03.
- *Integrability and viscosity solutions*, Workshop on New Connections Between Dynamical Systems and PDE's, American Institute of Mathematics, Palo Alto, California, USA, 7.03.
- *Viscosity solutions and problems in classical mechanics*, Partielle Differentialgleichungen Oberwolfach, Germany, 8.03.
- *Discrete Hamiltonian dynamics and its connections with optimal transport*, Optimal Transport Theory and Applications, Scuola Normale Superiore, Pisa, Italy, 10.03.

P. R. Pinto, *Fusion of sufferable modular invariant partition functions*, XII Oporto Meeting on Geometry, Topology and Physics, Oporto, Portugal, 17-20.7.03.

Center for Mathematics and its Applications (CEMAT)

C. Amado,

- *Reweighted estimators of multivariate location and scatter with smooth weight functions*, International Conference on Robust Statistics (ICORS2003), Antwerp, Belgium, 13-18.7.03.
- *Alternativa robusta ao teste T2 de Hotelling*, XI Congresso Anual da Sociedade Portuguesa de Estatística, Faro, Portugal, 24-27.9.03.

T. Diogo,

- *Approximate solutions to a singular Volterra integral equation*, XX Biennial Conference on Numerical Analysis, Dundee, UK, 24-27.6.03.
- *Numerical solution of a singular Volterra integral equation by piecewise polynomial collocation*, IX International Conference on Enhancement and Promotion of Computational Methods in Engineering and Science (EPMESC IX), Macao, China, 25-28.11.03.

P. M. Lima,

- *Análise e aproximação numérica de um problema de valores de fronteira singular*, Seminar, Departamento de Ciências de Computação e Estatística, Instituto de Ciências Matemáticas de São Carlos, Brazil, 21.10.03.
- *Analytical-numerical approach to a singular boundary value problem*, Ibero-Latin-American Congress on Computational Methods in Engineering and Science (CILAMCE XXIV), Ouro Preto, Brazil, 29-31.10.03.
- *Numerical methods for a nonuniquely solvable Volterra integral equation*, Ibero-Latin-American Congress on Computational Methods in Engineering and Science (CILAMCE XXIV), Ouro Preto, Brazil, 29-31.10.03.
- *Computational methods for a singular boundary-value problem*, IX International Conference on Enhancement and Promotion of Computational Methods in Engineering and Science, Macao, China, 25-28.11.03.

P. Lopes,

- *Counting colorings and knotted surfaces*, Workshop on Combinatorics Algorithms and Applications, Ubatuba, Brazil, 1-5.9.03.
- *Telling knots apart: Counting colorings and algorithms for implementing it*, Workshop on Combinatorics Algorithms and Applications, Ubatuba, Brazil, 1-5.9.03.

M. C. Morais, *Taxas de alarme de esquemas de controlo markovianos*, XI Congresso Anual da Sociedade Portuguesa de Estatística, Faro, Portugal, 24-27.9. 2003.

M. R. Oliveira,

- *Robust PLS for canonical correlation analysis and related methods*, III International Symposium on PLS and related methods (PLS'03), Lisbon, Portugal, 15-17.9.03.
- *Robust redundancy analysis by alternating regression*, International Conference on Robust Statistics 2003 (ICORS 2003), Antwerp, Belgium, 13-18.7.03.

A. Pacheco Pires,

- *Analysis of GI/M/s/c systems with batch arrivals*, XI Annual Congresso Anual da Sociedade Portuguesa de Estatística, Faro, Portugal, 24-27.9.03.
- *Analysis of GI/M/s/c queues via Markov regenerative processes and uniformization*, EURO/INFORMS 2003, Istanbul, Turkey, 6-10.7.03.
- *Cluster analysis of Internet users based on hourly traffic utilization*, I International Conference on Performance Modelling and Evaluation of Heterogeneous Networks, Ilkley, West Yorkshire, UK, 21-23.7.03.

A. M. Santos, *Teoria de operadores e problemas de difracção com condições de fronteira-transmissão aproximadas*, Seminário do Grupo de Análise Funcional da UI&D, Matemática e Aplicações, Aveiro, Portugal, 16.1.03.

J. H. Videman, *Reynolds type equation for a thin flow under intensive transverse percolation*, International Conference on Trends in Partial Differential Equations of Mathematical Physics, Óbidos, Portugal, 7-10.6.03.

4 Guest Program

Center for Logic and Computation (CLC)

W. Blok, University of Illinois at Chicago, USA, 25-26.5.03. *Lecture:* The Beth property in algebraic logic, 26.5.03.

F. Borceux, Université Catholique de Louvain, Belgium, 30.4.03. *Lecture:* Operações de Mal'cev e álgebra homológica não comutativa.

V. Brattka, Fern Universität Hagen, Germany, 2-6.4.03. *Lecture:* From Hilbert's 13th problem towards a characterization of the computational power of feedforward neural networks, 4.4.03.

R. Brown, University of Wales, UK, 24-25.1.03. *Lecture:* What we have tried to do in the popularisation of mathematics - Colloquium of the Department of Mathematics, 24.1.03.

A. Carvalho, Instituto de Engenharia e Sistemas e Computadores, Portugal, 31.10.03. *Lecture:* A parallel algorithm for the extraction of structured motifs.

J. O. Cerdeira, Instituto Superior de Agronomia, Portugal, 14.11.03. *Lecture:* 2-colour partitions of acyclic tournaments.

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

- Program extraction from large proof developments, 17.10.03.
- Program extraction from large formalizations, 28.3.03.

H.-D. Ehrich, Technical University of Braunschweig, Germany, 7-12.1.03. *Lecture:* Checking object system designs, 10.1.03.

M. Gabbay, University of Cambridge, UK, 30.5.03. *Lecture:* Fraenkel-Mostowski for syntax.

D. Graça, Universidade do Algarve, Portugal, 7.3.03. *Lecture:* Turing universality for the GPAC model.

H. Guerra, Universidade dos Açores, Portugal, 14.2.03. *Lecture:* A trinity for finite processes with global liveness requirements.

P. Lopes, Instituto Superior Técnico, Portugal, 12.12.03. *Lecture:* Quandles, colorings, and knotted surfaces.

M. Mackaay, Universidade do Algarve, Portugal, 14-15.5.03. *Lecture:* Representações categóricas, 14.5.03.

J. Marcos, IFCH, Unicamp, Brazil, 16.5.03. *Lecture:* On what negation is not.

M. Martins, Universidade de Aveiro, Portugal, 3.10.03. *Lecture:* Abstract algebraic logic approach to behavioral reasoning.

C. J. Mulvey, University of Sussex, de 2-16.6.03.

J. Mycka, University M. Curie-Sklodowska, Poland, *Lectures:*

- Real recursive functions and their hierarchy, 21.11.03.
- Real recursive functions in descriptive set theory, 6.6.03.

A. Oliveira, Instituto Superior Técnico, Portugal, 19.9.03. *Lecture:* Inference of regular languages using state merging algorithms with search.

D. Pigozzi, Iowa State University, USA, 25-26.9.03. *Lecture:* Large amalgamation and interpolation in abstract algebraic logic, 26.9.03.

T. Porter, University of Wales, UK, 24-25.1.03.

J. E. Santo, Universidade do Minho, Portugal, 7.11.03. *Lecture:* A lambda-calculus for sequent calculus.

L. Schröder, University of Bremen, Germany, 17-23.2.03. *Lecture:* Henkin models of the partial lambda-calculus, 21.2.03.

