



Research Report 1997

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RESEARCH REPORT

1997

Preface

Instituto Superior Técnico (IST) was founded in 1911 with the aim of becoming the leading school of engineering in Portugal. In 1930, together with three other higher education institutes, IST was incorporated into the Universidade Técnica de Lisboa, and presently it is one of the seven schools of this university. Up until 1980 the institute did not have a formal mathematics department, the mathematics courses for engineering students being mostly taught by engineering graduates.

When the Department of Mathematics was created in 1980 it was just a service department for the teaching of mathematics in the engineering programs at IST and counted only five members holding PhD level degrees. In 1983 the department initiated a formal graduate program and adopted the goal of becoming a research department as well. This was the beginning of a period of fast development that is still in progress. Three years later, in 1986, the department began offering its own undergraduate degree in Applied Mathematics and Computer Science, emphasizing mathematical analysis, numerical analysis, statistics and computer science. Since 1992 the geometry and algebra components of this degree have been gradually reinforced.

At present, the department has 57 members holding PhD degrees and relies on the contribution of a large number of teaching assistants. Most of these are also graduate students in mathematics.

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

We intend to maintain the editorial policy of the research report followed since the beginning of its publication in 1991 and under the directions of Professors António Ferreira dos Santos and Luis T. Magalhães.

We regard the annual publication of a research report as an important vehicle, with two complementary purposes. One is internal: to highlight *research publications* by department members and their involvement in *international scientific exchange* as a public statement of the importance we attach to them; the other is external: to provide information to interested people outside the department about our current research work.

In the second half of 1996 most of the research activities of the department were subjected to an external international review, within the overall Research Units Assessment carried out by the Ministry of Science and Technology. The members of the mathematics review board were Hyman Bass (Univ. of Columbia, USA), Eugene Calabi (Univ. of Pennsylvania, USA), Irene Fonseca (Carnegie Mellon Univ., USA), Peter Olver (Univ. of Minnesota, USA), George Papanicolaou (Stanford Univ., USA) and Hugo Beirão da Veiga (Univ. of Pisa, Italy). The research units related to our department received very high ratings from this board acknowledging the international value of the research. These reviews should be taken as an additional stimulus for further development. The department experienced a fast development since it embraced the goal of becoming a research department just 15 years ago. Moreover, it is past the critical mass in the number of members holding PhD degrees and the predominant youth of its faculty is appropriate for the creation and conduction of innovative projects. It is now time to accept the challenge of a new phase directed at achieving a significant position among international mathematics research centers.

I would like to thank everyone who was involved in the organization of this issue, especially Professor Gabriel Pires, who coordinated the preparation of the report. I am also grateful to Ema Silva for her work in word processing this issue.

Lisbon, 15 April 1998

The Department Chairman

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Research Areas

The main areas of research pursued in the Department of Mathematics of IST are:

Dynamical Systems and Differential Equations

The dominant research in this area falls within the general field of mathematical analysis with an emphasis on non-linear 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 non-linear analysis, control theory and mechanics of continuous media. The research is organized along five lines of work: qualitative theory of dynamical systems, geometric mechanics and hamiltonian systems, methods of non-linear analysis in mechanics of continuous media and methods of non-linear systems analysis in control theory, ergodic theory and discrete dynamical systems.

Geometry and Topology

The work in this area is mostly concerned with problems spanning geometry, topology, algebra and analysis, namely questions related to the connection of some classical topics - differential geometry, mathematical physics, dynamical systems, symplectic geometry - with modern developments, including infinite-dimensional and discrete problems, for which Lie groups, K-theory, von Neumann algebras, noncommutative geometry and combinatorics are essential tools.

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.

Theory of Distributions and Ultradistributions

The work in this area has addressed problems such as algebraic and topological aspects of some concepts of limit and value of a distribution at a point, generalization to distributions on manifolds of certain results of classical analysis like, for instance, Stokes theorem, development of the theory of ultradistributions pursuing the holomorphic representations, the axiomatic and functional analytic approaches, multiplicative product of ultradistributions and limit of an ultradistribution at a point.

Probability, Statistics and Applications

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

Numerical Analysis and Mathematical Analysis in Fluid Dynamics

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

Computer Science

The research work in the area of Computer Science has been focused on the algebraic, categorial and logical foundations of software engineering, with emphasis on system specification and verification. The main lines of research are: (1) combination of logics for heterogeneous approaches to specification; (2) alternatives to the temporal logic approach to the specification and verification of reactive, concurrent systems, such as the situation calculus and observational logic; (3) action and deontic logic for the representation of juridical and organizational knowledge; (4) new logics for specifying and verifying probabilistic and hybrid systems. Typical problems addressed include the categorial characterization of logic structures and translation mechanisms as well as the completeness of specialized calculi. Most of the work has been carried out within the scope of either international cooperation projects, namely the ESPRIT Basic Research Actions ASPIRE, FIREworks and MODELAGE, or national projects, namely the PRAXIS projects ACL, LogComp, MAGO, SARA and SitCalc.

Other Areas

There are also some individual members of the department working in other areas, such as mathematical physics, combinatorics, logic and operations research.

Research seminars

During 1997 the Department of Mathematics at IST ran regular sessions of the following seminars:

- Seminar on Analysis, Geometry, and Dynamical Systems, every week.
(former seminar on Dynamical Systems and Continuous Mechanics)
Organizer: Luis Barreira.
- Seminar on Mathematical Physics, every week.
Organizers: Rui Loja Fernandes and Esmeralda Dias.
- Seminar on Applied Mathematics and Numerical Analysis, every other week.
Organizer: Adélia Sequeira.
- Seminar on Theory of Computing, every week.
Organizer: Amílcar Sernadas.
- Seminar on Functional Analysis and Applications, one session every two weeks.
Organizer: Frank-Olme Speck.

- Seminar on Geometric and Topological Methods in Low Dimensions and Infinite Dimensions, every other week.
Organizer: J. Sousa Ramos.
- TQFT Club, on Geometry, Topology and Quantum Theory, monthly.
Organizer: Roger Picken

1 Publications

1.1 Publications which appeared in 1997

Algebra and Mathematical Analysis

Barreira, L., Pesin, Ya. and Schmeling, J., On a general concept of multifractality. Multifractal spectra for dimensions, entropies, and Lyapunov exponents. Multifractal rigidity, *Chaos*, **7**, (1997), 27-38.

Barreira, L., Pesin, Ya. and Schmeling, J., Multifractal spectra and multifractal rigidity for horseshoes, *Journal of Dynamical and Control Systems*, **3**, (1997), 33-49.

Barreira, L. and Schmeling, J., Invariant sets with zero measure and full Hausdorff dimension, *Electronic Res. Announc. Amer. Math. Soc.*, **3**, (1997), 114-118.

Barreira, L., Pesin theory, Kluwer's Encyclopaedia of Mathematics, (1997), 406-411.

Buescu, J., Exotic attractors - from Liapunov stability to riddled basins, Progress in Mathematics, Birkhäuser, **153**, (1997).

Campos Ferreira, J., Introduction to the theory of distributions, Pitman Monographs and Surveys in Pure and Applied Mathematics, (1997).

Castro, H. M. A. and Oliva, W. M., Poisson structures on the phase space of mechanical systems with constraint, *Resenhas IME-USP*, **3**, (1), (1997), 85-92.

Castro, L. P. and Speck, F.-O., A Fredholm study for convolution operators with piecewise continuous symbols on a union of a finite and a semi-infinite interval, *Applicable Analysis*, **64** (1997), 171-187.

Cordovil, R., Coloring matroids, *Discrete Mathematics*, **165/166**, (1997), 155-160.

Coutinho, R. and Fernandez, B., Extended symbolic dynamics in bistable CML: Existence and stability of fronts, *Physica D*, **108**, (1997), 60-80.

Coutinho, R. and Fernandez, B., On the global orbits in a bistable CML, *Chaos*, **7**, (1997), 301-310.

Fernandes, R. L. and Santos J. P., Integrability of the periodic KM system, *Rep. on Math. Phys.* **40**, (3), (1997).

Freitas, P., Eigenvalue problems for the wave equation with strong damping, *Proc. Roy. Soc. Edinburgh A.*, **127**, (1997), 755-771.

Freitas, P., Grinfeld, M. and Knight, P., Stability of finite-dimensional systems with indefinite damping, *Adv. Math. Sci. Appl.*, **7**, (1997), 435-46.

Freitas, P., Some results on the stability and bifurcation of stationary solutions of delay-diffusion equations, *J. Math. Anal. Appl.*, **206**, (1997), 59-82.

Fusco, G. and Oliva, W. M., Integrability of a system of N electrons subjected to Coulombian interactions, *J. Differential Equations*, **135**, (1), (1997), 16-40.

Lebre, A. B., Moura Santos, A. and Speck, F.-O., Factorization of a class of matrices generated by Sommerfeld diffraction problems with oblique derivatives, *Math. Meth. Appl. Sci.* **20**, (1997), 1185-1198.

Moura Santos, A. and Speck, F.-O., Sommerfeld diffraction problems with oblique derivatives, *Math. Meth. App. Sci.*, **20**, (1997), 635-652.

Oliva, W. M. and Taboas, P. Z., Existence of periodic orbits, set of global solutions and behavior near equilibrium for Volterra equations of retarded type, *Portugaliae Mathematica*, **54**, (2), (1997), 165-1856.

Picken, R., Reflections on topological quantum field theory, *Rep. Math. Phys.*, **40**, (1997), 295-303.

