Center for Mathematical Analysis,
Geometry, and Dynamical Systems

Report 2006

April 2007

Contents

1 Visitors

The following researchers visited the Center in 2006:

R. Abgrall, Univ. Bordeaux 1, France, 23–29.07.06.

P. Aguiar, Instituto Superior Técnico, Portugal, 5.05.06.

K. Ammar, Freie Univ. Berlin, Germany, 23–29.07.06.

P. del Angel, Centro de Investigación en Matemáticas, Mexico, 28.11–1.12.06.

J. Babadjian, Scuola Internazionale Superiore di Studi Avanzati, Italy, 4–9.09.06.

F. Balibrea, Univ. Murcia, Spain, 27–30.11.06.

M. Barchiesi, Scuola Internazionale Superiore di Studi Avanzati, Italy, 4–9.09.06.

M. Bardi, Univ. Padova, Italy, 24–28.07.06.

R. Barros, Univ. Aix-Marseille III, France, 29.11.06.

A. Barroso, Univ. Lisboa, Portugal, 4–9.09.06.

A. Bas, Univ. Murcia, Spain, 27–30.11.2006.

A. Bernardino, Instituto Superior Técnico, Portugal, 7.12.06.

J. Bioucas, Instituto Superior Técnico, Portugal, 14.07.06.

A. Braides, Univ. Studi di Roma Tor Vergata, Italy, 1–9.09.06.

F. Boca, Univ. Illinois, Urbana-Champaign, USA, 31.08–5-09.06.

F. Cagnetti, Scuola Internazionale Superiore di Studi Avanzati, Italy, 1–2.09.06.

F. Camilli, Univ. l'Aquila, Italy, 28.01–4.02.06.

P. Cannarsa, Univ. Studi di Roma Tor Vergata, Italy, 24–28.07.06.

P. Cardaliaguet, Univ. Bretagne Occidentale, Brest, France, 24–28.07.06.

A. Carvalho, Univ. São Paulo, São Carlos, Brazil, 27–29.11.06.

C. Carvalho, Instituto Superior Técnico, Portugal, 12.01.06, 15.03.06.

F. Chalub, Univ. Nova de Lisboa, Portugal, 5.05.06.

C. Ciliberto, Univ. Studi di Roma Tor Vergata, Italy, 31.01–2.02.06.

S. Conti, Univ. Duisburg-Essen, Germany, 31.08–01.09.06.

M. Crainic, Utrecht Univ., The Netherlands, 28.08–8.09.06.

I. Cruz, Univ. Porto, Portugal, 8–12.05.06.

B. Dacorogna, École Polytechnique Fédérale de Lausanne, Switzerland, 3–10.09.06.

C. Dafermos, Brown Univ., USA, 14–21.01.06.

F. Da Lio, Univ. Torino, Italy, 23–28.07.06.

P. Damianou, Univ. Cyprus, Cyprus, 11–19.02.06.

J. Darbon, École Nationale Supérieure de Télécommunications, France, 27.1.06.

S. Darmatti, Univ. Paul Sabatier, Toulouse, France, 23–29.07.06.

A. Davini, Univ. Padova, Italy, 23–29.07.06.

A. Demianov, Scuola Internazionale Superiore di Studi Avanzati, Italy, 4–9.09.06.

C. Dolcetta, Univ. Roma La Sapienza, Italy, 23–29.07.06.

I. Dolgachev, Univ. Michigan, USA, 15–19.05.06.

F. Dragoni, Univ. Roma La Sapienza, Italy, 22–28.07.06.

S. Dwivedi, Darmstadt Univ. Technology, Germany, 23–29.07.06, 3–10.09.06.

M. Edmundo, Univ. Aberta, Portugal, 7.12.06.

M. Efendiev, Technische Univ. München, Germany, 10–15.09.06.

S. Elaydi, Trinity University, San Antonio, USA, 11–17.06.06.

D. Evans, Univ. Wales, Cardiff, UK, 31.08–2.09.06.

R. Exel, Univ. Federal de Santa Catarina, Brazil, 15.11.06.

M. Falcone, Univ. Roma La Sapienza, Italy, 24–28.07.06.

A. Fathi, École Normale Supérieure de Lyon, France, 24–28.07.06.

R. Ferreira, Instituto de Sistemas e Robótica, Portugal, 3.03.06.

I. Fonseca, Carnegie Mellon Univ., USA, 2–9.09.06.

N. Forcadel, Centre d'Enseignement et de Recherche en Mathématiques et Calcul Scientifique, France, 23–29.07.06.

D. Forge, Univ. Paris Sud, France, 23–29.03.06.

N. Fusco, Univ. Studi di Napoli Federico II, Italy, 2–10.09.06.

A. Garroni, Univ. Roma La Sapienza, Italy, 30.08–10.09.06.

J. Gaspar, Instituto Superior Técnico, Portugal, 7.12.06.

G. Gomes, Instituto Gulbenkian de Ciência, Portugal, 21.02.06.

J. Gomes, Centro de Matemática e Aplicações Fundamentais, Portugal, 17.10.06.

M. Gotay, Univ. Hawai, Manoa, USA, 9–13.10.06.

S. Hollander, Hebrew Univ. Jerusalem, Israel, 7–25.04.06, 26–30.06.06.

J. Hausmann, Univ. Geneva, Switzerland, 17–21.09.06.

J. Harper, Univ. Rochester, USA, 21–24.06.06.

A. Helemskii, Moscow State Univ., Russia, 16–31.10.06.

R. Hric, Univ. Paris XIII, France, 12–29.10.06.

H. Ishii, Waseda Univ., Japan, 24–28.07.06.

D. Jefferson, IPA Energy Institute, Edinburgh, UK, 20–26.11.06.

L. Kauffman, Univ. Illinois, Chicago, USA, 31.05–10.06.06.

M. Khovanov, Columbia Univ., New York, USA, 30.03–2.04.06.

N. Kitchloo, Univ. California, San Diego, USA, 16.06–5.07.06.

J. Kristensen, Univ. Oxford, UK, 31.08–2.09.06.

S. Lawton, Univ. Maryland, USA, 4–13.06.06.

O. Ley, Univ. Tours, France, 24–28.07.06.

F. Linares, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 24–28.07.06.

A. Linero, Univ. Murcia, Spain, 27–30.11.06.

J. Llibre, Univ. Autònoma de Barcelona, Spain, 13–24.11.06.

P. Loreti, Univ. Roma La Sapienza, Italy, 23–28.07.06.

A. Lopes, Univ. Federal do Rio Grande do Sul, Brazil, 3–31.01.06.

F. Macia, Univ. Complutense de Madrid, Spain, 23–29.07.06.

F. Maggi, Univ. Studi di Firenze, Italy, 3–10.09.06.

S. Maroso, Institut National de Recherche en Informatique Automatique, France, 23–28.07.06.

A. Martins, Instituto Superior Técnico, Portugal, 9.06.06.

G. Maso, Scuola Internazionale Superiore di Studi Avanzati, Italy, 31.08–2.09.06.

D. Matsnev, Penn State Univ., USA, 17–28.07.06.

D. McDuff, State Univ. New York, Stony Brook, USA, 15–18.03.06.

W. McEneaney, Univ. California, San Diego, USA, 24–28.07.06.

R. Monneau, École Nationale des Ponts et Chaussées, France, 24–28.07.06.

A. Montanari, Univ. Bologna, Italy, 24–28.07.06.

M. Mora, Scuola Internazionale Superiore di Studi Avanzati, Italy, 3–10.09.06.

F. Morgan, Williams College, Williamstown, USA, 11.09.06.

M. Morini, Scuola Internazionale Superiore di Studi Avanzati, Italy, 31.08–10.09.06.

P. Mossay, Univ. Alicante, Spain, 3–10.09.06.

C. Mulvey, Univ. Sussex and Cambridge Univ., UK, 5–17.11.06.

M. Nadia, École Nationale Supérieure de Techniques Avancées, France, 23–28.07.06.

J. Nascimento, Instituto de Sistemas e Robótica, Portugal, 10.11.06.

J. Neisendorfer, Univ. Rochester, USA, 10–13.10.06.

J. Nelson, Univ. Torino, Italy, 25–29.09.06.

F. Neumann, Univ. Leicester, UK, 26–30.06.06.

A. Nogueira, Institut de Mathématiques de Luminy, France, 31.10–1.11.06.

B. Noohi, Max Planck Institute, Bonn, Germany, 24–29.06.06.

P. Norbury, Univ. Melbourne, Australia, and Brandeis Univ., USA, 19–21.06.06.

M. Oliveira, Univ. Aberta, Portugal, 7.02.06.

J. Ortega, Centre National de la Recherche Scientifique, France, 31.10–6.11.06.

R. Pardini, Univ. Pisa, Italy, 19–26.03.06.

B. Perthame, École Normale Supérieure, France, 23–28.07.06.

M. Pinsonnault, The Fields Institute, Canada, 02–11.07.06.

G. Pisante, Seconda Univ. Studi di Napoli, Italy, 31.08–10.10.06.