J. M. Valença, Universidade do Minho, Portugal, 28.11.03. *Lecture:* Direitos e tecnologia da informação: Tecnologia na sociedade de informação hostil.

V. Vasconcelos, Faculdade de Ciências da Universidade de Lisboa, Portugal, 19.12.03. *Lecture:* Contract-guided system development.

L. Viganò, ETH, Switzerland, 26-29.7.03 and 30.8-13.9.03. *Lecture:* A new reduction technique for constraint-based analysis of security protocols, 5.9.03.

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

J. Agapito, University of California, Santa Cruz, USA, 2-20.9.03. *Lecture:* A weighted version of quantization commutes with reduction principle for a toric manifold, 16.9.03.

R. Albuquerque, Universidade de Évora, Portugal, 21.1.03. *Lecture:* On twistor spaces.

C. Barbaroïse, Universidade de Lisboa, Portugal, 20.11.03. *Lecture:* Bounds in homogenized coefficients for mixtures of several materials.

A. Beauville, Université de Nice, France, 10-14.3.03. *Minicourse:* Vector bundles on curves and generalized theta functions, 10-14.3.03.

F. Borceux, Université Catholique de Louvain, Belgium, 30.4.03. *Lecture:* Operações de Mal'cev e álgebra homológica não comutativa.

R. Brown, University of Wales, Bangor, UK, 24.1.03. *Lecture:* What we have tried to do in the popularisation of mathematics - Colloquium of the Department of Mathematics.

R. Carles, Université Bordeaux I, France, and Centro de Matemática e Aplicações Fundamentais, Lisbon, Portugal, 2.12.03. *Lecture:* On the role of quadratic oscillations in nonlinear Schrödinger equations.

- J. Chabrowski, The University of Queensland, Australia, 1-28.2.03. *Lecture:* The Neumann problem with critical Sobolev exponent, 18.2.03.
- V. Chernov, Dartmouth College, USA, 16-17.7.03. *Lecture:* Affine linking and winding numbers and the study of front propagation, 17.7.03.
- J. Costeira, Instituto Superior Técnico, Lisbon, Portugal, 5.12.03. *Lecture:* Correspondence problems in computer vision.
- I. Cruz, Universidade do Porto, Portugal, 18.2.03. *Lecture:* Estrutura de Poisson transversa a uma folha simpléctica.
- A. Davydov, Vladimir State University, Russia, 18.3.03. *Lecture:* Optimal strategies of time averaged optimization of cyclic motion.
- A. Dias, Universidade do Porto, Portugal, 30.9.03. *Lecture:* Symmetry groupoids, synchrony, and coupled cell networks.
- P. Didier, Université Paris-Sud, Orsay, France, 11.2.03 and 5.5.03. *Lectures:*
- Partial hyperbolicity, accessibility and stable ergodicity, 11.2.03.
 - Ergodicity and Hopf's argument, 5.5.03.
- P. Doutor, Universidade Nova de Lisboa, Portugal, 7.4.03. *Lecture:* Propriedades variacionais em teoria de dimensão.
- O. Dragulete, École Polytechnique Fédérale de Lausanne, Switzerland, 31.11-8.12.03. *Lecture:* Cosphere bundle reduction in contact geometry, 2.12.03.
- C. Earles, Rice University, Houston, USA, 8-12.6.03. *Lecture:* Residue theorems and Lie algebroid invariants, 12.6.03.
- M. Edmundo, Centro de Matemática e Aplicações Fundamentais, Lisbon, Portugal, 17.6.03. *Lecture:* O-minimal singular (co)homology and real étale cohomology.
- D. Evans, Cardiff University, UK, 20-30.7.03.
- F. Ferrari, Université de Neuchâtel, Switzerland, 5-8.2.03. *Lecture:* Quantum parameter spaces of $N = 1$ super Yang-Mills theories, 7.2.03.
- D. Forge, Laboratoire Recherche en Informatique, Orsay, France, 8-19.9.03.
- H. Frid, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil, and Centro de Matemática e Aplicações Fundamentais, Lisbon, Portugal, 1.7.03. *Lecture:* Soluções espacialmente periódicas para as equações de Euler em dinâmica dos gases relativística.
- G. Fusco, Università degli Studi di L'Aquila, Italy, 18-28.6.03. *Lecture:* Three time scales in the steepest descent dynamics of a regularized nonconvex functional of the gradient, 26.6.03.
- E. Gasparin, New Mexico State University, USA, 3.6.03. *Lecture:* Two applications of instanton numbers.

F. Gazzola, Università degli Studi del Piemonte Orientale, Italy, 5-13.7.03. *Lecture:* Existence and nonexistence results for anisotropic quasilinear elliptic equations, 8.7.03.

K. Gelfert, Max-Planck-Institut für Physik komplexer systeme, Dresden, Germany, 22.2-8.3.03 and 12-16.7.03. *Lectures:*

- Lower bounds of the topological entropy, 25.2.03.
- Dimension estimates in nonconformal dynamical system, 15.7.03.
- Dimension and dissipative dynamics, 15.12.03.

M. Grinfeld, University of Strathclyde in Glasgow, UK, 4-10.9.03. *Lecture:* Multiplicity of periodic solutions in mean-field theories of magnetisation, 9.9.03.

J. Hale, Georgia Institute of Technology, Atlanta, USA, 15-20.1.03. *Lecture:* Coupled oscillators on a circle, 16.1.03.

R. Hric, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 31.3.03 and 10.11.03. *Lectures:*

- Topological entropy, 31.3.03.
- Entropy conjecture, 10.11.03.

C. Ionescu, Institute of Mathematics, Romanian Academy, Bucharest, Romania, 12-28.6.03. *Lecture:* Some remarks on evolutions, 17.6.03.

R. Iturriaga, Centro de Investigaciones in Matematica, Guanajuato, Mexico, 31.5-7.6.03. *Lecture:* Convergence of viscosity solutions of random Hamilton Jacobi equations, 3.6.03.

N. Jung, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 21.10.03 and 28.11.03. *Lectures:*

- Continuity properties of D^2u in BV^2 with strict convergence, 21.10.03.
- A variational problem involving the determinant of the Hessian, 28.11.03.

J. Kedra, University of Szczecin, Poland, 13-20.7.03. *Lecture:* Groups of symplectomorphisms have complicated topology, 15.7.03.

M. Keel, University of Minnesota, USA, 14-22.12.03. *Lectures:*

- Global rough solutions for nonlinear dispersive equations, 16.12.03.
- Global in time existence and scattering for the critical defocusing nonlinear Schrödinger equation, 18.12.03.

D. Kinderlehrer, Carnegie Mellon University, USA, 22-24.6.03. *Lecture:* Remarks about diffusion mediated transport, 23.6.03.

N. Kitchloo, Johns Hopkins University, USA, 1-15.7.03. *Lecture:* On lifting isometries, 8.7.03.

J. Koiller, Fundação Getúlio Vargas, Rio de Janeiro, Brazil, 21-27.6.03. *Lecture:* Flagellar locomotion via geometric mechanics, 26.6.03.

D. Krejčířík, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 11.3.03 and 10.10.03. *Lectures:*

- Bound states in curved quantum layers, 11.3.03.
- The nature of the essential spectrum in curved tubes, 10.10.03.

H. Li, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 18.11.03. *Lecture:* Semi-free Hamiltonian circle actions on 6-dimensional symplectic manifolds.