Roberts, R. M. and de Sousa Dias, M. E. R., Bifurcations from relative equilibria of Hamiltonian systems, *Nonlinearity*, **10**, (1997), 1719-1738.

Roch, S., Santos, P. A. and Silberman, B., Finite section method in some algebras of multiplication and convolution operators and a flip, *ZAA*, **16**, (3), (1997), 575-606.

Statistics and Applications

Amaral, J. A. and Nunes, C., Main results in deterministic and stochastic scheduling, Proceedings of the 1st International Conference on Technology and Innovation, (1997), 2-4.

Branco, J. B., Book review: multivariate analysis, part 2: classification, covariance structures and repeated measurements, *The Statistician*, **46**, 3, (1997), 448-458.

Branco, J. B., Os três primeiros livros de análise multivariada, *Boletim Informativo da SPE*, **2**, (1997), 9-11.

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Morais, M., Resultados, mentiras e estatística, *TI-MAT*, **5**, (1997), 2-3.

Morais, M. and Ramalhoto, M. F., Cartas EWMA-VSI unilaterais superiores para o parâmetro de escala da população Weibull de mínimos tri-paramétrica: Que vantagens?, *A Estatística a Decifrar o Futuro*, (Vasconcelos, R., Alves, I. F, Canto e Castro, L. and Pestana, D., Eds.), Ed. Salamandra, Lisbon, (1997), 247-262.

Nunes, C., Aproximação de Taylor para o tempo médio de espera numa rede de filas, *Actas do IV Congresso Anual da SPE*, (Vasconcelos, R., Alves, I. F, Canto e Castro, L. and Pestana, D., Eds.), Ed. Salamandra, Lisbon, (1997), 239-246.

Pacheco, A., Uma equação de modelos de inventário em tempo contínuo. *A Estatística a Decifrar o Mundo*, *Actas do IV Congresso Anual da SPE*, (Vasconcelos, R., Alves, I. F, Canto e Castro, L. and Pestana, D., Eds.), Ed. Salamandra, Lisbon, (1997), 217-230.

Paulino, C. D. M., and Singer, J. M., *Análise de dados categorizados*, UFPE, Imprensa Universitária, Brazil, (1997).

Pires, A. M. and Branco, J. A., Comparação de duas médias: um velho problema revisitado, *A Estatística a Decifrar o Mundo*, *Actas do IV Congresso Anual da SPE*, (Vasconcelos, R., Alves, I. F, Canto e Castro, L. and Pestana, D., Eds.), Col. Novas Tecnologias/Estatística, Ed. Salamandra, Lisbon, (1997), 73-85.

Pires, A. M. and Branco, J. A., Comparison of multinomial classification rules, *Journal of Classification*, **14**, (1997), 137-145.

Ramalhoto, M. F. and Guedes Soares, C., Stochastic process control and quality management, *Advances in Safety & Reliability*, (Guedes Soares, C., Ed.), Pergamon, **3**, (1997), 2003-2010.

Silva, G. L. and Amaral-Turkman, M. A., Alguns resultados de modelos de fragilidade bayesianos, *Faculdade de Ciências, Universidade de Lisboa, Notas e Comunicações*, **13**, (1997).

Silva, G. L. and Amaral-Turkman, M. A., Bayesian analysis of gamma frailty models, *Faculdade de Ciências, Universidade de Lisboa, Notas e Comunicações*, **22**, (1997).

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Alves, C. J. S. and Ha Duong, T., On inverse scattering by screens, *Inverse Problems*, **13**, (1997), 1161-1176.

Alves, C. J. S. and Ha Duong, T., On the far field amplitude for elastic waves, *Modern Mathematical Methods in Diffraction Theory and its Applications in Engineering* (Meister, E., Ed.), Peter Lang, Frankfurt, (1997), 49-67.

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Galdi, G. P., Sequeira, A. and Videman, J. H. , Steady motions of a second-grade fluid in an exterior domain, *Adv. Math. Sci. Appl.* , **7**, (1997), 977-995.

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Lima, P. M. and Diogo, T., An extrapolation method for a Volterra integral equation with weakly singular kernel, *Appl. Num. Math*, **24**, (1997), 131-148.

Novotny, A., Sequeira, A. and Videman, J. H., Existence of three-dimensional flows of second-grade fluids past an obstacle, *Nonlinear Analysis, Theory, Methods & Applications*, **30**, (1997), 3051-3058.

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Ramos, J., The situation and state calculus, *Proceedings of the Second ESSLII Student Session*, (Drewery, A., Kruijff, G.-J., and Zuber, R., Eds.), (1997), 554-561.

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Santos, F., Carmo, J. and Jones, A., Action concepts for describing organised interaction, *Thirtieth Annual Hawaii International Conference on System Sciences*, (Sprague, R. A., Ed.), (1997), 373-382.

Santos, F., Jones, A. and Carmo, J., Responsibility for action in organisations: a formal model, *Contemporary Action Theory*, (Holmstrom-Hintikka, G. and Tuomela, R., Eds.), Synthese Library, **267**, Kluwer Academic Publishers, (1997), 333-350.

Sernadas, A., Sernadas, C. and Caleiro, C., Synchronization of logics with mixed rules: Completeness preservation, *AMAST97, LNCS, 1349*, Springer-Verlag, (1997), 465-478.

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1.2 Articles submitted in 1997

Algebra and Mathematical Analysis

Abreu, M., Kähler geometry of toric varieties and extremal metrics, to appear in *International Journal of Mathematics*.

Alves, J. F. and Sousa Ramos, J., Kneading theory: a functorial approach.

Barreira, L. and Schmeling, J., Sets of "non-typical" points have full topological entropy and full Hausdorff dimension, Preprint 14/97.

Bastos, M. A., Karlovich, Yu. I., Dos Santos, A. F. and Tishin, P. M., The corona theorem and the factorization of AP-matrix functions: criteria and explicit formulas, to appear in *J. Math. Anal. Appl.*

Bastos, M. A., Karlovich, Yu. I., Dos Santos, A. F. and Tishin, P. M., The corona theorem and the factorization of triangular AP-matrix functions, to appear in *J. Math. Anal. Appl.*

Caetano, A. P. and Picken, R., On a family of topological invariants similar to homotopy groups, to appear in *Rendiconti Univ. di Trieste*.

Canas da Silva, A., Karshon, Y. and Tolman, S., Quantization of presymplectic manifolds and circle actions, to appear in *Transactions AMS*.

Castro, H. M. A. and Oliva, W. M., Anosov flows induced by partiallyly hiperbolic \bullet -geodesic flows.

Castro, L. P. and Speck, F.-O., A Fredholm study for Sommerfeld diffraction problems, to appear in *Analysis, Numerics and Applications of Differential and Integral Equations*, (Constanda, C., Bach, M., Saedig, A. M., Werner, P., Hsiao, G. C., Eds), Longman, (1998), 47-51.

Castro, L. P. and Speck, F.-O., Regularity properties and generalised inverses of delta-related operators, Preprint 21/97.

Cordovil, R. and Duchet, P., Cyclic polytopes and oriented matroids.

Cordovil, R. and Etienne, G., A note on the Orlik-Solomon algebra.

Cordovil, R., The fundamental group of the complement of the complexification of a real arrangement of hyperplanes.

Costa, F. P., A finite dimensional dynamical model for gelation in coagulation processes, Preprint 4/97, to appear in *J. of Nonlinear Sci.*

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Coutinho, R. and Fernandez, B., Fronts and interfaces in bistable extended mappings, Preprint 27/97.

Duarte, P., Fernandes, R. L. and Oliva, W. M., Dynamics on the attractor of the Lotka-Volterra equations, to appear in *Journal of Differential Equations.*

Ferreira, J. M. and Pedro, A. M., Oscillations of delay difference systems, to appear in *J. Math. Anal. and Appl.*

Ferreira, J. M., Oscillations and nonoscillations in retarded functional equations, to appear in *Differential and Integral Equations.*

Freitas, P. and Lancaster, P., Optimal decay of energy for a system of linear oscillators, Preprint 24/97.

Freitas, P. and Sweers, G., Positivity results for a nonlocal elliptic equation, to appear in *Proc. Roy. Soc. Edinburgh.*

Freitas, P., Nonlocal reaction-diffusion equations.

Freitas, P., Optimizing the rate of decay of solutions of the wave equation using genetic algorithms: a counterexample to the constant damping conjecture, Preprint 19/97.

Freitas, P., Quadratic matrix polynomials with Hamiltonian spectrum and oscillatory damped systems, Preprint 16/97, to appear in *Z. Angew. Math. Phys.*

Freitas, P., The linear wave equation, Hamiltonian symmetry and the importance of being odd, to appear in *Disc. Cont. Dyn. Syst.*

Fusco, G., Oliva, W. M., Formation of symmetric structures in the dynamics of repelling particles.

Lampraia, J. P., Severino, R. and Sousa Ramos, J., Renormalizations for trimodal maps, Proceed. of the 1997 Halifax International Conference on Dif. Eq. with Apl. to Biology, Canada.

Lampreia, J. P., Severino, R. and Sousa Ramos, J., Factorizations on iterated symmetric cubic maps.

Picken, R., Knot invariants from a Kohno-Kontsevich integral for braids, Preprint 10/97.

Roch, S., Santos, P. A. and Silberman, B., Finite section method in some algebras of multiplication and convolution operators and a flip, to appear in *ZAA*.