A. Porretta, Univ. Studi di Roma Tor Vergata, Italy, 24–28.07.06.

A. Pratelli, Univ. Pavia, Italy, 3–10.09.06.

V. Quitalo, Instituto Politécnico de Setúbal, Portugal, 3–10.09.06.

P. Raith, Univ. Wien, Austria, 3–9.12.06.

T. Ratiu, École Polytechnique Fédérale de Lausanne, Switzerland, 31.10–6.11.06.

A. Ribeiro, Univ. Nova de Lisboa, Portugal, 3–10.09.06.

J.-L. Rodriguez, Univ. Almería, Spain, 25–29.06.06

J.-M. Roquejoffre, Univ. Toulouse, France, 24–28.07.06.

M. Rorro, Univ. Roma La Sapienza, Italy, 23–28.07.06.

L. Rossi, Univ. Roma La Sapienza, Italy, 23–28.07.06.

F. Russo, Univ. Federal de Pernambuco, Brazil, 21–25.10.06.

M. Sandberg, Royal Institute of Technology (KTH), Sweden, 23–28.07.06.

L. Scardia, Scuola Internazionale Superiore di Studi Avanzati, Italy, 4–9.09.06.

S. Shamir, Univ. Aberdeen, UK, 25.11–1.12.06.

A. Sharkovsky, National Academy of Sciences of Ukraine, Ukraine, 21.08–10.09.06.

A. Siconolfi, Univ. Roma La Sapienza, Italy, 23–28.07.06.

T. Sougadinis, Univ. Texas, Austin, USA, 24–28.07.06.

B. Sousa, Carnegie-Mellon Univ., USA, 2–13.09.06.

B. Stroffolini, Univ. Napoli, Italy, 24–28.07.06.

I. Stubbe, Centro de Matemática da Univ. Coimbra, Portugal, 21–24.06.06.

I. Sushko, National Academy of Sciences of Ukraine, Ukraine, 26.11–1.12.06.

I. Struchiner, Univ. Estadual de Campinas, Brazil, 10.1–30.06.06.

P. Supino, Univ. Roma Tre, Italy, 28.01–4.02.06.

G. Tabuada, Univ. Denis Diderot, Paris VII, France, 25–27.09.06.

G. Terrone, Univ. Padova, Italy, 23–29.07.06.

J. Tiago, Univ. Castilla-La Mancha, Spain, 4–9.09.06.

P. Turner, Heriot-Watt University, UK, 30.03–2.04.06.

J. Urbano, Univ. Coimbra, Portugal, 23–28.07.06.

E. Valdinoci, Univ. Studi di Roma Tor Vergata, Italy, 1–9.03.06, 16–29.07.06.

P. Vaz, Univ. Algarve, Portugal, 30.03–1.04.06.

S. Verra, Univ. Roma Tre, Italy, 14–19.05.06.

A. Vitolo, Univ. Salerno, Italy, 23–29.07.06.

J. Weitsman, Univ. California, Santa Cruz, USA, 22.06–2.07.06.

N. Winter, Aachen Univ., Germany, 22–29.07.06.

M. Wolfrum, Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany, 25.03–5.04.06.

J. Xavier, Instituto Superior Técnico, Portugal, 13.10.06.

E. Zappale, Univ. Salerno, Italy, 15–20.09.06.

2 Seminars

Analysis, Geometry, and Dynamical Systems Seminar. This is the main seminar of the Center. It included the following talks in 2006:

- Peter Raith (Univ. Wien), Continuity properties of pressure and entropy for piecewise monotone interval maps, 7/12/06.
- Andrey Biryuk (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Analysis of a pressureless dynamical system and an open geometrical problem, 5/12/06.
- Francisco Balibrea (Univ. Murcia), Geometric unfolding of some difference equations, 29/11/06.

- Antonio Linero (Univ. Murcia), Some results on omega-limit sets of two-dimensional permuted direct product maps, 29/11/06.
- Irina Sushko (National Academy of Sciences of Ukraine), Bifurcation structure of parameter plane for a family of unimodal piecewise smooth maps: border-collision bifurcation curves, 29/11/06.
- Alexandre Carvalho (Univ. São Paulo, São Carlos), Strongly damped wave equations: continuity of attractors, 28/11/06.
- Jaume Llibre (Univ. Autònoma de Barcelona), The set of periods for the Morse–Smale diffeomorphisms on $\mathbb{T}^2$, 21/11/06.
- Ruy Exel (Univ. Federal de Santa Catarina), Algebras associated to irreversible dynamical systems, 15/11/06.
- Arnaldo Nogueira (Institut de Mathématiques de Luminy), Ergodic properties of triangular partitions, 31/10/06.
- Godofredo Iommi (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Phase transitions and multifractal analysis for horseshoes, 24/10/06.
- José Maria Gomes (Centro de Matemática e Aplicações Fundamentais), $2^n - 1$ positive solutions to a superlinear elliptic problem with sign changing weight, 17/10/06.
- Dmitry Matsnev (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), The Baum–Connes conjecture and linear group actions on spaces of finite asymptotic dimension, 3/10/06.
- Nuno Luzia (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Measure of full dimension for nonconformal dynamics, 19/9/06.
- Messoud Efendiev (Technische Univ. München), On some class of nonautonomous equations and their attractors, 12/9/06.
- Frank Morgan (Williams College, Williamstown), The double bubble theorem, 11/9/06.
- Saber Elaydi (Trinity Univ., San Antonio), From periodic to almost periodic dynamical systems, 16/6/06.
- Saber Elaydi (Trinity Univ., San Antonio), Topological properties of global atractors, 14/6/06.
- Nuno Luzia (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Hausdorff dimension for an open class of repellers in $\mathbb{R}^2$, 16/5/06.

- Matthias Wolfrum (Weierstrass Institute for Applied Analysis and Stochastics, Berlin), Systems of delay differential equations with large delay, 28/3/06.
- Godofredo Iommi (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Suspension flows over countable Markov shifts, 7/3/06.
- Gabriela Gomes (Instituto Gulbenkian de Ciência), Fundamental assumptions in models of reinfection, 21/2/06.
- Pantelis Damianou (Univ. Cyprus), The modular class and integrable systems, 14/2/06.
- Maria João Oliveira (Univ. Aberta), Bogoliubov functionals: from measure theory to functional analysis, 7/2/06.
- Constantine Dafermos (Brown Univ.), Hyperbolic conservation laws with contingent entropies and involutions, 18/1/06.

Algebra Seminar. This included the following talks in 2006:

- Pedro Ferreira dos Santos (Instituto Superior Técnico), Bigraded equivariant cohomology of real quadrics, 15/12/06.
- Joana Ventura (Instituto Superior Técnico), Extension of linking systems III, 12/12/06.
- Mário Edmundo (Univ. Aberta), Cohomology in o-minimal and real algebraic geometry, 7/12/06.
- Shoham Shamir (Univ. Aberdeen), Cellular approximations and the Eilenberg–Moore spectral sequence, 30/11/06.
- Pedro del Angel (Centro de Investigación en Matemáticas, Mexico), On the motive of certain subvarieties of fixed flags, 29/11/06.
- Joana Ventura (Instituto Superior Técnico), Extensions of linking systems II, 29/11/06.
- Joana Ventura (Instituto Superior Técnico), Extensions of linking systems, 23/11/06.
- Joe Neisendorfer (Univ. Rochester), Application of Dror–Farjoun localization in algebraic topology, 12/10/06.
- Stavros Papadakis (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Introduction to unprojection III, 21/7/06.