P. Lima-Filho, Texas A&M University, College Station, USA, 13-27.7.03. *Lecture:* The bigger Brauer group, twisted algebraic K-theory and motives, 16.7.03.

R. de la Llave, University of Texas, Austin, USA, 8-19.1.03. *Lecture:* Rigidity properties of hyperbolic systems preserving conformal structures on the invariant distributions, 9.1.03.

M. Lemos, Universidade Federal de Pernambuco, Brazil, 18-25.9.03.

J. Lopes Dias, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 20.10.03. *Lecture:* Renormalization and differentiable conjugacies.

Y. Lozano, Universidad de Oviedo, Spain, 20-23.3.03. *Lecture:* A microscopical itemize of giant gravitons, 21.2.03.

L. Macarini, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil, 20.7-9.8.03. *Lecture:* Hofer-Zehnder sensitive capacity of cotangent bundles and symplectic submanifolds, 29.7.03.

M. Mackaay, Universidade do Algarve, Faro, Portugal, 14.5.03. *Lecture:* Representações categóricas.

G. Del Magno, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 28.4.03, 13.5.03 and 26.5.03. *Lectures:*

- Ergodicity and billiards, 28.4.03.
- Ergodic semifocusing billiards, 13.5.03.
- Local ergodicity, 26.5.03.

D. Mamone, Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy, 5-8.3.03. *Lecture:* Noncommutative solitons and string field theory, 7.3.03.

L. Mascarenhas, Universidade de Lisboa, Portugal, 31.10.03. *Lecture:* Bending moment in membrane theory.

M. Mendes Lopes, Centro de Matemática e Aplicações Fundamentais, Lisbon, Portugal, 18.3.03. *Lecture:* Surfaces with no global 1-forms and 2-forms.

S. Minwalla, Harvard University, USA, 26-29.3.03. *Lectures:*

- A Hagedorn transition in free Yang-Mills, 28.3.03.
- Physical Insights from string theory, 27.3.03.

- P. Monnier, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 4.2.03. *Lecture:* Levi decompositions of Poisson structures.
- G. Morais, Instituto Superior de Engenharia de Lisboa, Portugal, 10.3.03. *Lecture:* Análise multifractal e teoria dos números.
- P. Negrini, Università di Roma I, Italy, 19-27.6.03. *Lecture:* Integrability, nonintegrability and chaos in a system related to the Riemann ellipsoid problem, 26.6.03.
- P. Newstead, University of Liverpool, UK, 7-14.7.03. *Lecture:* Coherent systems on algebraic curves, 10.7.03.
- R. Oliver, Université Paris 13, France, 11-19.10.03. *Lecture:* Homotopy equivalences between completed classifying spaces of finite groups, 14.10.03.
- M. Pacífico, Universidade Federal do Rio de Janeiro, Brazil, 13-14.7.03. *Lecture:* Lorenz attractor versus singular hyperbolic attractor, 14.7.03.
- R. Pandharipande, Princeton University, USA, 22-28.11.03. *Lecture:* Gromov-Witten theory and Donaldson-Thomas theory, 25.11.03.
- A. Pereira, Universidade de São Paulo, Brazil, 1.12.02-28.2.03. *Lecture:* Continuity of attractors varying the domain, 4.2.03.
- M. Perlmutter, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos, Lisbon, Portugal, 26.6.03. *Lecture:* Gauged Poisson structures.
- F. Pioli, Universidade Autónoma de Madrid, Spain, 7-13.4.03. *Lectures:* Fourier-Mukai transforms, 8.4.03 and 10.4.03.
- C. Santa-Clara, Universidade de Lisboa, Portugal, 26.3.03. *Lecture:* Dimensões em teoria de módulos.
- B. Saussol, Université de Picardie Jules Verne, Amiens, France, 25-28.1.03. *Lecture:* Multifractal analysis of recurrence for smooth dynamical systems, 28.1.03.
- T. Schmah, University of Warwick, UK, 6-12.4.03. *Lecture:* The local geometry of symmetric Hamiltonian systems on cotangent bundles, 8.4.03.
- R. Silva, Universidade Nova de Lisboa, Portugal, 17.3.03. *Lecture:* Estabilidade em equações diferenciais não-autónomas.
- A.-M. Toader, Universidade de Lisboa, Portugal, 14.11.03. *Lecture:* Scale convergence and applications. A numerical method to approach Young measures.
- S. Vacaru, Instituto Superior Técnico, Lisbon, Portugal, 21.3.03. *Lecture:* (Non) commutative Finsler geometry, gauge gravity and strings.
- E. Valdinoci, Università degli Studi di Roma Tor Vergata, Italy, 12-22.1.03. *Lecture:* Elliptic tori and periodic solutions of the 3 body problem, 21.1.03.
- C. Valls, Università di Roma I, Italy, 19-30.5.03 and 18.7-1.8.03. *Lecture:* Weak KAM theory for multidimensional maps, 20.5.03.

P. Vanhaecke, Université de Poitiers, France, 11-19.9.03. *Lecture:* An introduction to algebraically completely integrable systems, 17.9.03.

J. Wattis, University of Nottingham, UK, 23.3-6.4.03. *Lecture:* A coarse-graining approximation for the Becker-Döring equations, 1.4.03.

C. Wolf, Wichita State University, USA, 14-24.7.03. *Lecture:* Measures of maximal dimension for hyperbolic diffeomorphisms, 22.7.03.

J. Xavier, Instituto Superior Técnico, Lisbon, Portugal, 7.11.03. *Lecture:* Lower bound on intrinsic variance of estimators in Riemannian manifolds.

S. Zarzuela, Universitat de Barcelona, Spain, 31.3-11.4.03.

N. Zung, Université Paul Sabatier, Toulouse, France, 17-22.5.03. *Lecture:* Proper groupoids and intrinsic convexity of momentum maps, 20.5.03.

Center for Mathematics and its Applications (CEMAT)

H. Beirão da Veiga, Università di Pisa, Italy, 23.6-14.7.03. *Lecture:* Alguns resultados sobre as equações de Stokes e de Navier-Stokes com condições de não-aderência na fronteira, 10.7.03.

D. Bresch, Université Joseph Fourier, France, 14-25.9.03. Short Course: Mathematics and the Environment, 22-24.9.03. *Lecture:* Schiffer's conjecture and rotating flows in a cylinder, 22.9.03.

A. Caetano, Universidade de Aveiro, 27.6.03. *Lecture:* Capacidade de crescimento local para funções de espaços do tipo Besov e Triebel-Lizorkin.

L. F. P. Castro, Universidade de Aveiro, 26.9.03. *Lecture:* Invertibilidade de operadores de convolução compostos com operadores de extensão par ou ímpar.

F. Cipriano, GFM-UL and Universidade Nova de Lisboa, 28.4.03. *Lecture:* Um problema inverso para a equação de Burgers.

I. Denissova, Institute of Problems in Mechanical Engineering, St. Petersburg, Russia, 6-19.06.03. *Lecture:* Evolution of compressible and incompressible fluids separated by a closed interface, 16.6.03.

T. Ha Duong, Université de Technologie de Compiègne, France, 27.10-2.11.03. *Lecture:* A non linear and non local boundary condition problem in petroleum engineering, 29.10.03.

N. Ford, Chester College, UK, 2-9.4.03. *Lecture:* Numerical methods for a non-uniquely solvable singular integral equation, 2.4.03.

