Center for Mathematical Analysis, Geometry, and Dynamical Systems

Report 2005

April 2006

Contents

1 Visitors

The following researchers visited the Center in 2005:

D. Abriani, Scuola Internazionale Superiore di Studi Avanzati, Italy, 9.10–12.11.05.

M. Audin, Institut de Recherche Mathématique Avancée de Strasbourg, France, 11–15.07.05.

D. Auroux, Massachusetts Institute of Technology, USA, 6–10.07.05.

J. Baptista, Cambridge Univ., UK, 10–26.10.05.

J. Bioucas, Instituto Superior Técnico, Portugal, 12.05.

C. Bispo, Instituto Superior Técnico, Portugal, 04.11.05.

F. Bourgeois, Univ. Libre de Bruxelles, Belgium, 6–9.07.05.

R. Brunetti, Institute für Theoretische Physik, Univ. Hamburg, Germany, 20–25.07.05.

J. Bryan, Univ. British Columbia, Canada, 16–22.10.05.

D. Bucur, Univ. Metz, France, 9–15.10.05.

H. Bursztyn, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 20–24.11.05.

A. Calabri, Univ. Bologna, Italy, 14–21.01.05.

C. Carvalho, Instituto Superior Técnico, Portugal, 13.12.05.

F. Chalub, Univ. Nova de Lisboa, Portugal, 1.04.05.

M. Cheng, Institute for Theoretical Physics, Univ. Amsterdam, Holland, 14–22.10.05.

R. Cohen, Stanford Univ., USA, 29.10–3.11.05.

A. Dey, The Institute of Mathematical Sciences, India, 9.10–12.11.05.

L. Díaz, Univ. Extremadura, Badajoz, Spain, 31.01.05.

Y. Dinar, Scuola Internazionale Superiore di Studi Avanzati, Italy, 10.10–12.11.05.

M. Domagala, Uniwersytet Warszawski, Poland, 20–25.07.05.

T. Domingos, Instituto Superior Técnico, Portugal, 18.01.05.

T. Downarowicz, Wroclaw Univ. Technology, Poland, 24–30.10.05.

M. Efendiev, Univ. Stuttgart, Germany, 15–22.05.05.

S. Elaydi, Trinity Univ., USA, 10–23.07.05.

J. Erven, Univ. München, Germany, 06.05.05.

G. Etesi, Budapest Univ. Technology and Economics, Hungary, 20–25.07.05.

P. Flandrin, Ecole Normale Supérieure de Lyon, France, 25.02.05.

F. Garcia, Instituto Superior Técnico, Portugal, 08.04.05.

W. Goldman, Univ. Maryland, USA, 14–17.06.05.

P. Gonçalves, Instituto de Sistemas e Robótica, Portugal, 04.02.05.

T. Graber, Univ. California, Berkeley, USA, 6–13.11.05.

M. Grinfeld, Univ. Strathclyde, UK, 4–10.05.05.

A. Grünrock, Univ. Wuppertal, Germany, 18–25.09.05.

S. Gukov, Harvard Univ., USA, 25–30.10.05.

S. Gutierrez, Catholic Univ. Chile, Chile, 23.04–01.05.05.

J. Hale, Georgia Institute of Technology, USA, 23–30.06.05.

S. Hollander, Hebrew Univ. Jerusalem, Israel, 4–20.11.05.

R. Jerrard, Univ. Toronto at St. George, Canada, 14.06–13.07.05.

N. Jung, Univ. Toronto at Mississauga, Canada, 14.06–13.07.05.

A. Klemm, Univ. Wisconsin, Madison, USA, 6–13.11.05.

Y.-P. Lee, Univ. Utah, USA, 16–29.10.05.

P. Lescot, Univ. Picardie, France, 22.06.05.

P. Lima-Filho, Texas A&M Univ., USA, 20.05–09.06.05.

J. de Loera, Univ. California, Davis, USA, 7–9.07.05.

A. Lopes, Univ. Federal do Rio Grande do Sul, Brazil, 16–18.07.05.

M. Málek, Silesian Univ., Czech Republic, 3–10.12.05.

A. Mandel, Univ. São Paulo, Brazil, 1–5.11.05.

C. Manolescu, Princeton Univ., USA, 5–10.07.05.

R. Dawe Martins, Univ. Nottingham, UK, 10.10–12.11.05.

R. Martins, Univ. Nova de Lisboa, Portugal, 18.10.05.

A. Mateus, Instituto Superior Técnico, Portugal, 19.12.05.

D. Maulik, Princeton Univ., USA, 18.10–1.11.05.

R. McCann, Univ. Toronto at St. George, Canada, 14–15.01.05.

D. McComb, Univ. Edimburgh, UK, 20–25.07.05.

C.J. Mulvey, Univ. Sussex & Univ. Cambridge, UK, 16.03.05.