Santos, A. M., Speck, F.-O. and Teixeira, F. S., Minimal normalization of Wiener-Hopf operators in applications, to appear in *Analysis, Numerics and Applications of Differential and Integral Equations*, (Constanda, C., Bach, M., Saendig, A. M., Werner, P., Hsiao, G. C., Eds), Longman, (1998), 189-193.

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Amado, C. and Pires, A., Uso de técnicas de reamostragem para selecção de variáveis em análise discriminante, to appear in Actas do V Congresso Anual da SPE, Curia, Portugal, 1997.

Ramalhoto, M. F. and Gomez-Corral, A., On the stationary distribution of a Markovian process arising in the theory of multiserver retrial queueing systems, to appear in *Mathematical and Computer Modelling*, Special Number on Retrial Queues.

Morais, M. and Natário, I., Improving an upper one-sided c -chart.

Morais, M. and Pacheco, A., Ordenação estocástica: Um pouco de história e aplicações, to appear in Actas do V Congresso Anual da SPE, Curia, Portugal, 1997.

Morais, M. and Pacheco, A., Two stochastic properties of one-sided exponentially weighted moving average control charts.

Morais, M., Esquemas CEWMA para o controlo simultâneo de μ e de σ^2 — Uma abordagem Markoviana, to appear in Actas do V Congresso Anual da SPE, Curia, Portugal, 1997.

Morais, M., PCV: Um velho problema revisitado estatisticamente, to appear in Actas da V Conferência do CEMAPRE, Lisbon, Portugal, 1997.

Nunes, C. and Pacheco, A., Martingalas: uma ferramenta em inferência estatística, to appear in Actas do V Congresso da SPE, 1997.

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Ramalhoto, F. M., Maintenance, reliability, risk analysis and safety, to appear in *European Journal Engineering Education*.

Ramalhoto, F. M., Stochastic modelling for quality improvement in processes, to appear in *Statistical Process Monitoring and Optimization* (Park and Vining, Eds.), Marcel Dekker.

Rodrigues, I. and Paulino, C. D. M., Avaliação comparada da susceptibilidade à cárie dentária: Uma análise de dados categorizados incompletos.

Silva, G. L. and Amaral-Turkman, M. A., Alguns resultados de modelos de fragilidade Bayesianos, to appear in Actas do V Congresso da SPE, 1997.

Soares, P. and Paulino, C. D. M., Análise Bayesiana de dados categorizados informativamente omissos: uma abordagem por simulação, to appear in Actas do V Congresso Anual da SPE, Curia, Portugal, 1997.

Applied Mathematics and Numerical Analysis

Alves, C. J. S., Inverse scattering with spherical incident waves, to appear in Proceedings of the 4th Int. Conf. on Math. and Num. Aspects of Wave Propagation.

Brinca, A. L. and Romeiras, F. J., On the stability of stationary nongyrotropic distribution functions: coupling and purely growing waves, to appear in *J. Geophys. Res.*

Graça, M. M., Formal sequence transformations for monotone sets, Preprint 25/97.

Lima, P. M. and Carpentier, M., Asymptotic expansions and numerical approximation of non-linear degenerate boundary-value problems, Preprint 17/97, to appear in *Comp. Appl. Math.*

Romeiras, F. J. and Brinca, A. L., On the stability of Bernstein modes in stationary nongyrotropic plasmas, to appear in *J. Geophys. Res.*

Sequeira, A. and Videman, J. H., Existence, uniqueness and asymptotic behaviour of viscoelastic fluids in \mathbf{R}^3 and in \mathbf{R}^3_+ , to appear in Proceedings NSE-6 Conference (Amann et al., Eds.), Palanga, Lithuania, May 1997, Preprint 20/97.

Tomé, M. F. and McKee, S., Numerical simulation of viscous flow: Buckling of planar jets, Preprint 23/97.

Tomé, M. F. et al., Numerical simulation of axisymmetric free surface flows, Preprint 22/97.

Computer Science

Carmo, J. and Jones, A., Deontic logic and contrary-to-duties in Defeasible deontic logic, to appear in the Second Edition of the Handbook of Philosophical Logic, Vol V.

Conrad, S., Ramos, J., Saake, G. and Sernadas, C., Evolving logical specification in information systems, to appear in Logic for Databases and Information Systems, (Chomicki, J. and Saake, G., Eds.), Kluwer Academic Publishers, (1997).

Dionísio, F. and Lipeck, U., Specifying with defaults: compositional semantics, to appear in Springer LNCS Series (accepted papers from WADT97: 12th Workshop on Algebraic Development Techniques).

Ehrich, H.-D., Caleiro, C., Sernadas, A. and Denker, G., Logics for specifying concurrent information systems, to appear in Logic for Databases and Information Systems, (Chomicki, J. and Saake, G., Eds.), Kluwer Academic Publishers, (1997).

Ravara, A. and Vasconcelos, V., A type algebra for concurrent objects.

Resende, P., Quantales, finite observations and strong bisimulation, Preprint 26/97.

Sernadas, A., Sernadas, C. and Caleiro, C., Fibring of logics as a categorial construction, Preprint 13/97.

2 Academic degrees awarded in 1997

2.1 Doutoramentos/PhD's

Almeida, J., Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 29.7.97. Thesis: *Ultradistribuições Temperadas e Ultradistribuições de Tipo Exponencial*. Supervisor: Francisco Viegas.

Dionísio, F., Dr. Rer. Nat., Computer Science, University of Hannover, Germany, 16.7.97. Thesis: *Composition of Hierarchic Default Specifications*. Supervisor: Udo Lippeck

Florentino, C., Ph. D. in Mathematics, State University of New York at Stony Brook, USA, August 1997. Thesis: *On Schottky Vector Bundles over Riemann Surfaces*. Supervisor: Leon Takhtajan.

Graça, M. M., Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 1997. Thesis: *The IRA Procedures and other Methods in Convergence Acceleration*. Supervisor: Claude Brezinski.

Menezes, P., Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 4.2.97. Thesis: *Reificação de Objectos Concorrentes*. Supervisor: Amílcar Sernadas.

Videman, J. H., Doutoramento em Matemática, Instituto Superior Técnico, Universidade Técnica de Lisboa, 1997. Thesis: *Mathematical Analysis of Viscoelastic Non-Newtonian Fluids*. Supervisor: Adélia Sequeira.

2.2 Mestrados/MSc's

Bernardino, R., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 4.7.97. Thesis: *Factorização numa álgebra*. Supervisor: Cristina Câmara.

Coutinho, M., J., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 17.11.97. Thesis: *Estudo Categorial do Relacionamento entre Lógicas*. Supervisor: Cristina Sernadas.

Espírito Santo, J., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 10.4.97. Thesis: *Chu e Galois: Polaridade, Conexão e Adjunção*. Supervisor: Cristina Sernadas.

Lopes, P., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 6.11.97. Thesis: *Classification of factors and ergodic relations*. Supervisor: Shingo Okamoto.

Naique, S., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 12.1.97. Thesis: *Sobre a Teoria das Hiperfunções*. Supervisor: Luísa Maria Lopes Ribeiro.

Rodrigues, I., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, March 1997. Thesis: *Implementação computacional de análises clássicas de dados categorizados incompletos*. Supervisor: Carlos Daniel Paulino.

Santos, A., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 19.11.97. Thesis: *Tópicos em multidimensional scaling*. Supervisor: João Branco.

Silvestre, A., Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, 18.3.97. Thesis: *Os espaços de ultradistribuições $U_w(\bullet)$ e $V'_w(\bullet)$* . Supervisor: Francisco Viegas.

3. Research Lectures

3.1 Lectures at Conferences, Workshops, Meetings etc.

Algebra and Mathematical Analysis

Abreu, M., Topology of symplectomorphism groups of 4-manifolds:

- PCMI summer program in symplectic geometry and topology, Park City, Utah, USA, 29.6.97 - 19.7.97.
- 1997 Clifford Conference, Tulane University, New Orleans, Louisiana, USA, 30.10.97 - 2.11.97.

Buescu, J., Reconstrução de atractores e modelos dinâmicos num sistema experimental em psicologia, 8º Colóquio de Psicologia, ISPA, Lisboa, Portugal, April 1997.

Canas da Silva, A., Spin-c quantization, AMS meeting, Oregon, April 1997.

Coutinho, R. and Fernandez, B., Patterns and fronts in bistable CML, 2º Encontro Projecto PRAXIS de Física-Matemática, Funchal, Portugal, 19.2.97 - 22.2.97.

de Sousa Dias, M. E. R., Bifurcations from relative equilibria of Hamiltonian systems, Surrey Autumn Workshop 1997, Symmetry of Hamiltonian systems, 4.9.97 - 5.9.97.

Fernandes, R. L., Dynamics of stable dissipative systems, International Conference on Differential Equations with Applications to Biology, Halifax, Canada, 25.7.97 - 29.7.97.

Fernandes, R. L., Poisson brackets on symmetric spaces, XVI Workshop on Geometric Methods in Physics, Bialowieza, Poland, 30.6.97 - 6.12.97.

Ferreira J. M., Oscillations in linear difference equations, EQUADIF IX, BRNO, Czech Republic, 25.8.97 - 29.8.97.

Freitas, P., Nonlocal reaction-diffusion equations: general review and some new results on the shadow FitzHugh-Nagumo system, International Conference on Differential Equations with Applications to Biology, Dalhousie University, Halifax, Nova Scotia, Canada, July of 1997.