H. Frid, IMPA, Rio de Janeiro, Brazil, 24.6-18.7.03. *Lecture:* Esquemas em diferenças finitas com correctores de derivadas mistas para sistemas quasilineares parabólicos multidimensionais, 16.7.03.

G. P. Galdi, University of Pittsburgh, USA, 10-30.6.03. *Lecture:* Existence and uniqueness of time-periodic Physically reasonable Navier-Stokes flow past an obstacle, 12.6.03.

E. Glushkov, Kuban State University, Russia, 5-23.7.03. *Lecture:* Radial and local Green's functions in diffraction and singularly perturbed problems, 21.7.03.

Y. I. Karlovich, Universidad Autónoma del Estado de Morelos, Mexico, 7.4-5.5.03, 12.7-24.8.03, 11-19.10.03 and 15-20.12.03. *Lectures:*

- Index calculations for convolution type operators, 11.4.03.
- An algebra of pseudodifferential operators with symbols of restricted smoothness, 25.7.03.
- Algebras of singular integral operators with shifts and oscillating coefficients, 16.10.03.
- C^* -algebras of integral operators with shifts having massive sets of periodic points, 19.12.03.

N. Konyukhova, Dorodnycin Computing Center of RAS, Moscow, Russia, 2-16.11.02. *Lecture:* Singular problems for self-similar solutions to the systems of nonlinear wave equations in the inflationary cosmology, 12.11.03.

O. Ladyzhenskaya, Steklov Institute of Mathematics, St. Petersburg, Russia, 2.6-2.7.03. *Lecture:* On the mathematical problems for viscous fluids of various types, 18.6.03.

M. Lukacova-Medvidova, Technical University of Hamburg-Harburg, Germany, 1-6.12.03. *Lecture:* On numerical modelling of some non-newtonian fluids, 3.12.03.

S. Nazarov, St. Petersburg University, Russia, 1.4-30.6.03 and 5-30.9.03. *Short Course:* Asymptotic conditions at infinity for viscous flows in tubes, 08,25.8.03.

J. Nelson, Università di Torino, Italy 29.9-3.10.03.

H. Oliveira, Universidade do Algarve, Portugal. *Lecture:* Localization of solutions for planar Navier-Stokes equations, 3.12.03.

R. G. Owens, EPFL-Lausanne, Switzerland, 17-24.5.03. *Lecture:* Fokker-Planck-based methods for flows of dilute polymeric solutions described by dumbbell models, 22.5.03.

A. Pedas, Tartu University, Estonia, 29.1-5.2.03. *Lecture:* Numerical solution of a class of weakly singular integro-differential equations, 3.2.03.

J. Pitkäranta, Helsinki University of Technology, Finland, 7-21.7.03. *Lecture:* Lowest-order finite elements for thin structures - mathematical and historical reflections, 11.7.03.

K. R. Rajagopal, Texas A & M University, College Station, USA, 9-14.4.03. *Lecture:* Mathematical modelling of growth and remodelling, 11.4.03.

A. Marie Robertson, University of Pittsburgh, USA, 10-30.6.03. *Lecture:* Constitutive modeling of the arterial wall, 12.6.03.

S. Samko, Universidade do Algarve, Faro, 28.2.03. *Lecture:* A further progress in the theory of Lebesgue spaces with variable exponent: singular integral equations and Sobolev theorem for potentials.

I. L. Sofronov, Keldysh Institute of Applied Mathematics and Russian Academy of Sciences, Moscow, Russia, 24-3.5.03. *Lecture:* Transparent boundary conditions for aeroelastic problems in wind tunnels, 28.4.03.

C. Teleman, Cambridge University, UK, 31.5- 5.6.2003. *Minicourse:* Twisted K-theory and applications (IV Lisbon Summer Lectures in Geometry) 2-4.6.03.

P. Turner, Heriot-Watt University, Edinburgh, UK, 11-16.4.03.

Other Research Units

Alberto Calabri, Dipartimento di Matematica, Università degli Studi di Bologna, Italy, 8-14.11.03.

5 Postdoctoral Program

5.1 Postdoctoral fellows

Center for Logic and Computation (CLC)

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

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

G. Del Magno, Ph.D. in Mathematics, Georgia Institute of Technology, Atlanta, USA, 2002. Support: FCT grant SFRH/BPD/12079/2003 since October 2003. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 10.02. *Research areas:* Dynamical systems.

K. Gelfert, Ph.D. in Mathematics, Technische Universität, Dresden, Germany, 2001. Support: FCT grant SFRH/BPD/12108/2003. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 12.03. *Research Areas:* Dynamical systems, dimension theory, ergodic theory.

R. Hric, Ph.D. in Mathematics, Comenius University, Bratislava, Slovakia, 1999 and RNDr. in Mathematics, Silesian University, Opava, Czech Republic, 2000. Support: FCT grant SFRH/BPD/10157/2002. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 12.01. *Research areas:* Dynamical systems.

N. Jung, Ph.D. in Mathematics, University of Illinois, Urbana-Champaign, USA, 2003. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 9.03. *Research Areas:* Nonlinear analysis.

D. Krejčířík, Ph.D. in Mathematics, Université de Toulon et du Var, France, 2001 and Ph.D. in Theoretical Physics, Charles University in Prague, Czech Republic, 2001. Support: FCT grant SFRH/BPD/11457/2002. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 2.03. *Research Areas:* Mathematical physics, quantum mechanics, spectral geometry.

H. Li, Ph.D. in Mathematics, University of Illinois, Urbana-Champaign, USA, 2003. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 9.03. *Research Areas:* Symplectic geometry.

J. Lopes Dias, Ph.D. in Mathematics, University of Cambridge, UK, 2002. Support: FCT grant SFRH/BPD/7197/2001. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 6.03. *Research Areas:* Dynamical systems, renormalization, Hamiltonian dynamics.

P. Monnier, Ph.D. in Mathematics, University of Montpellier, France, 2001. Support: FCT grant SFRH/BPD/12057/2003. 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, USA, 1999. Support: FCT grant SFRH/BPD/11205/2002. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 12.01. *Research Areas:* Geometric mechanics, symplectic and Poisson geometry, geometric integrators.

C. Valls, Ph.D. in Mathematics, Universidad de Barcelona, Spain, 1999. Support: FCT grant SFRH/BPD/14404/2003. Center for Mathematical Analysis, Geometry, and Dynamical Systems, since 10.03. *Research Areas:* Dynamical systems, partial differential equations.

Center for Mathematics and its Applications (CEMAT)

N. Arada, Docteur en Mathématiques, Université de Toulouse, France, 1997. Support: FCT SFRH/BPD/3506/2000. Center for Mathematics and its Applications (with A. Sequeira), since 1.04.01. *Research Areas:* Partial differential equations, optimal control theory, mathematical fluid dynamics.

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.

Z. Khatir, Ph.D. in Engineering, University of Warwick, UK, 2000. Support: European Research Training Network HaeMOdel (Mathematical and Numerical Modelling in Haemodynamics) HPRN-CT-2002-00270, 1.10.02 - 30.09.06. Center for Mathematics and its Applications (with A. Sequeira), since 1.06.03. *Research Areas:* Theoretical and computational fluid dynamics, non-Newtonian blood flow modelling.

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

5.2 Publications²

Center for Logic and Computation (CLC)

M. E. Coniglio, A. Sernadas and C. Sernadas, *Fibring logics with topos semantics*, Journal of Logic and Computation **13** (2003), 595-624.