- Stavros Papadakis (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Introduction to unprojection II, 20/7/06.
- Stavros Papadakis (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Introduction to unprojection I, 19/7/06.
- Frank Neumann (Univ. Leicester), Frobenius actions on the cohomology of moduli stacks of vector bundles on curves, 28/6/06.
- John Harper (Univ. Rochester), Finite H-spaces with retractile generating complex, 23/6/06.
- Isar Stubbe (Centro de Matemática da Univ. Coimbra), Q-orders and Q-modules, 21/6/06.
- João Faria Martins (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), On the homotopy type and the fundamental crossed complex of the skeletal filtration of a CW-complex, 12/4/06.
- Paola Supino (Univ. Roma Tre), Injective endomorphisms of algebraic varieties, 1/2/06.
- Gustavo Granja (Instituto Superior Técnico), Realizing modules over the homology of a DGA, 18/1/06.

Discrete Dynamical Systems Seminar. This included the following talks in 2006:

- Alexander Sharkovsky (National Academy of Sciences of Ukraine), About common periodical orbits of several maps, 6/9/06.
- Alexander Sharkovsky (National Academy of Sciences of Ukraine), On some mathematical models of storing (and processing?) information, 4/9/06.

"Geometria em Lisboa" Seminar. This included the following talks in 2006:

- Rosa Sena-Dias (Instituto Superior Técnico), Estimated transversality and rational maps, 20/12/06.
- Tudor Ratiu (École Polytechnique Fédérale de Lausanne), Convexity for symplectic actions, 2/11/06.
- Francesco Russo (Univ. Federal de Pernambuco), Homaloidal hypersurfaces and hypersurfaces with vanishing Hessian, 24/10/06.

- Jean-Claude Hausmann (Univ. Geneva), Polygon spaces and Hamiltonian geometry, 19/9/06.
- Nitu Kitchloo (Univ. California, San Diego), K-theory and representations of loop groups, 4/7/06.
- Paul Norbury (Univ. Melbourne and Brandeis Univ.), Volumes of moduli spaces of hyperbolic surfaces, 20/6/06.
- Sean Lawton (Univ. Maryland), Poisson structure of flat SL(3)-bundles over a thrice punctured sphere, 7/6/06.
- Inês Cruz (Univ. Porto), Exact (or unimodular) Poisson structures on a 4-dimensional manifold, 9/5/06.
- José Natário (Instituto Superior Técnico), Relativity and singularities — A short introduction for mathematicians, 26/4/06.
- Carlos Florentino (Instituto Superior Técnico), Invariants of 2 by 2 matrices and $\mathrm{SL}(2,\mathbb{C})$ character varieties, 4/4/06.
- Rita Pardini (Univ. Pisa), The fundamental group of surfaces with small K^2, 21/3/06.
- Dusa McDuff (State Univ. New York, Stony Brook), Homotopy properties of groups of symplectomorphisms, 15/3/06.
- Emily Dryden (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Using heat invariants to hear the geometry of orbifolds, 7/3/06.
- André Neves (Princeton Univ. and Instituto Superior Técnico), Singularities of Lagrangian mean curvature flow, 10/1/06.

Mathematics, Systems and Robotics Seminar. In collaboration with Instituto de Sistemas e Robótica. It included the following talks in 2006:

- (December 7)
  - Pedro Resende (Instituto Superior Técnico), What is a good semigroup of binary relations?
  - Alexandre Bernardino, José Gaspar (Instituto Superior Técnico), Biologically Inspired Visual Geometries.
- (November 10)
  - Margarida Baía (Instituto Superior Técnico), An example of 2D discrete-continuum reduction argument by Γ-convergence.

  - Jacinto Nascimento (Instituto de Sistemas e Robótica), Probabilistic data association techniques for target/contour tracking in clutter.

- (October 13)

  - João Xavier (Instituto Superior Técnico), Time-series models on manifolds: the AR case.
  - Henrique Oliveira (Instituto Superior Técnico), Synchronization of pendulum clocks — the Huygens phenomena.

- (July 14)

  - Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Recent Techniques for Solutions to Nonlinear Dispersive Equations.
  - José Bioucas (Instituto Superior Técnico), Two-step iterative shrinkage/thresholding algorithms for total variation and wavelet-based image restoration.

- (June 9)

  - Pedro Santos (Instituto Superior Técnico), Gamma-convergence.
  - André Martins (Instituto Superior Técnico), String kernels and similarity measures for information retrieval.

- (May 5)

  - Pedro Aguiar (Instituto Superior Técnico), Minimum-energy and H-infinity state estimation.
  - Fabio Chalub (Univ. Nova de Lisboa), O processo de Moran contínuo.

- (March 3)

  - Ricardo Ferreira (Instituto de Sistemas e Robótica), Hessian of the Riemannian distance function on connected locally symmetric spaces: centroid computation with a Newton method.
  - Enrico Valdinoci (Univ. Roma II), Entropy penalization methods for Hamilton-Jacobi equations.

- (January 27)

  - Pedro Girão (Instituto Superior Técnico), Some remarks on extremal functions for Poincaré–Sobolev-type inequalities.

– Jerome Darbon (École Nationale Supérieure de Télécommunications, France), Fast and exact algorithms for energy minimization.

Partial Differential Equations Seminar. This included the following talks in 2006:

- Diogo Gomes (Instituto Superior Técnico), Another short course on Aubry–Mather theory IV, 6/12/06.
- Ricardo Barros (Univ. Aix-Marseille III), Gravity waves in two-layer flows with free surface, 29/11/06.
- Daniel Jefferson (IPA Energy Institute, Edinburgh), The small dissipation limit for CGL equations, 22/11/06.
- Diogo Gomes (Instituto Superior Técnico), Another short course on Aubry–Mather theory III, 15/11/06.
- Diogo Gomes (Instituto Superior Técnico), Another short course on Aubry–Mather theory II, 8/11/06.
- Diogo Gomes (Instituto Superior Técnico), Another short course on Aubry–Mather theory I, 25/10/06.
- Elvira Zappale (Univ. Salerno), A lower semicontinuity result in SBD, 18/9/06.
- Diogo Gomes (Instituto Superior Técnico), Wigner and semiclassical defect measures and dissipative wave equation, 24/2/06.
- Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos) Well posedness issues for some nonlinear dispersive equations, 17/2/06.
- Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Unique Continuation for some nonlinear dispersive equations, 10/2/06.
- Fabio Camilli (Univ. l'Aquila), Large deviations and Aubry–Mather theory, 3/2/06.

Topological Quantum Field Theory Club. This included the following talks in 2006:

- Louis Kauffman (Univ. Illinois, Chicago), Virtual knot theory I, 2/06/-2006.

- Louis Kauffman (Univ. Illinois, Chicago), Virtual knot theory II, 6/06/-2006.
- Louis Kauffman (Univ. Illinois, Chicago), Virtual knot theory III, 7/06/2006.
- Mark Gotay (Univ. Hawai, Manoa), Experimental star-product quantization, 13/10/2006.
- Mark Gotay (Univ. Hawai, Manoa), Obstructions to quantization, 12/10/2006.
- Mark Gotay (Univ. Hawai, Manoa), Stress-energy-momentum tensors, 9/10/2006.

Working Seminar on Groupoids and Noncommutative Geometry. This included the following talks in 2006:

- Dmitry Matsnev (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Introduction to coarse geometry, 28/9/06.
- Ivan Struchiner (Univ. Estadual de Campinas), The equivalence problem for G-structures, 21/6/06.
- Rui Loja Fernandes (Instituto Superior Técnico), Proper groupoids, 17/5/06.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Morita equivalence for groupoids and C*-algebras III, 26/4/06.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Morita equivalence for groupoids and C*-algebras II, 19/-4/06.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Morita equivalence for groupoids and C*-algebras I, 29/-3/06.
- Catarina Carvalho (Instituto Superior Técnico), Index theory and groupoids II, 15/3/06.
- Rui Loja Fernandes (Instituto Superior Técnico), Symplectic groupoids, 8/3/06.
- Rui Loja Fernandes (Instituto Superior Técnico), Integrability of Lie algebroids II, 22/2/06.

- Pedro Resende (Instituto Superior Técnico), Étale groupoids and quantales II, 22/2/06.
- Rui Loja Fernandes (Instituto Superior Técnico), Integrability of Lie algebroids I, 16/2/06.
- Pedro Resende (Instituto Superior Técnico), Étale groupoids and quantales I, 16/2/06.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Locally compact groupoids and C*-algebras, 12/1/06.
- Catarina Carvalho (Instituto Superior Técnico), Index theory and groupoids I, 12/1/06.

Other seminars. The Center has also contributed to activities of the Department of Mathematics of Instituto Superior Técnico and of other research centers, in particular providing partial support to the Colloquium of the Department of Mathematics and to the Quantum Information and Computation Seminar of the Center for Logic and Computation.