J. Nelson, Univ. Torino, Italy, 10–14.10.05.

A. Neitzke, Harvard Univ., USA, 16–23.10.05.

A. Okounkov, Princeton Univ., USA, 9–14.10.05.

M.R. Olmos, École Polytechnique Fédérale de Lausanne, Switzerland, 2–9.09.05.

R. Pandharipande, Princeton Univ., USA, 10.10–12.11.05.

R. Pardini, Univ. Pisa, Italy, 13–20.02.05 and 23.06–01.07.05.

M. Pinsonnault, The Fields Institute, Canada, 2–10.07.05.

A. Plakhov, Univ. Aveiro, Portugal, 03.06.05.

M. Portilheiro, Univ. Coimbra, Portugal, 17.06.05.

V. Przyjalkowski, Steklov Mathematical Institute, Russia, 9.10–12.11.05.

L. Rastelli, Princeton Univ., USA, 27.10–3.11.05.

M. Ribeiro, Instituto Superior Técnico, Portugal, 07.10.05.

N. Romão, Univ. Adelaide, Australia, 29.06.05.

V. Rychkov, Scuola Normale Superiore di Pisa, Italy, 24–27.10.05.

V. Ruuska, Univ. Jyväskylä, Finland, 17.10–11.11.05.

S.F. Sawin, Fairfield Univ., USA, 8–13.02.05.

E. Scheidegger, Univ. Piemonte Orientale, Italy, 26.10–11.11.05.

B. Schroer, Centro Brasileiro de Pesquisas Físicas, Brazil, 19–24.07.05.

A. Sharkovsky, Institute of Mathematics, Ukraine, 31.03–22.04.05.

J.N. Silva, Univ. Lisboa, Portugal, 20.05.05.

J. Silva, Instituto Superior de Engenharia de Lisboa, Portugal, 20.05.05.

I. Smith, Univ. Cambridge, UK, 6–9.07.05.

L. Snoha, Matej Bel Univ., Slovakia, 24–31.10.05.

J. Sobrinho, Instituto Superior Técnico, Portugal, 06.05.05.

M. Stessin, State Univ. New York, Albany, USA, 25.09–1.10.05.

B. Szendroi, Utrecht Univ., Holland, 10–15.05.05.

L. Szulc, Warsaw Univ., Poland, 20–25.07.05.

G. Tabuada, Univ. Paris VII - Denis Diderot, France, 14.09.05.

S. Vacaru, Instituto de Matemáticas y Física Fundamental, Spain, 4–5.07.05.

E. Valdinoci, Univ. Roma II, Italy, 24.07–2.08.05.

J. Weitsman, Univ. California, Santa Cruz, USA, 14–20.06.05.

C. Werner, Allegheny College, USA, 25.05–02.06.05.

T. Weth, Univ. Giessen, Germany, 20–28.02.05.

M. Zambon, Univ. Zürich, Switzerland, 22–29.01.2005.

2   Seminars

Mathematical Analysis, Geometry, and Dynamical Systems Seminar.   This is the main seminar of the Center. It included the following talks in 2005:

- Roman Hric (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Topology of minimal systems, 13/12/05.

- Michal Málek (Silesian Univ.), Basic sets and distributional chaos in dimension one, 6/12/05.

- João Martins (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), 2-dimensional homotopy invariants of complements of embedded surfaces in S^4, 29/11/05.

- Nuno Luzia (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), On Hausdorff dimension in higher dimensions, 15/11/05.

- Arnaldo Mandel (Univ. São Paulo), Faithful linear representions of the free group, 3/11/05.

- Tomasz Downarowicz (Wroclaw Univ. Tech.), Minimal realizations of Jewett-Krieger type for nonuniquely ergodic systems II, 28/10/05.

- Tomasz Downarowicz (Wroclaw Univ. Tech.), Minimal realizations of Jewett-Krieger type for nonuniquely ergodic systems I, 26/10/05.