Grácio, C. and Sousa Ramos, J., Symbolic dynamics and hyperbolic groups, International Conference on Dynamical Systems, Cuernavaca, México, 1997.

Oliva, W. M., Global approach for mechanical systems on a distribution, International Conference on Applied Analysis, IST, Lisbon, Portugal, 26.2.97 - 1.3.97.

Oliva, W. M., Anosov flows induced by partially hyperbolic •-geodesic flows, International Conference on Dynamical Systems, IMPA, Rio de Janeiro, Brazil, 29.7.97 - 8.8.97.

Picken, R., Topological quantum field theories for embedded manifolds, 2º Encontro Projecto PRAXIS de Física-Matemática, Madeira, Portugal, 19.2.97 - 22.2.97.

Picken, R., Projective families of smooth graphs and measures on spaces of holonomies, Workshop on Quantum Gravity and Low-dimensional Topology, Warsaw, Poland, 26.5.97 - 7.6.97.

Speck, F.-O., Normalization of some ill-posed problems in diffraction theory, Workshop on Diffraction Theory, Darmstadt, Germany, 17.7.97 - 24.7.97.

Statistics and Applications

Amado, C., Uso de técnicas de reamostragem para selecção de variáveis em análise discriminante, V Congresso Anual da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Branco, J., O fascínio de coleccionar e analisar dados estatísticos, V Congresso Anual da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Branco, J., How much one has to pay for not observing a latent variable, 10th European Meeting of the Psychometric Society, Santiago de Compostela, Spain, 15.7.97 - 18.7.97.

Morais, M., PCV: Um velho problema revisitado estatisticamente, V Conferência do CEMAPRE, Lisbon, Portugal, 26.5.97 - 28.5.97.

Morais, M. and Pacheco, A., Ordenação estocástica: Um pouco de história e aplicações, V Congresso Anual da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Nunes, C., Flowshop scheduling: some contributions, V Conferência do CEMAPRE, Lisbon, Portugal, 26.5.97 - 28.5.97.

Nunes, C. and Pacheco, A., Stability for input-output processes, École d'Été de Saint-Flour, France, 4.7.97 - 23.7.98.

Nunes, C. and Pacheco, A., Martingalas: uma ferramenta em inferência estatística, V Congresso Anual da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Paulino, C. D. M., Analysis of incomplete categorical data, 42nd. Annual Meeting of Brazilian Region of Biometry International Society, Recife, Brazil, 10.7.97.

Paulino, C. D. M., Linear regression in categorical data by maximum likelihood, Fifth School of Regression Models, Campos do Jordão, Brazil, 26.2.97 - 28.2.97.

Pires, A. M., Brandão, A. and Portugal, J., Agrupamentos de Concelhos de Portugal Continental e sua caracterização, JOCLAD 97, V Jornadas de Classificação e Análise de Dados, Porto, Portugal, 4.12.97 - 6.12.97.

Pires, A. M., Brandão, A. and Portugal, J., Construção de perfis sócio-económicos de Portugal Continental, V Congresso Anual da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Ramalhoto, M. F., A framework approach to queueing systems issues in maintenance management, European Workshop and Round Table on Maintenance Management, Lisbon, Portugal, 15.6.97 - 17.6.97.

Ramalhoto, M. F., Control charts and their links to some maintenance schemes, 18th IFIP Conference on Mathematical Modeling, Detroit, USA, 22.7.97 - 25.7.97.

Ramalhoto, M. F. and Gomez-Corral, A., Some retrial queue graphs useful in maintenance management, European Workshop and Round Table on Maintenance Management, Lisbon, Portugal, 15.6.97 - 17.6.97.

Rodrigues, I., Análise por mínimos quadrados generalizados de dados categorizados incompletos, V Congresso Anual da SPE, Curia, Portugal, 11.7.97 - 14.7.97.

Rodrigues, I., Avaliação comparada da susceptibilidade à cárie dentária: uma análise de dados categorizados incompletos, V Congresso Anual da SPE, Curia, Portugal, 11.7.97 - 14.7.97.

Silva, G. L., Alguns resultados de modelos de fragilidade Bayesianos, V Congresso da SPE, Curia, Portugal, 11.6.97 - 14.6.97.

Silva, G. L., Bayesian analysis of additive frailty models. Practical Bayesian Statistics 4, R.S.S. 97 Conference, Nottingham, England, 14.7.97 - 18.7.97.

Soares, P., Análise Bayesiana de dados categorizados incompletos, V Congresso Anual da SPE, Curia, Portugal, 11.7.97 - 14.7.97.

Soares, P., Bayesian analysis of incomplete categorical data, Royal Statistical Society 1997 Conference, Nottingham, UK, 15.7.98 - 18.7.98.

Applied Mathematics and Numerical Analysis

Alves, C. and Ha-Duong, T., On inverse scattering by screens, Sommerfeld 96 Workshop, Freudenstadt, Germany, October 1996.

Diogo, T. and Lima, P., Numerical methods and asymptotic expansions for a class of Volterra integral equations with weakly singular kernel, XX CNMAC, Gramado RS, Brazil, 8.9.97 - 12.9.97.

Lima, P. M., Asymptotic expansions and numerical approximation of non-linear degenerate boundary-value problems:

- EQUADIFF IX, BRNO, Czech Republic, 25.8.97 - 29.8.97.
- II Panamerican Workshop of Computational and Applied Mathematics, Gramado, Brazil, 8.9.97 - 12.9.97.

Sequeira, A., A decoupled FEM approach for the simulation of steady flows of second grade fluids, International Workshop on Stability in Fluid Dynamics, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 10.8.97 - 16.8.97.

Sequeira, A., Numerical approximations of viscoelastic fluid models, Sixth International Conference on Navier-Stokes Equations and Related Nonlinear Problems, Palanga, Lithuania, 22.5.97 - 29.5.97.

Tomé, M. F., Numerical simulation of axisymmetric free surface flows, International Conference on Applied Analysis, Lisbon, Portugal, 26.2.97 - 1.3.97.

Tomé, M. F., Numerical simulation of three-dimensional free surface flows, II Panamerican Workshop of Computational and Applied Mathematics, Gramado, RS, Brazil, 8.9.97 - 12.9.97.

Videman, J. H., Mathematical results on viscoelastic fluids, Sixth International Conference on Navier-Stokes Equations and Related Nonlinear Problems, Palanga, Lituânia, 22.5.97 - 29.5.97.

Computer Science

Caleiro, C., Synchronization of logics with mixed rules: Completeness preservation, AMAST'97-6th International Conference on Algebraic Methodology and Software Technology, Macquarie University, Sydney, Australia, 13.12.97 - 17.12.97.

Caleiro, C., Canonical operational semantics of temporal specifications, FIREworks General Meeting 1, FUNDP, Namur, Belgium, 23.5.97 - 24.5.97.

Caleiro, C., Temporal specification of distributed systems: The power of event calling, ASPIRE General Meeting 1, TUBS, Braunschweig, Germany, 21.2.97 - 22.2.97.

Coutinho, M.-J., Relating logic systems, 1st Joint Subgroup Meeting of the ESPRIT IV Working Group 22704 ASPIRE, Lisbon, Portugal, 19.9.97 - 20.9.97.

Dionísio, F., Specifying with defaults: compositional semantics, 12th WADT Workshop on Algebraic Development Techniques, Tarquinia, Italy, 3.6.97 - 7.6.97.

Mateus, P., Compositional model checking: a categorial approach, 1st Joint Subgroup Meeting of the ESPRIT IV Working Group 22704 ASPIRE, Lisbon, Portugal, 19.9.97 - 20.9.97.

Ramos, J., Object situation and state calculus, 1st Joint Subgroup Meeting of the ESPRIT IV Working Group 22704 ASPIRE, Lisbon, Portugal, 19.9.97 - 20.9.97.

Ramos, J., The situation and state calculus, ESSLLI'97 (9th European Summer School in Logic, Language and Information), Aix-en-Provence, France, 11.8.97 - 22.8.97.

Ramos, J., Situation and state calculus, LogComp Meeting, Instituto Superior Técnico, Lisbon,

Portugal, 12.6.97.

Ramos, J., Situation and state calculus, ASPIRE General Meeting 1, TUBS, Braunschweig, Germany, 21.2.97 - 22.2.97.

Ravara, A., Behavioural types for a calculus of concurrent objects:

- 1st Joint Subgroup Meeting of the ESPRIT IV Working Group 22704 ASPIRE, Lisbon, Portugal, 19.9.97 - 20.9.97.
- 3rd Euro-Par Conference, Passau, Germany, 26.8.97 - 29.8.97.

Sernadas, A., Synchronization of Logics, FIREworks General Meeting 1, FUNDP, Namur, Belgium, 23.5.97 - 24.5.97.

Sernadas, C. and Sernadas, A., Advanced course on categorical techniques for combining logics, ESSLLI'97 (9th European Summer School in Logic, Language and Information), Aix-en-Provence, France, 11.8.97 - 22.8.97.

Sernadas, C., Combinação algébrica de lógicas (course), Escola de Verão em Fundamentos Matemáticos da Computação, CIM, Observatório Astronómico da Universidade de Coimbra, Coimbra, Portugal, 8.9.97 - 11.9.97.

3.2 Invited lectures

Algebra and Mathematical Analysis

Abreu, M., Geometria de Kähler de variedades tóricas e métricas extremas, Seminário de Geometria do CMAF, Universidade de Lisboa, Lisbon, Portugal, July 1997.