3 Conferences and short courses

The following Conferences and Short Courses were organized or co-organized by members of the Center in 2006:

CAMGSD Thematic Semester on Partial Differential Equations

July 1 to December 31, 2006

Events (see details further down):

- Conference: *New Trends in Viscosity Solutions and Nonlinear PDEs*, Lisboa, July 24–28, 2006,
- *Workshop in Calculus of Variations and Applications*, Lisboa, September 1–2, 2006,
- *Summer School on Calculus of Variations and Applications* (Satellite meeting of the International Congress of Mathematicians 2006), Ponta Delgada, September 4–9.

http://www.math.ist.utl.pt/∼dgomes/pdesem/

IST Courses on Algebraic Geometry III—Introduction to classical Cremona transformations

Instituto Superior Técnico, May 15–19, 2006

Lecturers:

- Igor Dolgachev (Univ. Michigan),
- Sandro Verra (Univ. Roma Tre).

http://www.math.ist.utl.pt/∼mmlopes/CourseAGIII.html

VII Lisbon Summer Lectures in Geometry

Instituto Superior Técnico, June 26–28, 2006

Lecturer: Jonathan Weitsman (Univ. California, Santa Cruz).

http://www.math.ist.utl.pt/SummerLect06/

Introduction to Topological Stacks

Instituto Superior Técnico, June 26–29, 2006

Main lecturer: Behrang Noohi (Max Planck Institute, Bonn).

Additional lectures by:

- Gustavo Granja (Instituto Superior Técnico),
- Sharon Hollander (Hebrew Univ. Jerusalem).

http://www.math.ist.utl.pt/∼ggranja/TopStacks/

XV$^{\text{th}}$ Oporto Meeting on Geometry, Topology and Physics — Mathematical Aspects of Supersymmetry

Faculdade de Ciências, Univ. Porto, July 20–23, 2006

Main speakers:

- Frank Ferrari (Univ. Libre de Bruxelles),
- Dan Freed (Univ. Texas, Austin),
- Nicholas Manton (Cambridge Univ.),
- Veeravalli Varadarajan (Univ. California, Los Angeles),
- Albert Schwarz (Univ. California, Davis).

http://www.fc.up.pt/oldcfp/omgtp2006/

New Trends in Viscosity Solutions and Nonlinear PDEs

Instituto Superior Técnico, July 24–28, 2006

Main speakers:

- Martino Bardi (Univ. Padova),
- Piermarco Cannarsa (Univ. Studi di Roma Tor Vergata),
- Pierre Cardaliaguet (Univ. Brest),
- Albert Fathi (École Normale Supérieure de Lyon),
- Hitoshi Ishii (Waseda Univ.),
- Régis Monneau (École Nationale des Ponts et Chaussées),
- Benoit Perthame (École Normale Supérieure),
- José Rodrigues (Univ. Lisboa),
- Jean-Michel Roquejoffre (Univ. Toulouse),
- Antonio Siconolfi (Univ. Roma La Sapienza),
- Takis Souganidis (Univ. Texas, Austin),
- José Urbano (Univ. Coimbra).

http://www.math.ist.utl.pt/∼dgomes/newtrends/

Brazilian Operator Algebras Conference (Satellite Meeting of the XV International Congress on Mathematical Physics)

Florianópolis, Brazil, July 24–28, 2006

Invited speakers:

- Ola Bratteli (Univ. Oslo),
- Joachim Cuntz (Univ. Münster),
- David Evans (Univ. Wales, Cardiff),
- Vaughan Jones (Univ. California, Berkeley),
- Karl-Henning Rehren (Univ. Goettingen),
- Mikael Rordam (Univ. Southern Denmark),
- Yasuo Watatani (Kyushu Univ.).

http://www.mtm.ufsc.br/∼exel/oa/

Workshop in Calculus of Variations and Applications

Instituto Superior Técnico, September 1–2, 2006

Invited speakers:

- Ana Barroso (Univ. Lisboa),
- Andrea Braides (Univ. Studi di Roma Tor Vergata),
- Sergio Conti (Univ. Duisburg-Essen),
- Gianni Dal Maso (Scuola Internazionale Superiore di Studi Avanzati),
- Antonia di Napoli (Univ. Studi di Napoli Federico II),
- Adriana Garroni (Univ. Roma La Sapienza),
- Diogo Gomes (Instituto Superior Técnico),
- Jan Kristensen (Univ. Oxford),
- Felipe Linares (Instituto Nacional de Matemática Pura e Aplicada).

http://www.math.ist.utl.pt/∼dgomes/wcva/

Knot Theory and Related Areas (Symposium of the International Conference on Interdisciplinary Mathematical & Statistical Techniques 2006)

Instituto Politécnico de Tomar, September 1–4, 2006

Invited speakers:

- Rui Carpentier (Instituto Superior Técnico),
- J. Scott Carter (Univ. South Alabama),
- J. Faria Martins (Instituto Superior Técnico),
- Pedro Lopes (Instituto Superior Técnico),
- Roger Picken (Instituto Superior Técnico).

http://scra2006.southalabama.edu/

Summer school and workshop on Operator Algebras, Operator Theory and Applications (Satellite meeting of the International Congress of Mathematicians 2006)

Instituto Superior Técnico, September 1–5, 2006

Invited short courses by:

- Stephen Power (Lancaster Univ.),
- Konrad Schmüdgen (Leipzig Univ.),
- Bernd Silbermann (Chemmitz Univ.),
- Harald Upmeier (Marburg Univ.).

Invited lectures by:

- Mikhail Agranovich (Moscow Institute of Electronics and Mathematics),
- Florin Boca (Univ. Illinois, Urbana-Champaign),
- Lewis Coburn (State Univ. New York, Bufallo),
- David Evans (Univ. Wales, Cardiff),
- Israel Gohberg (Tel Aviv Univ.),
- Yuri Karlovich (Univ. Autonoma del Estado de Morelos),
- Naum Krupnik (Univ. Toronto),
- Vladimir Manuilov (Moscow State Univ.),
- Nikolai Nikolski (Univ. Bordeaux and Steklov Mathematical Institute),
- Vladimir Rabinovich (Instituto Politecnico Nacional, Mexico),
- Steffen Roch (Technical Univ. Darmstadt),
- Stefan Samko (Univ. Algarve),
- Ilya Spitkovsky (William and Mary College, Williamsburg).

http://woat2006.ist.utl.pt/

Summer School on Calculus of Variations and Applications (Satellite meeting of the International Congress of Mathematicians 2006)

Ponta Delgada, Açores, September 4–9, 2006

Lecturers:

- Andrea Braides (Univ. Studi di Roma Tor Vergata),
- Bernard Dacorogna (École Polytechnique Fédérale de Lausanne),
- Irene Fonseca (Carnegie Mellon Univ.),
- Nicola Fusco (Univ. Studi di Napoli Federico II).

Invited speakers:

- Roberto Alicandro (Univ. Studi di Cassino),
- Jean-François Babadjian (Scuola Internazionale Superiore di Studi Avanzati),
- Mikil Foss (Univ. Lincoln, Nebraska),
- Francesco Maggi (Univ. Studi di Firenze),
- Maria Mora (Scuola Internazionale Superiore di Studi Avanzati),
- Massimiliano Morini (Scuola Internazionale Superiore di Studi Avanzati),
- Giovanni Pisante (Seconda Univ. Studi di Napoli),
- Ana Ribeiro (Univ. Nova de Lisboa).

http://www.math.ist.utl.pt/∼dgomes/sscva/

Introduction to Differential Graded Categories

Instituto Superior Técnico, September 25–27, 2006

Lecturer: Gonçalo Tabuada (Univ. Denis Diderot, Paris VII).

http://www.math.ist.utl.pt/∼ggranja/DGCats/

Quantum Functional Analysis in the Non-coordinate Presentation

Instituto Superior Técnico, October 17–30, 2006

Lecturer: Alexander Ya. Helemskii (Moscow State Univ.).

http://www.math.ist.utl.pt/∼jmourao/MC/AYH/

II Workshop de Estatística, Matemática e Computação

Univ. Aberta, November 8–9, 2006

Main speakers:

- Gael Dias (Univ. Beira Interior),
- Fernando Ferreira (Univ. Lisboa),
- João Mexia (Univ. Nova de Lisboa),
- João Pequito (PSE - Produtos e Serviços de Estatística, Lda.),
- Manuela Neves (Instituto Superior de Agronomia),
- Margarida Cardoso (Instituto Superior de Ciências do Trabalho e da Empresa),
- Pedro Resende (Instituto Superior Técnico),
- Roman Zmyslony (Univ. Zielona Góra).

http://www.moodle.univ-ab.pt/moodle/course/view.php?id=66

4 Postdoctoral program

The Center started a postdoctoral program in the academic year 1998/99. Positions are for one year, with the possibility of extension for a second year upon mutual agreement. Applicants must have earned a Ph.D. in mathematics preferably within a 2-year period before the opening date of the position. To be selected an applicant must show very strong research promise in one of the areas in which the members of the Center are currently active. There are no teaching duties associated with these positions. They are announced internationally including in the Notices and in the Data Base of the American Mathematical Society. In addition, the Center hosts postdoctoral fellows supported directly by the FCT or by other research projects.