C. Hermida and P. Mateus, *Paracategories I: Internal paracategories and saturated partial algebras*, Theoretical Computer Science **309** (2003), 125-156.

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

D. Kruml, J.W. Pelletier, P. Resende and J. Rosický, *On quantales and spectra of C^* -algebras*, Applied Categorical Structures **11** (2003), 543-560.

²Including publications in 2003 resulting from work carried out by post-docs in previous years.

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

J. F. Alves, R. Hric and J. Sousa Ramos, *The Artin-Mazur zeta function for graph maps*, to appear in Iteration Theory (ECIT 02), J. Sousa Ramos, D. Gronau, C. Mira, L. Reich and A. Sharkovsky Eds., Grazer Mathematische Berichte.

F. Balibrea and R. Hric, *Minimal sets on graphs and dendrites*, Internat. J. Bifur. Chaos Appl. Sci. Engrg. **13** (2003), 1721-1725.

L. Barreira, L. Radu and C. Wolf, *Dimension of measures for suspension flows*, to appear in Dynam. Syst.

L. Barreira and C. Wolf, *Measures of maximal dimension for hyperbolic diffeomorphisms*, Comm. Math. Phys. **239** (2003), 93-113.

B. Chenaud, P. Duclos, P. Freitas and D. Krejčířík, *Geometrically induced discrete spectrum in curved tubes*, preprint.

R. Cordovil and D. Forge, *Quadratic Orlik-Solomon algebras of graphic matroids*, Matemática Contemporânea **25** (2003), 25-32.

R. Cordovil and D. Forge, *Diagonal bases in Orlik-Solomon type algebras*, Annals of Combinatorics **7** (2003), 247-257.

R. Cordovil and D. Forge, *A note on Tutte polynomials and Orlik-Solomon algebras*, European Journal of Combinatorics **24** (2003), 1081-1087.

R. Cordovil and D. Forge, *Gröbner and diagonal bases in Orlik-Solomon type algebras*, to appear in Cubo Journal.

G. Del Magno and R. Makarian, *Bernoulli Elliptical Stadia*, Comm. Math. Phys. **233** (2003), 211-230.

P. Exner, P. Freitas and D. Krejčířík, *A lower bound to the spectral threshold in curved tubes*, to appear in R. Soc. Lond. Proc. Ser. A Math. Phys. Eng. Sci.

R. L. Fernandes and P. Monnier, *Linearization of Poisson brackets*, preprint.

R. L. Jerrard and N. Jung, *On strict convergence in BV*, preprint.

D. Krejčířík and J. Kriz, *On the spectrum of curved quantum waveguides*, preprint.

H. Li, *Semi-free hamiltonian circle actions on 6-dimensional symplectic manifolds*, Trans. Amer. Math. Soc. **355** (2003), 4543-4568.

H. Li, π_1 of hamiltonian S^1 manifolds, Proc. Amer. Math. Soc. **131** (2003), 3579-3582.

H. Li, *On the construction of certain 6-dimensional symplectic manifolds with Hamiltonian circle actions*, to appear in Trans. Amer. Math. Soc.

H. Li, π_1 of symplectic manifolds with hamiltonian SU^2 or SO^3 actions, preprint.

M. Perlmutter, M. Rodríguez-Olmos and E. Sousa Dias, *On the geometry of reduced cotangent bundles at zero momentum*, Preprint 21/03.

Center for Mathematics and its Applications (CEMAT)

N. Arada and A. Sequeira, *Strong steady solutions for a generalized Oldroyd-B model with shear-dependent viscosity in a bounded domain*, Mathematical Models & Methods in Applied Sciences **13** (2003), 1303-1323.

N. Arada and J. P. Raymond, *Time optimal problems with Dirichlet boundary controls*, Discrete and Continuous Dynamical Systems **9** (2003), 1549-1570.

N. Arada and A. Sequeira, *Steady flows of shear-dependent Oldroyd-B fluids around an obstacle*, to appear in J. of Mathematical Fluid Mechanics.

N. Arada and A. Sequeira, *Existence results for steady flows of quasi-Newtonian fluids using weak monotonicity*, preprint.

N. Arada and A. Sequeira, *A note on non-Newtonian modelling of blood flow in small arteries*, in Proceedings of the International Conference on Modelling and Numerical Simulation in Continuum Mechanics, CIM, 2003.

A. Karlovich, Yu. Karlovich and A. B. Lebre, *Invertibility of functional operators with slowly oscillating non-Carleman shifts*, in Singular Integral Operators, Factorization and Applications, IWOTA 2000, Faro, Portugal, A. Böttcher, M. A. Kaashoek, A. B. Lebre, A. F. dos Santos and F.-O. Speck Eds., Operator Theory: Advances and Applications, 142, Birkhäuser, 2003, pp. 147-174.

A. Karlovich and Yu. Karlovich, *Compactness of commutators arising in the Fredholm theory of singular integral operators with shifts*, in Factorization, Singular Operators and Related Problems, Proceedings of the Conference in Honour of Professor Georgii Litvinchuk (2002), Funchal, Portugal, S. Samko, A. B. Lebre and A. F. dos Santos Eds., Kluwer, 2003, pp. 111-129.

A. Karlovich, *Fredholmness of singular integral operators with piecewise continuous coefficients on weighted Banach function spaces*, Journal of Integral Equations and Applications **15** (2003), 263 - 320.

A. Karlovich, *Norms of Toeplitz and Hankel operators on Hardy type subspaces of rearrangement-invariant spaces*, to appear in Integral Equations and Operator Theory.

A. Karlovich, *Singular integral operators with flip and unbounded coefficients on rearrangement-invariant spaces*, to appear in Functional Analysis and its Applications.

A. Karlovich and P. A. Santos, *On asymptotics of Toeplitz determinants with symbols of nonstandard smoothness*, Preprint 15/03.

A. Karlovich and A. Lerner, *Commutators of singular integrals on generalized L^p spaces with variable exponent*, preprint.

6 Research Programs and Sponsorship

6.1 Research Projects Coordinated by Department Members

Center for Logic and Computation (CLC)

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

P. Resende,

- Quantales, FCT POCTI/1999/MAT/33018, 10.00-6.03.

- Quantalic aspects of quasi-periodic tilings, CRUP/British Council Treaty of Windsor B-22/04, 12.03-03.05.

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

M. Abreu, Invariants in Symplectic and Related Geometries, FCT POCTI/MAT/33081/2000, 1.01-12.03.

M. E. Sousa Dias, Bifurcations and Dynamics of the Affine-rigid Bodies, European Research Training Network MASIE-HRPN-CT-2000-00113.

P. Freitas, Qualitative Theory of Partial Differential Equations, FCT POCTI/32931/MAT/2000, 9.00-9.03.

J. P. Nunes, Moduli Spaces, Integrability and String Theory, FCT POCTI/33943/MAT/2000, 1.1.01- 31.12.03.

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

Center for Mathematics and its Applications (CEMAT)

C. J. S. Alves, Inverse problems and numerical analysis in wave scattering, FCT POCTI/MAT/34735/2000, 2000-2003.

P. M. Lima, Computational Methods for Singular Problems, FCT POCTI/MAT/45700/2002, 9.03-9.06.

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

A. Sequeira,

- HaeMOdel-Mathematical and Numerical Modelling in Haemodynamics, European Research Network, HPRN-CT- 2002-00270, 1.10.02-30.09.06.