Abreu, M., Topology of symplectomorphism groups of $S^2 \times S^2$, Differential Geometry Seminar, Brown University, Providence, Rhode Island, USA, April 1997.

Barreira, L., Dimensão de medidas hiperbólicas e a conjectura de Eckmann-Ruelle, IMPA, Rio de Janeiro, Brazil, February 1997.

Barreira, L., Dimensão de medidas hiperbólicas, Seminário das Equações de Evolução, IME, Universidade de São Paulo, São Paulo, Brazil, February -March 1997.

Barreira, L., Conjuntos com medida nula e dimensão de Hausdorff máxima, Colóquio, IME, Universidade de São Paulo, Brazil, February -March 1997.

Barreira, L., A non-additive thermodynamic formalism, Centre de Physique Théorique, Marseilles, France, April 1997.

Barreira, L., A non-additive thermodynamic formalism, Centre de Physique Théorique, Marseilles, France, April 1997.

Barreira, L., Invariant sets with zero measure and full Hausdorff dimension, Minicourse and Workshop on Recent Advances in Hyperbolic Dynamics, ETH, Zurich, Switzerland, 20.5.97 - 23.5.97.

Buescu, J., Bacias emaranhadas, Seminário de Sistemas Dinâmicos, Faculdade de Ciências do Porto, January 1997.

Buescu, J., Conjuntos ω - limite em aplicações do intervalo, Seminário de Sistemas Dinâmicos, Faculdade de Ciências do Porto, December 1997.

Canas da Silva, A., Folding symplectic manifolds:

- Hebrew University, Jerusalem, Israel, December 1997.
- University of California, Berkeley, USA, November 1997.
- Institute for Advanced Study, Princeton, May 1997.
- University of California, Santa Barbara, USA, March 1997.
- Mathematical Sciences Research Institute, Berkeley, USA, February 1997.

Cordovil, R., Sur l'algèbre des indépendants d'un matroïde, Université Paris 6, France, July 1997.

Duarte, P., A conservative Lotka-Volterra model with positive topological entropy, Kungliga Tekniska Högskolan, Stockholm, Sweden, 10.9.98.

Fernandes, R. L., Integrability and periodic orbits, Dia de Física-Matemática, Universidade de Coimbra, Portugal, October 1997.

Fernandes, R. L., Dinâmica de sistemas de Lotka-Volterra, Centro de Matemática Aplicada da Universidade do Porto, Portugal, April 97.

Campos Ferreira, J., José Sebastião e Silva - Testemunho de um discípulo, Departamento de Matemática, Faculdade de Ciências de Lisboa, Torre do Tombo, Lisbon, Portugal, 12.12.97.

Florentino, C., Fibrados vectoriais de Schottky sobre superfícies de Riemann, CMAF, Lisbon, Portugal, 18.11.97.

Freitas, P., Quadratic pencils and stability:

- Department of Mathematics and Statistics, University of Calgary, Canada, July 1997.
- Department of Mathematics, Kungl Tekniska Högskolan, Stockholm, Sweden, August 1997.

Girão, P., The crystalline algorithm for motion by curvature, Mathematics and Mechanics Institute for Applied Mathematics (IIMAS) at the University of Mexico, Mexico City, August 1997.

Loureiro, C., Veloso, G. and Sousa Ramos, J., O que é e o porquê da matemática discreta, Encontro de Professores de Matemática – APM, PROFMAT97, Figueira da Foz, Portugal, November 1997.

Oliva, W. M., D, Dynamics on the attractor of the Lotka-Volterra equations, IME-USP, São Paulo, Brazil, April 1997.

Pinto, J. T., Variedades de “Slow Motion” para equações de reacção e difusão, IMSC, Universidade de São Paulo, São Carlos, Brazil, 1997.

Pinto, J. T., Variedades invariantes associadas a problemas de perturbação singular, IMSC, Universidade de São Paulo, São Carlos, Brazil, February, 1997.

Rocha, C., Fluxos de Morse-Smale e semigrupos que preservam estruturas de ordem, Seminário de Equações Diferenciais e com Derivadas Parciais, Universidade da Beira Interior, Covilhã, Portugal, 18.10.97.

Rocha, C., Realization of meander permutations by boundary value problems and attractors for reaction-diffusion equations, Large Time Behavior in Dynamical Systems: Analysis and Numerics, Mathematisches Forschungsinstitut Oberwolfach, Germany, 28.7.97.

Rocha, C., Attractors for reaction-diffusion equations and meander permutations, Università di L'Áquila, Italy, 15.4.97.

Rocha, C., Meander permutations and reaction-diffusion equations, Università di Roma II, Torvergata, Italy, 11.4.97.

Rocha, C., Meander permutations and boundary value problems, International Conference on Applied Analysis, IST, Lisbon, Portugal, 27.2.97.

Santos, A. M., Minimal normalization of Wiener-Hopf operators in applications, Technische Hochschule Darmstadt, Fachbereich Mathematik Darmstadt, Germany, 11.3.97.

Severino, R. and Sousa Ramos, J., Algebraic invariants for bimodal dynamical systems, Algebra, Geometry and Combinatorics, Braga, Portugal, 20.6.97.

Severino, R. and Sousa Ramos, J., Algebraic and topological invariants of 0-1 matrices, On Integral Matrices, Centro de Álgebra da Universidade de Lisboa, Lisbon, Portugal, 12.7.97.

Speck, F.-O., Normalisierung einiger schlecht gestellter Probleme der Beugungstheorie,

Freiberg, Germany, 25.7.97.

Sousa Ramos, J., Dinâmicas dos fluxos de informação, Palestras de Matemática, CMAF. Univ. Lisboa, Lisbon, Portugal, 20.2.97.

Sousa Ramos, J., A matemática experimental, Forum Ciência Viva, Picoas, Lisbon, Portugal, 6.6.97.

Sousa Ramos, J., O que a teoria do caos e a geometria fractal têm a dizer sobre complexidade, Ciclo de Seminários sobre s Forma, Departamento de Informática, Faculdade de Ciências da Universidade de Lisboa, Lisbon, Portugal, 24.6.97.

Statistics and Applications

Branco, J., Estatística multivariada: o problema da simplicidade e da complexidade, Faculdade de Ciências do Desporto e de Educação Física, Universidade do Porto, Portugal, 21.2.97.

Paulino, C. D. M., Analyses of Missing at Random Categorical Data, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, 29.8.97.

Paulino, C. D. M., Bayesian analysis of informatively incomplete categorical data:

- Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, 29.8.97.
- Universidade Estadual de Campinas, Campinas, Brazil, 19.8.97.
- Universidad de Valparaíso, Chile, 8.8.97.
- Pontificia Universidad Católica, Santiago do Chile, Chile, 6.8.97.
- Universidade de São Paulo, Brazil, 22.5.97.

Paulino, C. D. M., Perspectives in probability and statistics: research in categorical data, Universidade de São Paulo, Brazil, 27.5.97.

Paulino, C. D. M., Missing categorical data: Bayesian analysis and computational implementation, Universidade Federal do Rio de Janeiro, Brazil, 7.5.97.

Paulino, C. D. M. and Singer, J. M., Introduction to categorical data analysis (Short course), 42nd. Annual Meeting of Brazilian Region of Biometry International Society, Recife, Brazil, 7.7.97 - 11.7.97.

Applied Mathematics and Numerical Analysis

Alves, C. J. S., Détection de fissures élastiques, Université de Technologie de Compiègne, France, 28.10.97.

Graça, M. M., Formal sequence transformations for monotone sets, Departamento de Matemática Aplicada, Universidade do Porto, Portugal, 27.11.97.

Lima, P., Métodos de extrapolação e suas aplicações, Instituto de Ciências Matemáticas de S. Carlos, Universidade de S. Paulo, Brazil, 3.9.97.

Videman, J. H., Análise matemática de fluidos viscoelásticos, Centro de Matemática e Aplicações Fundamentais, Lisbon, Portugal, 24 .7.97.

Videman, J. H., Mathematical analysis of viscoelastic fluids, Helsinki University of Technology, Finland, 22.8.97.

Computer Science

Carmo, J., Lógica deontica e obrigações contrárias ao dever, Seminário do Departamento de Informática da Faculdade de Ciências da Universidade de Lisboa, Portugal, 22.10.97.

Ramos, J., The situation and state calculus, Faculdade de Ciências da Universidade de Lisboa, Portugal, 29.10.97.

Resende, P., Sistemas tropológicos em concorrência e especificação, Faculdade de Ciências da Universidade de Lisboa, Portugal, 5.2.97.

Sernadas, C., Combinação algébrica de lógicas, Seminário do Departamento de Informática da Faculdade de Ciências da Universidade de Lisboa, Portugal, 3.12.97.

4. Guest Programme

Algebra and Mathematical Analysis

Alvarez, J. C., Université Catholique de Louvain, Belgium, 18.12.97. *Lecture:* Admissible Symplectic Forms and Hilbert's Fourth Problem.

Arrieta, J., Universidad Complutense de Madrid, Spain, 20.11.97. *Lecture:* Abstract parabolic problems with critical nonlinearities and applications to heat equations with nonlinear boundary conditions.

Barros Neto, J., Rutgers University, USA, 4.6.97 - 13.6.97. *Lecture:* Soluções fundamentais do operador de Tricomi.

Bedjaoui, N., CMAP, École Polytechnique, France, 12.6.97 - 21.6.97. *Lecture:* Stabilization of a non-hyperbolic system modeling a stratified two-phase flow. The effects of surface tension.