- Lubomír Snoha (Matej Bel Univ.), Small scrambled sets, 25/10/05.

- Rogério Martins (Univ. Nova Lisboa), When is the attractor of a dissipative system in the cylinder homeomorphic to the circle?, 18/10/05.

- Peter McNamara (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Symmetric functions and cylindric Schur functions, 11/10/05.

- Michael Stessin (State Univ. New York, Albany), Subalgebras dense in Hardy spaces, 27/9/05.

- Axel Grünrock (Univ. Wuppertal), The Cauchy problem for nonlinear evolution equations with roughdata, 20/9/05.

- Radoslaw Czaja (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Asymptotics of parabolic equations with possible blow-up, 13/9/05.

- Miguel Rodríguez Olmos (École Polytech. Fédérale de Lausanne), Stability of relative equilibria in Hamiltonian mechanical systems, 6/9/05.

- Saber Elaydi (Trinity Univ.), Extension of the Sharkovsky theorem to non-autonomous dynamical systems II, 21/7/05.

- Saber Elaydi (Trinity Univ.), Extension of the Sharkovsky theorem to non-autonomous dynamical systems I, 19/7/05.

- Artur Lopes (Univ. Federal do Rio Grande do Sul), Gibbs states limits and large deviations, 18/7/05.

- Jesus de Loera (Univ. California, Davis), The many aspects of counting lattice points on polytopes, 8/7/05.

- Jack Hale (Georgia Institute of Tech.), Perturbation of periodic orbits of functional differential equations, 28/6/05.

- Sara Fernandes (Univ. Évora), Spectral theory and discrete dynamical systems, 31/5/05.

- Messoud Efendiev(Univ. Stuttgart),Symmetry and attractors,17/5/05.

- Nuno Luzia (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), On the variational principle for Hausdorff dimension, 26/4/05.

- Vitor Saraiva (Instituto Superior Técnico), Average densities on invariant sets, 19/4/05.

- Lucian Radu (Instituto Superior Técnico), Measures of maximal dimension, 12/4/05.

- Jorge Buescu (Instituto Superior Técnico), Positivity and differentiable reproducing kernel inequalities, 5/4/05.

- Godofredo Iommi (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Ergodic optimization, 15/3/05.

- Tobias Weth (Univ. Giessen), Partial symmetry of solutions to some variational problems, 22/2/05.

- Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Global solutions for the modified KdV equation, 25/1/05.

- Tiago Domingos (Instituto Superior Técnico), The formal unification of thermodynamics and microeconomics, 18/1/05.

"Geometria em Lisboa" Seminar. This included the following talks in 2005:

- Catarina Carvalho (Instituto Superior Técnico), Operators on groupoids and the analytic index, 13/12/05.

- Henrique Bursztyn (Instituto Nacional de Matemática Pura e Aplicada), Reduction of generalized complex structures, 22/11/05.

- José Agapito (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Paradan polytope decompositions and Euler Maclaurin formulas for simple integral polytopes, 4/10/05.

- Sang Seon Kim (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Geometry of contact domains and transformations, 20/9/05.

- Michèle Audin (Institut de Recherche Math. Avancée), Around the Sofia Kowalevskaya top, 12/7/05.

- Martin Pinsonnault (The Fields Institute), Homotopical complexity of symplectomorphism groups, 5/7/05.

- Bruno de Oliveira (Univ. Miami), Symmetric differentials in algebraic geometry, part II, 30/6/05.

- Bruno de Oliveira (Univ. Miami), Symmetric differentials in algebraic geometry, part I, 28/6/05.

- Caryn Werner (Allegheny College), Examples of surfaces with zero geometric genus, 31/5/05.

- Balazs Szendroi (Utrecht Univ.), Quivers and sheaves on surfaces and threefolds, 10/5/05.

- José Agapito (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Weighted polytope decompositions, toric varieties and Euler Maclaurin formulas, 12/4/05.

- Tiago Requeijo (Stanford Univ.), Introduction to Ricci Flow, 29/3/05.

- José Natário (Instituto Superior Técnico), An Overview of Mathematical General Relativity, 8/3/05.

- Marco Zambon (Univ. Zürich), Averaging of isotropic submanifolds, 25/1/05.

Partial Differential Equations Seminar. This included the following talks in 2005:

- Robert Jerrard (Univ. Toronto), On the weak continuity of Hessian measures, 1/7/05.