- Mathematical and Numerical Modelling of the Human Cardiovascular System, FCT POCTI/MAT/41898/2001, 15.1.02 -14.1.05

- Mathematical Analysis and Numerical Simulation of non-Newtonian Fluids with Applications in Liquid-Crystalline Polymers, FCT POCTI/MAT/380/2001 (2nd phase of Project Praxis XXI 2/2.1/MAT/380/94), 1.9.01–31.8.04.

Other Research Units

M. Mendes Lopes, Classification of complex algebraic surfaces, FCT POCTI/MAT/44068/2002, 10.9.03-9.9.06.

M. F. Ramalhoto, PRO-ENBIS - Contract No. G6RT/CT/2001/05059, 2002-2006 (with Spain, UK, Norway, Sweden, Italy, Germany), and WP4-Reliability, Safety and Quality Improvement, of the same Project.

6.2 Participation in other Research Projects

Center for Logic and Computation (CLC)

P. Gouveia, ConTComp: Continuous Time Computation and Complexity, FCT FEDER POCTI/MAT/45978/2002, 1.9.03-31.8.06.

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.

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

A. Cannas da Silva,

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

R. Cordovil, Applications of Oriented Matroids to convexity and arrangements of hyperplanes. POCTI/MAT/36563/2000, 1.00-6.04.

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

Center for Mathematics and its Applications (CEMAT)

J. Mourão, Nonperturbative aspects of fields and strings, CERN/FNU/49529/2002, 1.01-31.12.03.

M. R. Oliveira,

- Traffic Modeling and Performance Evaluation of Multiservice Networks, POSI- 42069 /CPS/2001, 1.02.2002- 31.1.2004.
- Euro-NGI (New Generation Internet) – Sixth Framework Programme of the European Union, 2002-2006.

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

A. Pacheco Pires,

- Traffic Modeling and Performance Evaluation of Multiservice Networks, POSI/42069/CPS/2001, 1.2.02-31.1.04.
- EURO-NGI, Design and Engineering of the Next Generation Internet, Towards Convergent Multi-Service Networks, 1.12.03-30.11.06.

R. Picken, Nonperturbative aspects of fields and strings, CERN/FNU/49529/2002, 1.01-31.12.03.

A. Sequeira, Multiscale Models of Blood Flow in the Cerebral Vasculature, NSF - 0104680 project of international cooperation (with A. Quarteroni and coordinated by A.M. Robertson – Univ. Pittsburgh, USA), 1.9.01-31.8.04.

J. H. Videman, Nonlinear PDEs and Interface Problems, FCT POCTI-34471-MAT-2000, 2001-2004.

Other Research Units

A. B. Cruzeiro, Mathematical Methods in Classical and Quantum Dynamics, FCT POCTI/1999/MAT/34924, 02-7.04.

M. Mendes Lopes, EAGER (Algebraic Geometry in Europe), European Commission, Research Training Network, HPRN-CT-2000-00099, 00-9.04.

7 Organization of Conferences, Workshops, Meetings, etc.

Center for Logic and Computation (CLC)

C. Caleiro, Member of the Scientific Committee of the XIII Encontro Brasileiro de Lógica, CLE, Campinas, Brazil, 26-30.5.03.

A. Sernadas, Member of the Scientific Committee of the CAiSE2003: XV Conference Advanced Information Systems Engineering, Klagenfurt/Velden, Austria, 16-20.6.03.

C. Sernadas, Member of the Scientific Committee of the XIII European-Japanese Conference on Information Modelling and Knowledge Bases, Kyushu Institute of Technology, Kitakyushu, Japan, 3-6-6.03.

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

A. Cannas da Silva, Co-organizer of the Special Session on Symplectic and Related Geometries, EMS Mathematical Weekend, Lisbon, Portugal, 12-14.9.03.

R. Cordovil, Co-organizer of Combinatorics in Oporto, Universidade do Porto, Portugal, 12-17.9.03

P. Freitas, Co-organizer of the Conference on Mathematical Problems in Quantum Mechanics, Instituto Superior Técnico, Lisbon, Portugal, 21-24.7.03.

J. P. Nunes,

- Co-organizer of the IV IST Lectures in Algebraic Geometry and Physics, Vector Bundles on Curves and Generalized Theta Functions, Lisbon, Portugal, 10-14.3.03.
- Co-organizer of the Young Researchers Symposium, Instituto Superior Técnico, Lisbon, Portugal, 25-26.7.03.
- Co-organizer of the XIV ICMP, Lisbon, Portugal, 28.7-2.8.03.

J. Sousa Ramos,

- Organizer of the Mini Workshop on Discrete Dynamical Systems: Triangular Maps, Instituto Superior Técnico, Lisbon, Portugal, 14.2.03.
- Organizer of the One Day Meeting on Discrete Dynamical Systems, PDE and Countable Markov Shifts, Instituto Superior Técnico, Lisbon, Portugal, 9.5.03.

M. Vaz Pinto, Member of the Organizing Committee of the Lisbon Conference on Commutative Algebra, Lisbon, Portugal, 23-27.06.03.

Center for Mathematics and its Applications (CEMAT)

C. J. S. Alves,

- Co-organizer of MeshFree 2003 - International Workshop on MeshFree Methods, Instituto Superior Técnico, Lisbon, Portugal, 21-23.7.03.
- Member of the Scientific Committee of ISIP-2003: International Symposium on Inverse Problems in Engineering Mechanics, Nagano, Japan, 18-21.2.03.
- Member of Scientific Committee and Co-organizer of the session on Métodos sem Malha e Métodos Numéricos, VII Congresso de Mecânica Aplicada e Computacional, Universidade de Évora, Portugal, 14-16.4.03.

C. Florentino,

- Co-organizer of the Euroconference VBAC 2003, Vector bundles on algebraic curves - moduli spaces and topology, Oporto, Portugal, 1-5.7.03.
- Co-organizer of the IV IST Lectures on Algebraic Geometry and Physics, Vector Bundles on Curves and Generalized Theta Functions, Instituto Superior Técnico, Lisbon, Portugal, 10-14.3.03.
- Co-organizer of the Euroconference VBAC 2003, Vector bundles on algebraic curves - moduli spaces and topology, Porto, Portugal, 1-5.7.03.
- Co-organizer of the IV IST Lectures on Algebraic Geometry and Physics, IST, Lisbon, Portugal, 10-14.3.03.

J. Mourão,

- Member of the Organizing Committee of the International Congress on Mathematical Physics, University of Lisbon, Portugal, 28.7-2.8.03.
- Co-organizer of the IV IST Lectures in Algebraic Geometry and Physics, Vector Bundles on Curves and Generalized Theta Functions, Instituto Superior Técnico, Lisbon, Portugal, 10-14.3.03.
- Co-organizer of the XII Oporto Meeting on Geometry, Topology and Physics, Universidade do Porto, Portugal, 17-20.7.03.
- Co-organizer of the Young Researchers Symposium on Mathematical Physics, Instituto Superior Técnico, Lisbon, Portugal, 25-26.7.03.

R. Picken,

- Member of the Organizing Committee of the Workshop on Categorification and Higher-Order Geometry, Lisbon, Portugal, 23-24.7.03.
- Member of the Scientific Committee of the XII Fall Workshop on Geometry and Physics, Coimbra, Portugal, 8-10.9.03.
- Member of the Organizing Committee of the XII Oporto Meeting on Geometry, Topology and Physics, Universidade do Porto, Portugal, 17-20.7.03.