The following fellows have stayed in the Center during the whole or part of 2006:

- J. Agapito, PhD in Mathematics, Univ. California, Santa Cruz, USA, 2004. Research areas: symplectic geometry, discrete mathematics. Supported by an FCT postdoctoral grant (Jan. 2005–present).

- A. Biryuk, PhD in Mathematics, Heriot-Watt Univ., Edinburgh, 2002. Research areas: nonlinear partial differential equations, stochastic partial differential equations, differential geometry, harmonic analysis, numerical methods. Supported by the CAMGSD plurianual funding (Sep. 1, 2006–Aug. 31, 2007).

- J.O. Brahic, PhD in Mathematics, Univ. Montpellier II, France, 2004. Research areas: Poisson geometry, Lie groupoids and algebroids, representation theory. Supported by an FCT postdoctoral grant (Jan. 2006–present).

- R. Czaja, PhD in Mathematics, Univ. Silesia, Poland, 2004. Research areas: semilinear abstract parabolic equations. Supported by the CAMGSD plurianual funding (Sep. 1, 2005–Aug. 31, 2007).

- R. Dawe Martins, PhD in Mathematical Physics, Nottingham Univ., 2006. Research areas: Noncommutative geometry, spectral triples, standard model of particle physics, K-theory. Supported by an FCT postdoctoral grant (Oct. 2006–present).

- E. Dryden, PhD in Mathematics, Dartmouth College, USA, 2004. Research areas: spectral theory, geometry of orbifolds and Riemann surfaces. Supported by the CAMGSD plurianual funding (Oct. 1, 2005–Jul. 31, 2006).

- J. Faria Martins, PhD in Mathematics, Nottingham Univ., UK, 2004. Research areas: quantum topology, quantum groups, knot theory, applications of categorical groups to low dimensional topology. Supported by an FCT postdoctoral grant (Jan. 2005–present).

- J.M. Gomes, Doutoramento em Matemática, Faculdade de Ciências, Univ. Lisboa, Portugal, 2005. Research areas: partial differential equations, variational methods. Supported by an FCT postdoctoral grant (Dec. 2006–present).

- S. Hollander, PhD in Mathematics, Massachussets Institute of Technology, 2001. Research areas: algebraic topology and algebraic geometry. Supported by the CAMGSD plurianual funding (Nov. 1, 2006–Oct. 31, 2007).

- G. Iommi, PhD in Mathematics, Univ. Warwick, UK, 2004. Research areas: dynamical systems. Supported by an FCT postdoctoral grant (Jan. 2006–present).

- S.S. Kim, PhD in Mathematics, Stanford Univ., USA, 2001. Research areas: symplectic and contact geometry. Supported by an FCT postdoctoral grant (Jul. 2005–present).

- H. Li, PhD in Mathematics, Univ. Illinois, Urbana-Champaign, USA, 2003. Research area: symplectic geometry. Supported by an FCT postdoctoral grant (May 2006–present).

- N. Luzia, Doutorado em Matemática, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: dynamical systems. Supported by an FCT postdoctoral grant (May 2005–present).

- D. Matsnev, PhD in Mathematics, Penn State Univ., 2005. Research areas: operator algebra K-theory, noncommutative geometry, coarse geometry, Baum-Connes conjecture. Supported by the CAMGSD plurianual funding (Sep. 1, 2006–Aug. 31, 2007).

- P. McNamara, PhD in Mathematics, Massachussets Institute of Technology, USA, 2003. Research areas: algebraic combinatorics, matrix theory. Supported by the CAMGSD plurianual funding (Aug. 1, 2005–Jul. 31, 2006).

- M. Panthee, Doutorado em Matemática, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: partial differential equations, harmonic analysis. Supported by the CAMGSD plurianual funding (Dec. 15, 2004–Jan. 14, 2006) and an FCT postdoctoral grant (Jan. 15, 2006–present).

- S. Papadakis, PhD in Mathematics, Warwick Univ., UK, 2002. Research areas: birational geometry, commutative algebra, computer algebra methods in algebraic geometry, algebraic surfaces, unprojection. Supported by an FCT postdoctoral grant (Jul. 2006–present).

- R. Popescu, Doctorat de Mathématiques, Univ. Claude Bernard, Lyon 1, France, 2000. Research areas: C*-algebras, bivariant K-theory, groupoids, foliations, quantales. Supported by an FCT postdoctoral grant (Apr. 2005–present).

- N. Sousa, PhD in Physics, Katholieke Univ. Nijmegen (now Radbaud Univ.), The Netherlands, 2003. Research areas: string theory, conformal field theory, topological string theory, geometric quantization, matrix models. Supported by an FCT postdoctoral grant (Mar. 2006–present).

- C. Valls, Doctor in Matematics, Univ. Barcelona, Spain, 1999. Research areas: dynamical systems. Supported by two FCT postdoctoral grants (Oct. 2003–present).

- B. Van Steirteghem, PhD in Mathematics, Columbia Univ., USA, 2004. Research areas: algebraic groups, symplectic geometry. Supported by the CAMGSD plurianual funding (Nov. 1, 2004–Jan. 31, 2006) and an FCT postdoctoral grant (Feb. 1, 2006–present).

5 Publications in 2006

Publications which appeared in 2006

Books

F. da Costa, M. Grinfeld, W. Lamb and J. Wattis (editors). *Coagulation-Fragmentation Processes*. Phys. D, 222, Nos. 1–2. Elsevier, 2006.

A. Corso, P. Gimenez, M. Vaz Pinto and S. Zarzuela (editors). *Commutative Algebra. Geometric, Homological, Combinatorial and Computational Aspects*. Lect. Notes Pure Appl. Math., 244. Proc. First Joint Meeting of the Amer. Math. Soc. and the Real Sociedad Matemática Española and the Lisbon Conference of Commutative Algebra, Seville and Lisbon 2003. Chapman & Hall/CRC, 2006.

Chapters in books

L. Barreira and Ya. Pesin. Smooth ergodic theory and nonuniformly hyperbolic dynamics, with appendix by O. Sarig. In Handbook of Dynamical Systems 1B, edited by B. Hasselblatt and A. Katok. Elsevier, 2006, pp. 57–263.

A. Cannas da Silva. Symplectic geometry. Handbook of Differential Geometry II, edited by F. Dillen and L. Verstraelen. Elsevier, 2006, pp. 79–188.

Articles in international journals with referees

M. Abreu, G. Granja and N. Kitchloo. Moment maps, symplectomorphism groups and compatible complex structures. Special issue: Conference on Symplectic Topology (Stare Jablonki, Poland, 2004). *J. Symplectic Geom.*, 3 (2005), 655–670 (published in April 2006).

M. Aganagic, R. Dijkgraff, A. Klemm, M. Mariño and C. Vafa. Topological strings and integrable hierarchies. *Comm. Math. Phys.*, 261 (2006), 451–516.

J. Agapito. Weighted Brianchon–Gram decomposition. *Canad. Math. Bull.*, 49 (2006), 161–169.

L. Alvarez-Gaumé, P. Basu, M. Mariño and S. Wadia. Blackhole/string transition for the small Schwarzschild blackhole of $AdS_5 \times S^5$ and critical unitary matrix models. *Eur. Phys. J. C Part. Fields*, 48 (2006), 647–665.

J. Alves, J. Fachada and J. Sousa Ramos. Dynamical zeta functions and kneading determinants: a linear algebra point of view. *Linear Algebra Appl.*, 418 (2006), 913–924.

X. Arsiwalla, R. Boels, M. Mariño and A. Sinkovics. Phase transitions in q-deformed 2D Yang–Mills theory and topological strings. *Phys. Rev. D*, 73 (2006), 026005, 14 pp.