Bokowski, J., Technische Hochschule Darmstadt, Germany, 9.7.97. *Lecture:* Some algorithms for analysing, finding and proving geometrical theorems.

Bouchitte, G., Université de Toulon et du Var, Toulon, France, 13.11.97. *Lecture:* Shape optimization by solving Monge-Kantorovich equations.

Carr, J., Heriot-Watt University, Edinburgh, Scotland, UK, 25.5.97 - 30.5.97. *Lecture:* Solitary waves on lattices.

Carvalho, A., Universidade de São Paulo, São Carlos, Brazil, 15.11.97 - 23.11.97. *Lecture:* Attractors for parabolic problems with varying diffusion.

Castro, H. M. , IME, Universidade de São Paulo, São Paulo, Brazil, 3.3.97 - 23.3.97. *Lecture:* Fluxos em distribuições: estruturas de Poisson e conservação de volume.

Catsigeras Garcia, E., Facultad de Ingenieria de Montevideo, Uruguay, 11.7.97 - 15.7.97. *Lecture:* Persistência do atrator de Feigenbaum em famílias a um parâmetro.

Chipot, M., University of Zurich, Switzerland, 10.3.97. *Lecture:* Sharp estimates for the numerical analysis of well problems.

Cox, S., Rice University, Houston TX, USA, 12.10.97 - 17.10.97. *Lecture:* Extremal fastening of elastic bodies.

Crane, L., Kansas State University, USA, 8.7.97 - 9.7.97.

Dacorogna, B., École Polytechnique Fédérale de Lausanne, Switzerland, 22.2.97 - 28.2.97. *Lecture:* Some recent results in the vectorial calculus of variations.

Damianou, P., University of Cyprus, Cyprus, 14.2.97 - 19.2.97. *Lecture:* Transverse Poisson structures and singularities.

Enrich, H., Facultad de Ingenieria de Montevideo, Uruguay. 11.7.97 - 15.7.97. *Lecture:* Um problema de perda de simetria de um fluxo hidrodinamico helicoidal.

Feireisl, E. , Institute of Mathematics, Czech Academy of Sciences, Czech Republic, 29.11.97 - 6.12.97. *Lecture:* On the long time behaviour of solutions to the Navier-Stokes equations of compressible flows.

Fernandez, B., Centre de Physique Théorique, Luminy, France, 11.6.97 - 1.7.97. *Lecture:* On the dynamics of coupled map lattices.

Friesecke, G., ETH, Zurich, Switzerland, 10.2.97 - 21.2.97. *Lecture:* Quantum many-body systems.

Giaquinta, M., Universitat di Pisa, Italy. 10.7.97 - 24.7.97. *Lectures:* Cartesian Currents in the Calculus of Variations:

- I. Introduction. 11.7.97.
- II. Cartesian maps and Cartesian currents: Weak convergence of minors. 15.7.97.
- III. Weak diffeomorphisms and nonlinear elasticity. 16.7.97.
- IV. A homological theory of the Dirichlet integral. 17.7.97.

Greenberg, J., Carnegie Mellon University, USA. 30.6.97 - 12.7.97. *Lectures:*

- Antiplane shear flows in visco-plastic solids exhibiting isotropic and kinematic hardening.
- Elastic phase transitions.

Goldin, G., Rutgers University, USA, 8.11.97 - 16.11.97. *Lectures:*

- Infinite-dimensional current algebras and quantum mechanics.
- Anyon statistics, q-commutation relations, and diffeomorphisms.

Gutierrez, C., IMPA, Brazil. 7.7.97 - 16.7.97. *Lecture:* Affine interval exchange transformations with wandering intervals.

Härterich, J., Freie Universität Berlin, Germany. 28.9.97 - 10.10.97. *Lecture:* Global attractors of viscous scalar balance laws.

Hasselblatt, B., Tufts University, USA and ETH, Zurich, Switzerland. 17.3.97 - 25.3.97. *Lecture:* Prevalence of non-Lipschitz Anosov foliations.

Johnson, C. R., College of William and Mary, Williamsburg, Virginia, USA, 12.11.97. *Lecture:* Matrix completions: the positive definite case.

Karapetiants, N. K., Rostov State University, Russia, 3.7.97. *Lecture:* Hankel operators with symbol discontinuous at infinity.

Karlovich, A., South Ukrainian Pedagogical University, Odessa, 10.7.97. *Lecture:* Singular integral operators on reflexive rearrangement - invariant spaces.

Kauffman, L., University of Illinois at Chicago, USA, 9.7.97 - 12.7.97. *Lecture:* Rope tricks and the theory of knots.

Krupnik, N., Bar-Ilan University, Israel, April 1997. *Lecture:* Banach algebras with matrix symbol (Course of 4 lectures).

Lancaster, P., University of Calgary, Canada, 12.2.97 - 24.2.97. *Lecture:* Quadratic eigenvalue problems with symmetries.

Lancaster, P., University of Calgary, Canada. 21.10.97 - 25.10.97. *Lecture:* Families of stable gyroscopic systems.

Laurençot, P., Université de Nancy I, France. 23.11.97 - 29.11.97. *Lecture:* Large time behaviour for convection-diffusion equations on \mathbb{R}^n .

Melo, W., IMPA, Brazil. 12.4.97 - 14.4.97. *Lecture:* Teoremas de rigidez em dinâmica.

Mourão, J., Departamento de Física, Instituto Superior Técnico, Lisbon, Portugal, 9.10.97. *Lecture:* Alguns aspectos de medidas em espaços de conexões.

Nelson, J., University of Torino, Italy, 26.2.97 - 1.3.97 and 19.3.97 - 23.3.97.

Ornelas, A., Universidade de Évora, Évora, Portugal and SISSA, Trieste, Italy, 27.2.97. *Lecture:* Introdução à investigação em problemas de existência de minimizadores escalares para integrais simples não-convexos.

Pego, R., University of Maryland, USA. 2.7.97 - 6.7.97. *Lecture:* Convective stability of traveling waves.

Perelomov, A., Institute of Theoretical and Experimental Physics, Moscow, Russia. 5.4.97 - 12.4.97. *Lecture:* Classical integrable systems of Calogero-Sutherland type.

Pesin, Ya., Penn State University, USA. 25.3.97 - 30.3.97. *Lecture:* Integrability and smoothness of invariant foliations for Anosov maps.

Rabinovich, V., University of Rostov on Don, Russia, 10.10.97 - 17.10.97. *Lecture:* Pseudodifferential operators and their applications to the study of singular integral operators on Carleson curves.

Rota, G. C., MIT, USA, 6.7.97 - 11.7.97. *Lectures:*

- Introduction to Geometric Probability.
- Zeros of Polynomials.

Salvetti, M., Universitat di Pisa, Pisa, Italy., 30.1.97. *Lecture:* Topology of Artin groups.

Samko, S., Universidade do Algarve, Faro, Portugal, 24.2.97 - 17.3.97 - 14.4.97. *Lecture:* Equations with involutive operators - abstract theory (3 lectures).

Santos, J., Universidade de São Paulo, Ribeirão Preto, Brazil. *Lecture:* Efeito do retardamento em equações de reacção-difusão.

Saussol, B., Centre de Physique Théorique, Luminy, France. 18.6.97 - 30.6.97. *Lecture:* A probabilistic approach to intermittency.

Schapira, P., Université Pierre et Marie Curie, Paris, France. 9.9.97. *Lecture:* Recent results on the index theorem.

Silbermann, B., Technische Universität Chemnitz, Germany. 1.9.97 - 27.9.97. *Lecture:* Pieces of non-commutative Gelfand theory and operator theory, (6 lectures).

Simon, K., University of Miskolk, Hungary. 19.10.97 - 1.11.97. *Lecture:* Hausdorff dimension for some three dimensional horseshoe.

Spitkovsky, I., College of William and Mary, Williamsburg, Virginia, USA, 8.5.97 - 15.5.97.

Lectures:

- New results in almost periodic factorization: applications of the reduction procedure, 8.5.97.
- Caratheodory - Toeplitz and Nehari problems for almost periodic matrix functions, 15.5.97.

Vilela Mendes, R., Universidade Técnica de Lisboa, Lisbon, Portugal. 27.4.97. *Lecture:* Cicatrizes de sela. Existência e aplicações.

Wegert, E., Technische Universität Freiberg, Germany, 14.3.97. *Lecture:* Nonlinear transmission problems for holomorphic functions.

Wolfersdorf, L. von, Technische Universität Freiberg, Germany, 14.3.97. *Lecture:* Identification of memory kernels and transmission problems for analytic functions.

Wrzosek, D., Warsaw University, Poland. 23.11.97 - 29.11.97. *Lecture:* Coagulation-fragmentation models with diffusion.

Applied Mathematics and Numerical Analysis

Almeida, L., École Normale Supérieure de Cachan, France, 8.6.97 - 15.6.97. *Lecture: On Ginzburg-Landau equations and superconductivity.*

Amann, H., University of Zurich-Irchel, Switzerland, 25.6.97 - 26.6.97.

Beirão da Veiga, H., University of Pisa, Italy, 13.7.97 - 20.7.97. *Lecture: O método das truncaturas aplicado às equações de Navier-Stokes.*

Beux, F., TEA, Pisa, Italy, 12.10.97 - 19.10.97.

Brezinsky, C., Université de Lille, France, 31.5.97 - 5.6.97.