- Member of the Organizing Committee of the Young Researcher Symposium of the International Congress on Mathematical Physics, Lisbon, Portugal, 25-26.7.03.
 - Member of the Organizing Committee of the International Congress on Mathematical Physics, Lisbon, Portugal, 28.7-2.8.03.
- A. M. Pires, Member of the Scientific Committee of International Conference on Robust Statistics (ICORS2003), Antwerp, Belgium, 13-18.7.03.
- A. Sequeira,
- Member of the Scientific Committee of the VII Congresso de Mecânica Aplicada e Computacional, Évora, Portugal, 14-16.04.03.
 - Member of the Organizing Committee of the International Conference on Trends in Partial Differential Equations of Mathematical Physics, Óbidos, Portugal, 7-10.06.03.
 - Member of the Program Committee of the Workshop on Partial Differential Equations and Applications (dedicated to the 60th birthday of Christian Simader), Universidade de Évora, Portugal, 23-24.06.03.
 - Chairman of the Organizing Committee of the International Workshop on Partial Differential Equations: Theory and Applications - IWPDE03 (dedicated to the 60th birthday of H. Beirão da Veiga), Universidade da Madeira, Portugal, 26-28.06.03.
 - Member of the Scientific Committee of the International Symposium on Modelling of Physiological Flows - MPF2003, EPFL, Lausanne, Switzerland, 1-3.09.03.
 - Member of the Scientific Committee of the Summer School on Modelling of the Cardiovascular System: Mathematical Theory, Modelling and Applications, EPFL, Lausanne, Switzerland, 25-29.08.03.
- A. Silvestre, Co-organizer of the International Workshop on Non-Linear Partial Differential Equations, Universidade da Madeira, Portugal, 26-28.6.03.
- F.-O. Speck, Member of the Organizing Committee of the Workshop on Operator Theory in Analysis and Engineering in Honour of Professor Erhard Meister, Darmstadt, Germany, 17-18.6.03.
- 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.

Other Research Units

J. F. Costa, Co-organizer of the Advanced School and Workshop on Soft Computing and Complex Systems, Universidade de Coimbra, Portugal, 23-27.6.03.

A. B. Cruzeiro,

- Member of the local organizing committee of the International Congress of Mathematical-Physics, Lisbon, Portugal, 7.03.
- Member of the local organizing committee of the EMS Mathematical Weekend, Lisbon, Portugal, 12-14.9.03.

M. Mendes Lopes, Co-organizer of the IV IST Lectures in Algebraic Geometry and Physics, Vector Bundles on Curves and Generalized Theta Functions, Instituto Superior Técnico, Lisbon, Portugal, 10-13.3.03.

M. F. Ramalhoto,

- Member of the Scientific Committee of ESREL 2003, and organizer of the session Stochastic for the Quality Movement, Maastricht, Holland, 16-20.6.03.
- Organizer of the Pre-ESREL 2003 Workshop on Reliability, Quality and Programs, Maastricht, Holland, 15.6.03.
- Chairperson of the session Statistics and Quality Improvement, ENBIS and ISI-Industrial Sector joint Annual Conference, Barcelona, 20-23.8.03.

8 Miscellaneous

8.1 New Professors and Promotions

- A. Bravo, Professor Auxiliar.
- R. L. Fernandes, Professor Associado.
- P. Lopes, Professor Auxiliar.
- M. Mendes Lopes, Professor Associado.
- P. R. Pinto, Professor Auxiliar.
- J. Rasga, Professor Auxiliar.
- P. Resende, Professor Associado.
- I. Rodrigues, Professor Auxiliar.
- P. M. Rodrigues, Professor Auxiliar.
- P. Silva Santos, Professor Auxiliar.

8.2 Personal notes

- C. J. S. Alves,
 - Guest editor (with C.S. Chen and V. Leitão) of the special issue on Meshfree Methods, of the Journal Computer Modelling in Engineering and Sciences.
 - Guest editor (with A. Kirsch) of the special issue on Inverse Obstacle Problems, of the Journal Mathematics and Computers in Simulation.
 - Member of the International Advisory Committee, of the Inverse Problems Design and Optimization Symposium, Rio de Janeiro, Brazil, 17-19.3.04.
 - Co-organizer of the session Matemática Computacional, Congresso de Métodos Computacionais em Engenharia, Laboratório Nacional de Engenharia Civil, Lisbon, Portugal, 31.5-2.6.04.
 - Member of the Local Organizing Committee, V International Conference on Boundary Elements Techniques (ETEQ 2004), Lisbon, Portugal, 21-23.7.04.
 - Member of the Local Organizing Committee and Co-organizer of the Meshless Methods Session, International Conference on Computational & Experimental Engineering and Sciences (ICCES'04), Madeira, Portugal, 26-29.7.04.
 - Member of the Scientific Committee of the V International Conference on Inverse Problems in Engineering: Theory and Practice (ICIPE), Cambridge, UK, 11-15.7.05.

L. Barreira,

- Associate Member of the Center for Dynamics and Geometry, 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.

J. Buescu, Member of the Ph.D. jury of Maria Alexandrina David de Aguiar, Faculdade de Ciências da Universidade do Porto, Portugal, 27.2.03.

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

C. Caleiro,

- Observer of IFIP Working Group 1.3 - Foundations of System Specification.
- Member of the Ph.D. jury of J. Bacelar de Almeida, Universidade do Minho, Braga, Portugal, 20.6.03.

R. Cordovil,

- Member of the Ph.D. jury of Emeric Gioan, University of Bordéus I, France, 17.12.03.
- Executive Editor of the *Portugaliae Mathematica*.
- Associate Editor of the *European Journal of Combinatorics*.

J. F. Costa, Editor of the Science Series “Máquina do Mundo”, Bizâncio, Lisbon, Portugal.

A. B. Cruzeiro,

- Member of the evaluation committee of the program Ramon y Cajal, Spanish Ministry of Science and Technology, 6.03.
- President of the Sociedade Portuguesa de Matemática.

T. Diogo,

- Visited the Mathematics Department of the Baptist University of Hong Kong, China, 19.11-4.12.03.
- Member of the Organizing Committee of the International Workshop on Analysis and Numerical Approximation of Singular Problems, Instituto Superior Técnico, Lisbon, Portugal, 10-12.11.04.

F. Dionísio, Co-organizer of the VII Concurso/Encontro Nacional de Programação em Lógica, Lisbon, Portugal, 16-18.4.04

P. Freitas,

- Vice-president of the Sociedade Portuguesa de Matemática.
- Delegate of the European Mathematical Society.
- Representative member of the SPM in the Comissão Nacional de Matemática.

D. Gomes,

- Coordinator of the project *Ciência Viva "Caos e Ordem"*, Center of Mathematical Analysis, Geometry and Dynamical Systems, Instituto Superior Técnico, Portugal, 8.03.
- Tutor of the programme "Novos Talentos em Matemática", Fundação Gulbenkian.

A. B. Lebre, Vice-President for Scientific Affairs, Instituto Superior Técnico, up to 31.7.03.

P. M. Lima,

- Member of the Organizing Committee of the International Workshop on Analysis and Numerical Approximation of Singular Problems, Instituto Superior Técnico, Lisbon, Portugal, 10-12.11.04.
- Supervisor of the Ph.D. dissertation of António Morais Oliveira, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Portugal.