J.-F. Babadjian and M. Baía. Multiscale nonconvex relaxation and application to thin films. *Asymptot. Anal.*, 48 (2006), 173–218.

J.-F. Babadjian and M. Baía. 3D-2D analysis of a thin film with periodic microstructure. *Proc. Roy. Soc. Edinburgh Sect. A*, 136 (2006), 223–243.

L. Barreira. Nonadditive thermodynamic formalism: equilibrium and Gibbs measures. *Discrete Contin. Dyn. Syst.*, 16 (2006), 279–305.

L. Barreira and K. Gelfert. Multifractal analysis for Lyapunov exponents on nonconformal repellers, *Comm. Math. Phys.*, 267 (2006), 393–418.

L. Barreira and G. Iommi, Suspension flows over countable Markov shifts, *J. Statist. Phys.*, 124 (2006), 207–230.

L. Barreira and V. Saraiva, Explicit formulas for the average density of conformal repellers, *Ergodic Theory Dynam. Systems*, 26 (2006), 973–997.

L. Barreira and C. Valls, Center manifolds for nonuniformly partially hyperbolic trajectories, *Ergodic Theory Dynam. Systems*, 26 (2006), 1707–1732.

L. Barreira and C. Valls, Existence of stable manifolds for nonuniformly hyperbolic C^1 dynamics, *Discrete Contin. Dyn. Syst.*, 16 (2006), 307–327.

L. Barreira and C. Valls, A Grobman–Hartman theorem for nonuniformly hyperbolic dynamics, *J. Differential Equations*, 228 (2006), 285–310.

L. Barreira and C. Valls, Hölder conjugacies for random dynamical systems, *Phys. D*, 223 (2006), 256–269.

L. Barreira and C. Valls, Multifractal structure of two-dimensional horseshoes, *Comm. Math. Phys.*, 266 (2006), 455–470.

L. Barreira and C. Valls, Smooth invariant manifolds in Banach spaces with nonuniform exponential dichotomy, *J. Funct. Anal.*, 238 (2006), 118–148.

L. Barreira and C. Valls, Stable manifolds for nonautonomous equations without exponential dichotomy, *J. Differential Equations*, 221 (2006), 58–90.

L. Barreira and C. Wolf, Pointwise dimension and ergodic decompositions, *Ergodic Theory Dynam. Systems*, 26 (2006), 653–671.

J. Barrett and M. Mackaay, Categorical representations of categorical groups, *Theory Appl. Categ.*, 16 (2006), 529–557.

A. Biryuk. On invariant measures of the 2D Euler equation. *J. Statist. Phys.*, 122 (2006), 597–618.

A. Biryuk, W. Craig and V. Panferov. Strong solutions of the Boltzmann equation in one spatial dimension. *C. R. Acad. Sci. Paris Sér. I Math.*, 342 (2006), 843–848.

F. Bogomolov and B. de Oliveira. Hyperbolicity of nodal hypersurfaces. *J. Reine Angew. Math.*, 596 (2006), 89–101.

F. Bogomolov, P. Cascini and B. de Oliveira. Singularities on complete algebraic varieties. *Cent. Eur. J. Math.*, 4 (2006), 194–208.

F. Bogomolov and B. de Oliveira. Vanishing theorems of negative vector bundles on projective varieties and the convexity of coverings. *J. Algebraic Geom.*, 15 (2006), 207–222.

J. Buescu, M. Kulczycki and I. Stewart. Liapunov stability and adding machines revisited. *Dyn. Syst.*, 21 (2006), 379–384.

J. Buescu and A. Paixo. Eigenvalues of positive definite integral operators on unbounded intervals. *Positivity*, 10 (2006), 627–646.

J. Buescu and A. Paixão. Positive definite matrices and differentiable reproducing kernel inequalities. *J. Math. Anal. Appl.*, 320 (2006), 279–292.

J. Buescu and A. Paixão. A linear algebraic approach to holomorphic reproducing kernels in $\mathbb{C}^n$. *Linear Algebra Appl.*, 412 (2006), 270–290.

J. Buescu and A. Paixão. Positive definite matrices and integral equations on unbounded domains. *Differential Integral Equations*, 19 (2006), 189–210.

J. Buescu and A. Paixo. Inequalities for differentiable reproducing kernels and an application to positive integral operators. *J. Inequal. Appl.*, 2006, Art. ID 53743, 9 pp.

H. Burrows, F. Dias, A. Maçanita, F. da Costa, A. Monkman and J. Morgado. Kinetics and thermodynamics of poly(9,9-dioctylfluorene) β-phase formation in dilute solution. *Macromolecules*, 39 (2006), 5854–5864.

X. Carvajal and M. Panthee. On uniqueness of solution for a nonlinear Schrödinger-Airy equation. *Nonlinear Anal.*, 64 (2006), 146–158.

R. Cordovil and D. Forge. An Orlik–Solomon type algebra for matroids with a fixed linear class of circuits. *Port. Math. (N.S.)*, 63 (2006), 363–374.

C. Correia Ramos, N. Martins, R. Severino and J. Sousa Ramos. Noncommutative topological dynamics. *Chaos Solitons Fractals*, 27 (2006), 15–23.

C. Correia Ramos, N. Martins and J. Sousa Ramos. Conductance and noncommutative dynamical systems. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 127–134.

F. da Costa, H. Van Roessel and J. Wattis. Long-time behaviour and self-similarity in a coagulation equation with input of monomers. *Markov Process. Related Fields*, 12 (2006), 367–398.

R. Dawe Martins. Noncommutative geometry, topology, and the standard model vacuum. *J. Math. Phys.*, 47 (2006), 113507, 16 pp.

J. Duarte, L. Silva and J. Sousa Ramos. Computation of the topological entropy in chaotic biophysical bursting models for excitable cells. *Discrete Dyn. Nat. Soc.*, 2006 (2006), Article ID 60918, 18 pages.

J. Duarte, L. Silva and J. Sousa Ramos. The influence of coupling on chaotic maps modelling bursting cells. *Chaos Solitons Fractals*, 28 (2006), 1314–1326.

J. Duarte, L. Silva and J. Sousa Ramos. Types of bifurcations of FitzHugh–Nagumo maps. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 231–242.

S. Fernandes and J. Sousa Ramos. Conductance, Laplacian and mixing rate in discrete dynamical systems. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 117–126.

J. Ferreira and S. Pinelas. Oscillatory mixed difference systems. *Adv. Difference Equ.*, 2006, Art. ID 92923, 18 pp.

C. Florentino. Invariants of 2 by 2 matrices, irreducible $\mathrm{SL}(2,\mathbb{C})$ characters and the Magnus trace map. *Geom. Dedicata*, 121 (2006), 167–186.

C. Florentino, P. Matias, J. Mourão and J. Nunes. On the BKS pairing for Kähler quantizations of the cotangent bundle of a Lie group. *J. Funct. Anal.*, 234 (2006), 180–198.

P. Girão and T. Weth. The shape of extremal functions for Poincaré–Sobolev-type inequalities in a ball. *J. Funct. Anal.*, 237 (2006), 194–223.

D. Gomes and C. Valls. Perturbation theory and discrete Hamiltonian dynamics. *Math. Phys. Electron. J.*, 12 (2006), Paper 3, 29 pp.

L. Godinho. Semifree symplectic circle actions on 4-orbifolds. *Trans. Amer. Math. Soc.*, 358(2006), 4919–4933.

C. Grácio and J. Sousa Ramos. The first eigenvalue of the Laplacian and the conductance of a compact surface. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 243–250.

G. Iommi and B. Skorulski. Multifractal analysis for the exponential family. *Discrete Contin. Dyn. Syst.*, 16 (2006), 857–869.

F. Knop and B. Van Steirteghem. Classification of smooth affine spherical varieties. *Transform. Groups*, 11 (2006), 495–516.

J. Llibre and C. Valls. Formal and analytical integrability of the Bianchi IX system. *J. Math. Phys.*, 47 (2006), 022704, 15 pp.

P. Lopes and D. Roseman. On finite racks and quandles. *Comm. Algebra*, 34 (2006), 371–406.

N. Luzia. A variational principle for the dimension for a class of non-conformal repellers. *Ergodic Theory Dynam. Systems*, 26 (2006), 821–845.

N. Luzia. Hausdorff dimension for an open class of repellers in $\mathbb{R}^2$. *Nonlinearity*, 19 (2006), 2895–2908.

N. Martins, R. Severino and J. Sousa Ramos. Bowen–Franks groups of reducible bimodal sudshifts of finite type. *Linear Algebra Appl.*, 414 (2006), 125–137.