Carey, G. F., Texas University at Austin, USA, 6.3.97. *Lecture: Parallel supercomputing and finite elements.*

Ferreira, P., CMAP, École Polytechnique, France, 29.6.97 - 12.7.97. *Lecture: Difraccção de ondas electromagnéticas por um meio periódico bidimensional curvo.*

Germain-Bonne, B., Université de Lille, France, 31.5.97 - 5.6.97.

Jouve, F., CMAP, École Polytechnique, France, 29.6.97 - 6.7.97. *Lecture: Optimisation de formes élastiques par homogeneisation.*

Kress, R., University of Gottingen, Germany, 20.9.97 - 27.9.97. *Lecture: Integral equation methods in inverse obstacle scattering.*

Matusu-Necasova, S., Math. Inst. of Czech Academy of Sciences, Czech Republic, 25.2.97. - 8.3.97.

Parés Madronal, C., University of Malaga, Spain, 12.7.97 - 19.7.97. *Lecture: Duality methods for nonlinear problems. Application to shallow water equations.*

Perelomov, A., Institute of Theoretical and Experimental Physics, Moscow, Russia, Departamento de Física Teórica, Universidad de Zaragoza, Spain, 7.4.97 - 11.4.97. *Lecture: Classical integrable systems of Calogero-Sutherland type.*

Pukhnachov, V., Lavrentiev Institute of Hydrodynamics, Novosibirsk, Russia, 27.11.97. *Lecture: Partially invariant solutions of the Navier-Stokes equations describing free boundary flows.*

Rajagopal, K. R., Texas A&M University, USA, 2.4.97 - 9.4.97. *Lecture: On the mechanics of inelastic behavior of solids.*

Rodrigues, J. F., CMAF, University of Lisbon, Portugal, 19.12.97. *Lecture: Asymptotic derivation of diffusion equations with a discontinuous nonlinearity and nonlocal threshold.*

Salveti, M.V., University of Pisa, Italy, 12.10.97 - 19.10.97. *Lecture:* An implicit mixed finite-volume/finite-element formulation for the numerical simulation of reactive viscous flows.

Schonbek, M., University of California at Santa Cruz, USA, 21.6.97 - 1.7.97. *Lecture:* Pointwise and total variation decay of some fluid equations.

Simader, Ch. - University of Bayreuth, Germany, 25.2.97 - 4.3.97. *Lecture:* A new observation concerning the pressure term in Stokes system.

Simader, Ch., University of Bayreuth, Germany, 26.10.97 - 2.11.97. *Lecture:* Remarks on the pressure term in Stokes system.

Ziegler, T., University of Bayreuth, Germany, 26.10.97 - 2.11.97. *Lecture:* The weak Dirichlet and Neumann problem for the Laplacian in L^q in an infinite cylinder.

Computer Science

Miller, R., Queen Mary and Westfield College, London, U.K., 3.3.97 - 7.3.97. *Lecture:* A case study in reasoning about actions and continuous change.

Ehrich, H.-D., University of Braunschweig, Germany, 15.9.97 - 20.9.97.

Saake, G., University of Magdeburg, Germany, 15.9.97 - 20.9.97.

Schobbens, P.-Y., University of Namur, Belgium, 1.9.97 - 21.1.98. *Lecture:* A two-level temporal logic for evolving specifications, 10.10.97.

Pinto, L., Universidade do Minho, Portugal, 31.1.97. *Lecture:* Derivações canónicas em cálculo de sequentes intuicionista.

Andrade, L., Caixa SI, Portugal, 7.2.97. *Lecture:* Abordagem OMTX.

Honda, K., University of Edinburgh, U.K., 14.2.97. *Lecture:* Processes: An elementary approach.

Almada, T., Universidade de Lisboa, Portugal, 9.5.97. *Lecture:* Introdução às categorias extensivas.

Picado, J., Universidade de Coimbra, Portugal, 20.6.97. *Lecture:* Topologia sem pontos.

Clementino, M. M., Universidade de Coimbra, Portugal, 27.6.97. *Lecture:* Operadores de fecho.

Ferreirim, I., Universidade de Lisboa, Portugal, 11.7.97. *Lecture:* Modelos algébricos de (algumas) lógicas multivaluadas.

5. Post-Doc's

Algebra and Mathematical Analysis

Jair Santos, Universidade de São Paulo, Ribeirão Preto, Brazil, Center for Mathematical Analysis, Geometry, and Dynamical Systems, Research work with Waldyr Oliva.

Statistics and Applications

Gomez-Corral, A., Universidad Complutense de Madrid, Spain, 1.1.97 - 30.9.97, Research work with M. F. Ramalhoto.

6. Research Programmes and Sponsorship

6.1 Research Units

Several members of the Department participate in research units that receive grants under the "Programa de Financiamento Plurianual de Unidades de I&D", JNICT:

- Center for Applied Mathematics, n° 82/96, coordinated by A. Ferreira dos Santos.
- Center for Mathematical Analysis, Dynamical Systems and Applications, n° 89/96, coordinated by L. T. Magalhães until July 1997 and by C. Rocha since August 1997.
- Institute of Systems and Robotics at Lisbon, n° 101/96, coordinated by J. Sentieiro (Department of Electrical Engineering and Computers)
- Center for Plasma Physics, n° 90 B/96, coordinated by José Tito Mendonça (Complexo Interdisciplinar)
- Research Unit for Naval Engineering and Technology, n° 134/96, coordinated by Carlos Guedes Soares (Section of Naval Engineering)

6.2 Research Projects Coordinated by Department Members

Barreira, L., Portuguese coordinator of the following programmes:

- Dimension Theory, Multifractal Analysis and Rigidity, and Applications to Dynamical Systems and Ergodic Theory, Acção Integrada Luso-Alemã A-10/98, CRUP.
- Topics in Dynamical Systems, Dimension Theory, and Multifractal Rigidity, CRG 970161, Collaborative Research Grant Programme, NATO.

Canas da Silva, A., Coordinated the research project:

- Geometria e Topologia de Espacos Quociente, Project PRAXIS XXI, October 1997, PRAXIS/PCEX/P/MAT/44/96.

Cordovil, R., Coordinated the research project:

- Variedades Diferenciais Combinatoriais e Discretas, PRAXIS/PCEX/P/MAT/39/96.

Costa, F. P., Coordinated the research project:

- Transições de Fase e Equações Diferenciais Parciais, PBIC/C/MAT/2139/95, (1996-98).

Fernandes, R. L., Coordinated the research project:

- Geometric and Topological Methods in Hamiltonian Dynamical Systems and Ergodic Theory, PBIC/C/MAT/2140/95, FCT, (1996-98).

Freitas, P., Coordinated the research project:

- Teoria Qualitativa de Equações Funcionais e Sistemas de Equações Funcionais e Sistemas de Equações às Derivadas Parciais, PRAXIS PCEX/P/MAT/36/96.

Ramalhoto, M. F., Coordinated the projects:

- Decision Support for Maintenance Management and Quality Control - Human Capital Mobility Research Project Network, CHRX-CT-93/0294, (1993-97).
- Advances in Retrieval Queueing Theory - INTAS 96-0828, (1997-2000).

Rocha, C., Coordinated the research project:

- Análise Não-Linear e Sistemas Dinâmicos, PRAXIS XXI 2/2.1/MAT/199/94.

Sequeira, A., Coordinated the following projects:

- Mathematical Analysis and Numerical Solution of non-Newtonian Fluids with Applications in Liquid-Crystalline Polymers Technology, PRAXIS XXI-2/2.1/MAT/380/94.
- Navier-Stokes Equations in Domains with non-Compact Boundaries, in collaboration with the University of Bayreuth, Germany, CRUP/DAAD.
- Mathematical and Numerical Analysis of Nonlinear Problems in Mechanics and Physics, in collaboration with CMAP - École Polytechnique, JNICT/CNRS.

Sernadas, A., Coordinated the following projects:

- SitCalc: Situation Calculus - Modularization, Reification and Distribution, PRAXIS XXI Project 2/2.1/MAT/262/94, (1996-98). This project aims at establishing the situation calculus (SC) as an alternative to temporal logic for specifying concurrent reactive systems, namely: definition of the logic structure underlying the SC; development of the correspondence theory with respect to first order logic and to temporal logic; extension of SC with modularization, reification and distribution constructs (ESC); semantics of the language GNOME over ESC; ESC theorem prover over ISABELLE and/or MATHEMATICA.
- ACL: Algebraic Combination of Logics, PRAXIS XXI Project PCEX/P/MAT/46/96, (1997-99). The action is aimed at the development of the categorial theory of the combination of logics, namely: categorial foundations (theory of descent, closure operators, locales, constructions for institutions); combination of logics and theories (institutions, fibring, combinations as categorial constructions, computability issues, preservation of properties); applications (modal and temporal logics, concurrency models, compositionality in parallel program design languages)

Speck, F.-O., Coordinated the following projects:

- Singular Operators - New Features and Applications, in collaboration with the Technische Hochschule Darmstadt, JNICT and BMFT (the Federal Minister for Research and Technology in Germany), (1995-98).

- Spline-Galerkin Methods for Integral Equations of Wiener-Hopf Type, in collaboration with the Technische Universität Zwickau, Chemnitz, JNICT and BMFT (the Federal Minister for Research and Technology in Germany), (1995-98).