P. Lopes, Visited IMPA, Rio de Janeiro, Brazil, February-September, 2003.

L. T. Magalhães,

- 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 University of Pennsylvania, USA, 21-29.4.03.
- Member of the Organizing Committee of the Workshop on Combination of Logics: Theory and Applications (CombLog'04), Instituto Superior Técnico, Lisbon, Portugal, 28-30.07.04.
- Co-organizer of the Short Course on Directed Combinatorial Homology and Noncommutative Geometry by Marco Grandis, Instituto Superior Técnico, Lisbon, Portugal, 9-13.02.04.

M. Mendes Lopes, President of the jury for the prize Bento Jesus Caraça, 2003 (promoted by "Público" and Gradiva).

J. Mourão, Co-organizer of the XIII Oporto Meeting on Geometry, Topology and Physics, Universidade do Porto, Portugal, 16-19.7.04.

W. M. Oliva, Co-supervisor of the Ph.D. thesis of G. Terra, Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil, (Supervisor H. M. A. Castro).

A. Pacheco Pires, Reporting member of the Ph.D. jury of Paulo Infante, Universidade de Évora, Portugal.

R. Picken,

- Coordinator of the Group 4 (Mathematical Physics) of the Center for Mathematics and its Applications (CEMAT).
- Reporting member of the Ph.D. jury of N. Reis, École Normale Supérieure de Lyon, France, 15.12.2003.
- Co-organizer of the XIII Oporto Meeting on Geometry, Topology and Physics, Universidade do Porto, Portugal, 16-19.7.04.

M. F. Ramalhoto,

- Member of the jury for the “Agregação” of F. Durão, Departamento de Engenharia de Minas e Georecursos, Instituto Superior Técnico, Lisbon, Portugal, 12-13.7.02.
- Member of the Ph.D. jury of I. Santos, Departamento de Engenharia e Gestão Industrial, Instituto Superior Técnico, Lisbon, Portugal, 29.3.03.
- Associate Editor of the Journal: Quantitative Technology and Qualitative Management.
- Member of the Editorial Board of the European Journal for Engineering Education.
- Member of the evaluation committee of two research programmes of the fifth and sixth Framework Programme of the European Union.
- Member of the International Advisory Board of Reliability Conferences of the International Statistical Institute.
- Consultant of the Open University, UK, since 1994.
- Reviewer of the Short Book Reviews for the International Statistical Institute.
- Member of the International Technical Program Committee of ESREL 2004 Conference, Berlin, Germany and 2005, Poland.
- Member of the European Masters and Research Program on Total Quality Management, financed by the European Foundation for Quality Management.
- Guest Editor (with A. Akay) of the special issue on Industry-University and Globalization of the European Journal of Engineering Education.

J. Ramos,

- Member of the jury for the VI Concurso/Encontro Nacional de Programação em Lógica, Évora, Portugal, 9-11.5.03.
- Co-organizer of the VII Concurso/Encontro Nacional de Programação em Lógica, Lisbon, Portugal, 16-18.4.04.

A. Ravara,

- Visited BRICS, Department of Computer Science, Aalborg University, Denmark, 1-8.3.03.
- Visited the University of Sussex, UK, 12-21.6.03

- Visited the INRIA, Sophia-Antipolis, France, 20-27.9.03.

P. Resende,

- Member of the Ph.D. jury of João Xarez, Universidade de Aveiro, Portugal, 15.9.03.
- Visited the University of Sussex, UK, 4-13.2.03.

C. Rocha,

- Associate Editor of the *Portugaliae Mathematica*.
- Member of the FCT panel for the evaluation of Postdoctoral, Ph.D. and Master grants in Mathematics.
- Member of the Advisory Commission of the Project REANIMAT, Fundação Calouste Gulbenkian.
- Member of the jury for the “Agregação” of Maria de Fátima da Silva Leite, Departamento de Matemática, Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Portugal, 10-11.7.03.

P. A. Santos,

- Assistant-Director of Instituto Superior Técnico for New Information Technologies in Teaching and Learning.
- 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. Sequeira,

- Member of the Scientific Board of SAEN, Instituto Superior Técnico, since 1.09.03.
- Member of the FCT panel for the evaluation of Postdoctoral, Ph.D. and Master grants in Mathematics.
- Scientific reviewer of NRF projects - Evaluation of Research Outputs for National Research Foundation, South Africa.
- Member of the Advisory Board for a Full Professor Position at the Institute of Mathematics, Faculty of Mathematics and Physics, University of Freiburg, Germany.
- Guest editor (with A. Quarteroni) of a special issue of the *Journal of Computing and Visualization in Science*, on the Third International Conference on Applied Mathematics for Industrial Flow Problems (AMIF 2002).
- Visiting Professor at Charles University, Faculty of Mathematics and Physics, Mathematical Institute, Prague, Czech Republic, 25.03.03 – 5.04.03.
- Visiting Professor at École Polytechnique Fédérale de Lausanne, Institut d'Analyse et Calcul Scientifique, Lausanne, Switzerland, 24.08.03-5.09.03.

- Reporting member of the jury for the Habilitation Universitaire en Mathématiques Appliquées de l'Université de Tunis of El Asmi Lassaad, École Nationale d'Ingénieurs de Tunis, Tunisia, 26.02.03.
- Reporting member of the Ph.D. jury of J. Ribeiro Pereira, Departamento de Engenharia Mecânica, Instituto Superior Técnico, Lisbon, Portugal, 24.07.03.

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 Scientific Committee of the Journal Information and Software Technology.
- Evaluator of the program ACI Nouvelles Interfaces des Mathématiques, France.
- Member of the jury for the “Agregação” of A. Oliveira, Departamento de Engenharia Informática e de Computadores, Instituto Superior Técnico, Lisbon, Portugal, 2-3.12.2003.
- Member of the jury for the “Agregação” of V. Vasconcelos, Departamento de Informática, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Portugal, 6-7.10.2003.
- Member of the jury for the “Agregação” of A. Martins, Departamento de Física, Instituto Superior Técnico, Lisbon, Portugal, 16-17.6.2003.
- Member of the Organizing Committee of the Workshop on Combination of Logics: Theory and Applications (CombLog'04), Instituto Superior Técnico, Lisboa, Portugal, 28-30.07.04.

C. Sernadas,

- Member of the jury for the “Agregação” of M. Manuel Clementino, Departamento de Matemática, Faculdade de Ciências e Tecnologia, Universidade de Coimbra, Portugal, 30.6-1.7.03.
- Reviewer to the Mathematical Reviews of *A Simple incomplete extension of T which is the union of two complete modal logics with FMP*, by Roy Benton and *Characterizing interpolation pairs in infinitary graded logics*, by Giovanna D'Agostino.

F.-O. Speck,

- Member of the Advisory Board of Mathematische Nachrichten.
- Member of the Editorial Board of Mathematical Methods in the Applied Sciences.
- Reporting member of the M.Sc. jury of Dorabella Santos, Universidade de Aveiro, Portugal, 14.4.03.

J. H. Videman,

- Coordinator of the CIM Thematic Term on Mathematics and the Environment, 5.6.04.
- Chairman of the Organizing Committee of the CIM Summer School on Atmospheric Sciences and Climate Dynamics, Instituto Superior Técnico, Lisbon, Portugal, 12-16.7.04.
- Chairman of the Organizing Committee of the CIM Summer School and Workshop on Oceanography, Lakes and Rivers, Instituto Superior Técnico, Lisbon, Portugal, 19-24.7.04.