F. Moura and R. Schiappa. Higher-derivative corrected black holes: perturbative stability and absorption cross-section in heterotic string theory. *Classical Quantum Gravity*, 24 (2007), 361–386.

J. Natário. Newtonian limits of warp drive spacetimes. *Gen. Relativity Gravitation*, 38 (2006) 475–484.

P. Resende. A note on infinitely distributive inverse semigroups. *Semigroup Forum*, 73 (2006), 156–158.

L. Rocha and J. Sousa Ramos. Computing conditionality invariant measures and escape rates. *Neural Parallel Sci. Comput.*, 14 (2006), 97–114.

R. Sena-Dias. Estimated transversality and rational maps. *J. Symplectic Geom.*, 4 (2006), 199–236.

R. Severino, A. Sharkovsky, J. Sousa Ramos and S. Vinagre. Topological invariants in a model of a time-delayed Chua's circuit. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 81–90.

J. Sousa Ramos. Introduction to nonlinear dynamics of electronic systems: tutorial. Special issue: Nonlinear Dynamics of Electronic Systems (Évora, Portugal, 2004). *Nonlinear Dynam.*, 44 (2006), 3–14.

M. Stosic. New categorification of the chromatic and dichromatic polynomials for graph. *Fund. Math.*, 190 (2006), 231–243.

C. Valls. Analytic first integrals of the Halphen system. *J. Geom. Phys.*, 56 (2006), 1192–1197.

C. Valls. Existence of quasi-periodic solutions for elliptic equations on a cylindrical domain. *Comment. Math. Helv.*, 81 (2006), 783–800.

C. Valls. On the non-integrability of a generalized Darboux Halphen system. *J. Geom. Phys.*, 57 (2006), 89–100.

C. Valls. Quasiperiodic solutions for dissipative Boussinesq systems. *Comm. Math. Phys.*, 265 (2006), 305–331.

C. Valls. Stability of some waves in the Boussinesq systems. *Commun. Pure Appl. Anal.*, 5 (2006), 923–939.

Communications in proceedings with referees

M. Abreu. Moment maps, pseudo-holomorphic curves and symplectomorphism groups. In *Proc. XIV Fall Workshop on Geometry and Physics*, Bilbao, September 14–16, 2005. Publ. R. Soc. Mat. Esp., Vol. 10 (2006), 1–31.

C. Correia Ramos, N. Martins, P. Pinto and J. Sousa Ramos. Orbit equivalence and von Neumann algebras for piecewise linear unimodal maps. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 45–54.

J. Duarte, L. Silva and J. Sousa Ramos. Low-dimensional dynamics of cardiac arrhythmias. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 55–68

S. Fernandes and J. Sousa Ramos. Spectral invariants and conductance on iterated maps. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 69–81.

C. Florentino, J. Mourão and J. Nunes. Theta functions, geometric quantization and unitary Schottky bundles. In *The Geometry of Riemann Surfaces and Abelian Varieties*, Proc. III Iberoamerican Congress on Geometry, Salamanca, June 2004, edited by J. Porras, S. Popescu and R. Rodríguez. Contemporary Mathematics, 397 (2006), 55–73.

C. Grácio and J. Sousa Ramos. Spectrum of the Laplacian on hyperbolic surfaces. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 122–134.

D. Karagueuzian, B. Oliver and J. Ventura. The components of a variety of matrices with square zero and submaximal rank. In *Commutative Algebra, edited by A. Corso, P. Gimenez, M. Pinto and S. Zarzuela.* Lecture Notes Pure Appl. Math., Chapman & Hall / CRC, 2006, pp. 151–164.

M. Mendes Lopes and R. Pardini. The order of finite algebraic fundamental groups of surfaces with $K^2 \leq 3\chi - 2$. In *Algebraic Geometry and Topology*, Suurikaiseki Kenkyusho Koukyuuroku, No. 1490 (2006), 69–75.

R. Severino, A. Sharkovsky, J. Sousa Ramos and S. Vinagre. Symbolic dynamics in boundary value problems for systems with two spatial variables. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 210–224.

S. Vaz and J. Sousa Ramos. Symbolic dynamics and number theory for tent maps and beta transformations. In *Proc. Europ. Conf. on Iteration Theory (ECIT'04)*, edited by W. Forg-Rob, L. Gardini, D. Gronau, L. Reich and J. Smítal. Grazer Mathematische Berichte, Nr. 350 (2006), pp. 235–245.

Other publications

W. Oliva. Some words in memory of Dan Henry. In Dan Henry's Manuscripts (CD-ROM), Univ. São Paulo, 2006.

Accepted publications (submitted or accepted in 2006)

Books

L. Barreira and Ya. Pesin. *Nonuniform Hyperbolicity: Dynamics of Systems with Nonzero Lyapunov Exponents*. Encyclopedia of Mathematics and Its Applications, Cambridge Univ. Press, to appear.

M. Crainic and R. Loja Fernandes. *Lectures on Integrability of Lie Brackets*. Lecture notes for the 2005 Summer School in Poisson Geometry held at ICTP-Trieste. To be published by Mathematical Sciences Publishers; arXiv:math.DG/0611259.

Chapters in books

I. Stubbe and B. Van Steirteghem. Propositional systems, Hilbert lattices and generalized Hilbert spaces. In Handbook of Quantum Logic, edited by D. Gabbay, D. Lehmann and K. Engesser. Elsevier.

Articles in international journals with referees

M. Baía, I. Fonseca. The limit behavior of a family of variational multiscale problems. To appear in Indiana Univ. Math. J.

M. Baía and E. Zappale. A note on the 3D-2D dimensional reduction of a micromagnetic thin film with nonhomogeneous profile. To appear in Appl. Anal.

S. Bandyopadhyay, A. Barroso, B. Dacorogna and J. Matias. Differential inclusions for differential forms. To appear in Calc. Var. Partial Differential Equations.

L. Barreira and L. Radu, Multifractal analysis of nonconformal repellers: a model case. To appear in Dyn. Syst.

L. Barreira and C. Valls, Hölder Grobman–Hartman linearization. *Discrete Contin. Dyn. Syst.*, 18 (2007), 187–197.

L. Barreira and C. Valls, Nonuniform exponential dichotomies and Lyapunov regularity. *J. Dynam. Differential Equations*, 19 (2007), 215–241.

L. Barreira and C. Valls, Stability theory and Lyapunov regularity. *J. Differential Equations*, 232 (2007), 675–701.

L. Barreira and C. Wolf, Dimension and ergodic decompositions for hyperbolic flows. *Discrete Contin. Dyn. Syst.*, 17 (2007), 201–220.

J. Buescu and A. Paixão. Eigenvalue distribution of positive definite kernels on unbounded domains. To appear in Integral Equations Operator Theory.

R. Cordovil, B. Junior and M. Lemos. The 3-connected binary matroids with circumference 6 or 7. To appear in European J. Combin.

L. Cornalba, M. Costa, J. Penedones and R. Schiappa. Eikonal approximation in AdS/CFT: conformal partial waves and finite N four-point functions. *Nucl. Phys. B.*, 767 (2007), 327–351.

C. Correia Ramos, N. Martins, P. Pinto and J. Sousa Ramos. Orbit equivalence and von Neumann algebras for expansive interval maps. *Chaos Solitons Fractals*, 33 (2007), 109–117.

C. Correia Ramos, N. Martins and J. Sousa Ramos. Finite dimensional representations of $*$-algebras arising from a quadratic map. To appear in Chaos Solitons Fractals.

F. da Costa. Dynamics of a differential system using invariant regions. To appear in L'Enseignement Mathématique.

F. da Costa, M. Grinfeld, N. Mottram and J. Pinto. A mathematical study of a bistable nematic liquid crystal device. To appear in Math. Models Methods Appl. Sci.

F. da Costa and R. Sasportes. Dynamics of a nonautonomous ODE system occurring in coagulation theory. To appear in J. Dynam. Differential Equations.

P. Damianou and R. Loja Fernandes. Integrable hierarchies and the modular class. To appear in Ann. Inst. Fourier (Grenoble); arXiv:math.DG/0607784.