Sousa Ramos, J., Coordinated the following projects:

- Métodos Geométricos e Topológicos em Baixa Dimensão e em Dimensão Infinita. PRAXIS XXI - 2/2.1/MAT/132/94
- Ensino Experimental da Matemática, Project Ciência Viva IN.P030.

6.3 Participation in Other Research Projects

Carmo, J.

- Society of Animated and Responsible Agents, PRAXIS XXI Project 2/2.1/TIT/1662/95 - SARA.
- Modeling of Agents and Organizations, JNICT Project PCSH/C/OGE/1038/95 - MAGO.
- ModelAge A Common Formal Model of Cooperating Intelligent Agents" (ended in March 1997), ESPRIT-III BRA.

Romeiras, F. J.

- Plasmas Espaciais não Girotrópicos, PRAXIS XXI Project 2/2.1/FIS/435/94 (Coordinated by Brinaca, A. L., DEEC, IST)

Sernadas, A., Sernadas, C.

- Advanced Modeling and SPecification of Distributed InfoRmation SystEms, ESPRIT IV Working Group 22704 ASPIRE.
- Feature Integration in Requirements Engineering, ESPRIT IV Working Group 23531 FIREworks.

Sernadas, A., Sernadas, C., Resende, P., Gouveia, P., Ravara, A.

- LOGic and COMPUtation, PRAXIS XXI Project 2/2.1/TIT/1658/95 LogComp.

Some members of the Department also received research funding through projects coordinated outside the Department:

- Astrophysics and Gravitational Interaction Physics, ESO, coordinated by A. B. Henriques (Department of Physics, IST), project PESO/PRO/1009/93.
- Mathematical Physics, JNICT - Programa Base/PRAXIS XXI, coordinated by A. Cruzeiro (Department of Mathematics, Faculdade de Ciências, Universidade de Lisboa), project PBIC/CEN/1631/93.

7. Organization of Conferences, Meetings, etc.

Almeida, P., Organizer of the Conference on Recent Results in Noncommutative Geometry, IST, Lisbon, Portugal, 11.9.97 - 13/9/97.

Almeida, P. Organizer of the Summer School on Noncommutative Geometry and Applications, Monsaraz, Portugal, 1.9.97 - 10.9.97.

Branco, J., Chairman of the V Congresso da Sociedade Portuguesa de Estatística, Curia, Portugal, 11.7.97 - 14.7.97.

Matias, J., Organizer of the International Summer School on Mathematical Methods in Material Sciences and Engineering - "Variational Methods in Nonlinear Elasticity" CIM, Coimbra, Portugal, 23.8.97 - 6.9.97.

Picken, R., Member of Organizing Committee, VIth Oporto Meeting on Geometry, Topology and Physics, Oporto, Portugal, 4.7.97 - 7.7.97.

Pires, A. M., Chairman of the the Session on "Caracterização e Detecção de Outliers", V Congresso Anual da Sociedade Portuguesa de Estatística, Curia, Portugal, 11.6.97 - 14.6.97.

Ramalhoto, M. F., Chairman of the Program and Organizing Committee, European Workshop and Round Table on Maintenance Management, IST, Lisbon, Portugal, 15.6.97 - 17.6.97.

Ramalhoto, M. F., Member of the Technical Program Committee and Organizer and co-Chairman of the Session Reliability and Stochastic Process Control, ESREL'97 International Conference on Safety and Reliability, Gulbenkian, Lisbon, Portugal, 17.6.97 - 20.6.97.

Sequeira, A., Chairman of the Organizing Committee of the International Conference on Applied Analysis, IST, Lisbon, Portugal, 26.2.97 - 1.3.97.

Sernadas, A., 1st Joint Subgroup Meeting of the ESPRIT IV Working Group 22704 ASPIRE, Lisbon, Portugal, 19.9.97 - 20.9.97.

Speck, F.-O., Organizer of the Workshop on Operator Factorization and Applications, Lisbon, Portugal, 12.2.97 - 13.2.97.

Videman, J. H., Member of the Organizing Committee of the International Conference on Applied Analysis, Lisbon, Portugal, 26.2.97 - 1.3.97.

8. Personal Notes

A Honours and Prizes

Morais, M.:

- Received the "Best Poster SPE-97 Award" with the poster entitled "Cartas MEWMA para o controlo simultâneo de μ e de σ^2 ", V Congresso Anual da SPE, Curia, Portugal.
- Treasurer of the Portuguese Statistical Society.

B New Professors and Promotions

Abreu, M., Professor Auxiliar.

Almeida, J., Professor Auxiliar.

Canas da Silva, A., Professora Auxiliar.

Cordovil, R., Investigador Coordenador, Universidade Técnica de Lisboa.

Graça, M. M., Professor Auxiliar.

Moura, M., Professora Auxiliar.

Videman, J., Professor Auxiliar.

C Other Degrees Supervised by Members of the Department

Branco, J., Supervisor of the Master thesis, "Análise de Medições Repetidas: Diferentes Estruturas de Covariância", (Polidoro, M. J. F. P.), Faculdade de Ciências, Universidade de Lisboa, Portugal, 14.1.97.

Tomé, M. F., Supervisor of the Master thesis, "Simulação Numérica de Escoamentos Axissimétricos não-Newtonianos", (Luciane Grossi), ICMSC-USP Campus de São Carlos, Brazil, 22.11.97.

D Other Notes

Barreira, L.:

- Departmental Coordinator of the SOCRATES Programme.

Buescu, J.:

- Author and Publisher of the Section of Problems of "Boletim da S P M".
- Author and Publisher of the Section Science of "Ingenium, Revista da Ordem dos Engenheiros".

Canas da Silva, A., Co-organizer of the seminar on Symplectic Geometry, University of California, Berkeley, USA, August-December 1997.

Magalhães, L. T., President of the Fundação para a Ciência e Tecnologia, under appointment of the Minister of Science and Technology, Portugal.

Pacheco, A., Member of the Organizing Committee of VI Congresso Anual da S. P. E., to be held in Tomar, Portugal, June 1998.

Paulino, D.:

- Visiting Professor:
Universidade de São Paulo, Brazil, January - July 1997.
Pontificia Universidad Católica, Santiago de Chile, Chile, 4.8.97 - 9.8.97.
Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, 27.8.97 - 29.8.97.
- President of the Organizing Committee of VI Congresso Anual da S.P.E., to be held in Tomar, Portugal, 9.6.98 - 12.6.98.

Picken, R., Member of the organizing committee of the VIIth Oporto Meeting on Geometry, Topology and Physics to be held in Oporto, Portugal, 5.6.98 - 8.6.98, and of Recent Developments in Algebraic Topology to be held in Faro, Portugal, 13.7.98.

Ramalhoto, M. F.:

- Course Assessor, Open University, UK, 1998.
- Nominated Member of the New York Academy of Sciences, November 1997.

Rocha, C.:

- President of the Mathematics Department.
- Coordinator of the Center for Mathematical Analysis, Geometry and Dynamical Systems.
- Member of the Consultive Committee for the Editorial Board of *Portugaliae Mathematica*.
- Coordinator of the project Mathematics Laboratory - a space for research and experimentation (Ciência Viva PII-093).
- Member of the Scientific Committee of the IIIème Congrès de Mécanique, Société Marocaine des Sciences Mécaniques, Tétouan, Morocco, 22.4.97 - 25.4.97.

PREPRINT SERIES**1997**

- 1/97 FREITAS, P.; SWEERS, G.: Positivity Results for a Nonlocal Elliptic Equation. 19 pp.
- 2/97 FERNANDES, Rui L. ; SANTOS, João P.: Integrability of the Periodic KM System. 9pp.
- 3/97 FERNANDES, Rui L. ; OLIVA, Waldyr M.: Dynamics on the Attractor of the Lotka-Volterra. 16pp.
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- 12/97 KARLOVICH, A. Yu.: Singular Integral Operators with Piecewise Continuous Coefficients in Reflexive Rearrangement-Invariant Spaces. 46pp.
- 13/97 SERNADAS, A.; SERNADAS, C.; CALEIRO, C.: Fibring of Logics as a Categorical Construction. 34pp.
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- 18/97 KARAPETIANTS, N.K.; SAMKO, S.G.: On Fredholm Properties of a Class of Hankel Operators. 28pp.
- 19/97 FREITAS, P.: Optimizing the Rate of Decay of Solutions of the Wave Equation Using Genetic Algorithms: a Counterexample to the Constant Damping Conjecture. 12pp.
- 20/97 SEQUEIRA, Adélia; VIDEMAN, Juha H.: Existence, Uniqueness and Asymptotic Behaviour of Viscoelastic Fluids in \mathbf{R}^3 and in \mathbf{R}_+^3 . 14pp.
- 21/97 CASTRO, L.P.; SPECK, F.-O: Regularity Properties and Generalized Inverses of Delta-related Operators. 20pp.
- 22/97 TOMÉ, Murilo F.; MCKEE, Sean: Numerical Simulation of Viscous Flow: Buckling of Planar Jets. 18pp.
- 23/97 TOMÉ, Murilo F., et al: Numerical Simulation of Axisymmetric Free Surface Flows. 25pp.
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- 28/97 CORREIA, Joaquim M. C.; LEFLOCH, Philippe G.: Nonlinear Diffusive-Dispersive Limits for Multidimensional Conservations laws. 16pp.
- 29/97 BÖTTCHER, A.; KARLOVICH, Yu. I.; RABINOVICH, V. S.: The Method of Limit Operators for One-Dimensional Singular Integrals with Slowly Oscillating Data. 25pp.

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