M. Dodig and M. Stosic. The change of feedback invariants under one row perturbations. To appear in Linear Algebra Appl.

J. Faria Martins. Categorical groups, knots and knotted surfaces. To appear in J. Knot Theory Ramifications.

J. Faria Martins. On the homotopy type and the fundamental crossed complex of the skeletal filtration of a CW-complex. *Homology, Homotopy Appl.*, 9 (2007), 295–329.

J. Faria Martins and T. Porter. On Yetter's invariant and an extension of the Dijkgraaf–Witten invariant to categorical groups. *Theory Appl. Categ.*, 18 (2007), 118–150.

S. Fernandes and J. Sousa Ramos. Second eigenvalue of transition matrix associated to iterated maps. *Chaos Solitons Fractals*, 31 (2007), 316–326.

L. Godinho. Equivariant cohomology of S^1-actions on 4-manifolds. To appear in Canad. Math. Bull.

D. Gomes and C. Valls. Wigner measures and quantum Aubry–Mather theory. *Asymptot. Anal.*, 51 (2007), 47–62.

D. Graça, N. Zhong and J. Buescu. Computability, noncomputability and undecidability of maximal intervals of IVPS. To appear in Trans. Amer. Math. Soc.

S. Hollander. A Homotopy theory for stacks. To appear in Israel J. Math.

S. Hollander. Characterizing algebraic stracks. To appear in Proc. Amer. Math. Soc.

S. Hollander. Descent for quasi-coherent sheaves on stacks. To appear in Algebr. Geom. Topol.

L. Kauffman and P. Lopes. On the minimum number of colors for knots. To appear in Adv. in Appl. Math.

P. Lopes. Hyperfinite knots via the CJKLS invariant in the thermodynamic limit. To appear in Chaos Solitons Fractals.

M. Mackaay and P. Turner. Bar-Natan's Khovanov homology for coloured links. *Pacific J. Math.*, 229 (2007), 429–446.

M. Mackaay, P. Turner and P. Vaz. A remark on Rasmussen's invariant of knots. To appear in J. Knot Theory Ramifications.

J. Matias. Differential inclusions in $SBV_0(\Omega)$ and applications to the calculus of variations. To appear in J. Convex Anal.

M. Mendes Lopes and R. Pardini. Numerical Campedelli surfaces with fundamental group of order 9. To appear in J. Eur. Math. Soc. (JEMS).

M. Mendes Lopes and R. Pardini. On the algebraic fundamental group of surfaces with $K^A \leq 3\chi$. To appear J. Differential Geom.

M. Panthee. Analytic solution for a system of KdV equations. To appear in Nepali Math. Sci. Rep.

P. Pinto. Simple current modular invariants from braided subfactors. To appear in Chaos Solitons Fractals.

P. Resende. Étale groupoids and their quantales. Adv. Math., 208 (2007), 147–209.

C. Rito. On surfaces with $p_g = q = 1$ and non-ruled bicanonical involution. To appear in Ann. Sc. Norm. Super. Pisa Cl. Sci. (5).

J. Santos. Dirac operators coupled to instantons on positive definite four-manifolds. To appear in Math. Z.

M. Stosic. Categorification of the dichromatic polynomial for graphs. To appear in J. Knot Theory Ramifications.

Communications in proceedings with referees

A. Biryuk, W. Craig and S. Ibrahim. Construction of suitable weak solutions of the Navier–Stokes equations. In *Stochastic Analysis and Partial Differential Equations*, edited by G.-Q. Chen, E. Hsu, and M. Pinsky. To appear in Contemporary Mathematics.

D. Gomes. Variational methods for Hamiltonian systems. To appear in Oberwolfach Reports.

D. Gomes. On the variational principle for the Navier–Stokes equation. To appear in Proc. International Conference on Mathematical Analysis of Random Phenomena.

D. Graça, N. Zhong and J. Buescu. An ordinary differential equation defined by a computable function whose maximal interval of existence is non-computable. To appear in Proc. RNC7.

R. Loja Fernandes. The symplectization functor. In Proc. XV Fall Workshop on Geometry and Physics, Tenerife. To appear in Publ. R. Soc. Mat. Esp.; arXiv:math.DG/0610542.

Preprints submitted in 2006 (not yet accepted)

M. Abreu, E. Dryden, P. Freitas and L. Godinho. Hearing the weights of weighted projective planes; arXiv:math.DG/0608462.

M. Abreu, G. Granja and N. Kitchloo. Symplectomorphism groups and compatible complex structures on rational ruled surfaces; arXiv:math.SG/0610436.

J. Agapito and L. Godinho. New polytope decompositions and Euler–MacLaurin formulas for simple integral polytopes; arXiv:math.CO/0512475.

S. Anjos and F. Lalonde. The homotopy type of the space of symplectic balls in $S^2 \times S^2$ above the critical value; arXiv:math.SG/0406129.

J.-F. Babadjian, M. Baía and P.M. Santos. Characterization of two-scale gradient young measures and application to homogenization.

P. Berthomé, R. Cordovil and D. Forge. A note on rooted integral gain forests.

A. Biryuk. Lower bounds for derivatives of solutions for NLS.

L. Biscolla, J. Llibre and W. Oliva. The rolling ball problem on the sphere.

F. Camilli, I. Dolcetta and D. Gomes. An error estimate for the approximation of the effective Hamiltonian.

C. Ciliberto, M. Mendes Lopes and R. Pardini. Surfaces with $K^2 < 3\chi$ and finite fundamental group.

R. Cordovil, M. Lemos and C. Sales. Dirac's theorem on simplicial matroids.

L. Cornalba, M. Costa, J. Penedones and R. Schiappa. Eikonal approximation in AdS/CFT: from shock waves to four-point functions; arXiv:hep-th/0611122.

F. da Costa, J. Pinto and R. Sasportes. Convergence to self-similarity in an addition model with power-like time-dependent input of monomers.

D. Gomes. Selection criteria for Hamilton–Jacobi equations and Aubry–Mather measures.

D. Graça, M. Campagnolo and J. Buescu. Computability with polynomial differential equations.

G. Granja and S. Hollander. Realizing modules over the homology of a DGA.

C. Harle and W. Oliva. Caracterizações da elipse e do elipsóide no contexto da geometria afim.

P. Lopes. On computational aspects of two classical knot invariants.

N. Luzia. Measure of full dimension for a class of nonconformal repellers.

B. Oliver and J. Ventura. Extensions of linking systems with p-group kernel.

M. Mackaay and P. Vaz. The universal sl3 link homology.

M. Mariño. Open string amplitudes and large order behaviour in topological string theory; arXiv:hep-th/0612127.

J. Natário. Relativity and singularities — a short introduction for mathematicians.

S. Papadakis. Towards a general theory of unprojection; arXiv:math.AG/06-08158.

R. Popescu. Coactions of Hopf-C*-algebras and equivariant E-theory (revised); arXiv:math.KT/0410023.

P. Santos and E. Zappale. Lower semicontinuity in SBH.

M. Stosic. Homology of torus links; arXiv:math.QA/0606656.

6 Partnership protocols

In October 2004 the Center submitted to the Minister of Science, Innovation and Higher Education a request for the Statute of Associate Laboratory, with a strategic project entitled Internationalization of the Research and Promotion of Mathematics in Portugal. Besides pursuing the strategy of further development and internationalization of the research activities, in particular through the Postdoctoral Program and a Program for career development and employment of new researchers, the Center signed partnership protocols with the Institute for Systems and Robotics - Lisbon (Instituto de Sistemas e Robótica-Lisbon) and with the Institute of Telecommunications (IT) regarding interdisciplinary research cooperation, and also signed partnership protocols with 44 secondary and primary schools, which together enroll more than 38000 students, aiming at the promotion of Mathematics at these education levels through a set of activities oriented towards students and teachers.

While the evaluation of the request for the Statute of Associate Laboratory is still in progress, the Center has nevertheless started to develop various activities in collaboration with the secondary schools, and it has also pursued its past collaboration with the Ciência Viva Program. Some of these activities are listed below.

Summer school. "A Ciência do Não Linear", Instituto Superior Técnico, June 28 to July 1, 2006, http://www.math.ist.utl.pt/∼sramos/nao_linear .html (José Sousa Ramos).

Activities for secondary school teachers. The following working sessions took place in 2006:

- "Linear Programming" (Margarida Mendes Lopes and Diogo Gomes), Instituto Superior Técnico, April 22, 2006. (Seventeen teachers participated.)
- "Mathematics in the exploitation of natural resources" (José Fachada), and "The names of numbers" (Pedro Martins Rodrigues), Instituto Superior Técnico, December 16, 2006. (Ten teachers participated.)