- Carlos Rocha (Instituto Superior Técnico), Realization of attractors for semilinear parabolic equations, 24/6/05.

- Manuel Portilheiro (Univ. Coimbra), Histerese num problema parabólico mal-posto, 17/6/05.

- Shiwanand Dwivedi, Existence of solutions of two-point nonlinear boundary value problems using topological transversality techniques, 2/6/05.

- José Matias (Instituto Superior Técnico), Inclusões diferenciais (para formas diferenciais) e aplicações ao cálculo de variações, 13/5/05.

- Michael Grinfeld (Univ. Strathclyde), Reaction-Dispersal Equations, 9/5/05.

- Sergio Gutierrez (Catholic Univ. Chile), Compensated Compactness and the difference between quasiconvexity and rank-one convexity, 29/4/05.

- Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Almost conserved quantities and global solution to the KdV equation, 22/4/05.

- Mahendra Panthee (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Almost conserved quantities and global solution to the KdV equation, 15/4/05.

- Fabio Chalub (Univ. Nova de Lisboa), Kinetic models for chemotaxis, 1/4/05.

- José Natário (Instituto Superior Técnico), Einstein's Equation, 18/2/05.

- Luís Diaz (Univ. Extremadura, Badajoz), Aproximação em espaços normados com normas mistas, 31/1/05.

- Diogo Gomes (Instituto Superior Técnico), Construction of minimax Mather measures, 28/1/05.

- Diogo Gomes (Instituto Superior Técnico), PDE and integrability of Hamiltonian Systems, 21/1/05.

- Robert McCann (Univ. Toronto), Optimal convergence rates for the fastest conservative nonlinear diffusions, 14/1/05.

Mathematical Physics Seminar. This included the following talks in 2005:

- Paul Lescot (Univ. Picardie), Preliminaries to a possible construction of a unitarizing measure for the Virasoro algebra (after Kirillov and Malliavin), 22/6/05.

- Paulo Pinto (Instituto Superior Técnico), Subfactor or RCFT realisation of modular invariant partition functions, 9/3/05.

Topological Quantum Field Theory Club. This included the following talks in 2005:

- (June 30)

  - Marco Mackaay (Univ. Algarve), Rasmussen's s-invariant for links.
  - Marco Stosic (Instituto Superior Técnico), Categorification of the dichromatic polynomial for graphs.

- (June 29)

  - Nuno Romão (Univ. Adelaide), Gauged vortices in a background.
  - João Paulo Santos (Instituto Superior Técnico), Instantons, holomorphic bundles and the bar construction.

- (June 9)

  - Ricardo Schiappa (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), BRST cohomology and characters of pure spinors.
  - José Natário (Instituto Superior Técnico), Asymptotic quasinormal frequencies for d-dimensional black holes.

- (March 11)

  - Marco Mackaay (Univ. Algarve), Colored stable Bar-Natan link homology.
  - João Faria Martins (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Categorical groups, knots and knotted surfaces.

- (February 9)

  - Stephen Sawin (Fairfield Univ.), Witten-style nonabelian localization for a noncompact manifold.
  - Paulo Pinto (Instituto Superior Técnico), Subfactor or RCFT realisation of modular invariant partition functions.

Algebra Seminar.   This included the following talks in 2005:

- Gonçalo Tabuada (Univ. Paris VII), Invariantes aditivos de dg-categorias, 14/9/05.

- Paulo Lima-Filho (Texas A&M Univ.), On the holonomy Lie algebra of graphic arrangements, 1/6/05.

- Gustavo Granja (Instituto Superior Técnico), Local cohomology as cellular approximation (Part III), 4/5/05.

- Gustavo Granja (Instituto Superior Técnico), Local cohomology as cellular approximation (Part II), 27/4/05.

- Gustavo Granja (Instituto Superior Técnico), Local cohomology as cellular approximation (Part I), 20/4/05.

- Gustavo Granja (Instituto Superior Técnico), K-theory and derived equivalences (after Dugger and Shipley), 30/3/05.

- Christopher J. Mulvey (Univ. Sussex & Univ. Cambridge), Sheaves of C*-algebras, 16/3/05.

Mathematics, Systems and Robotics Seminar.   In collaboration with Instituto de Sistemas e Robótica. It included the following talks in 2005:

- (December 19)

  - Alexandre Mateus (Instituto Superior Técnico), Interconnection among ISPs in a competitive environment.
  - Diogo Gomes (Instituto Superior Técnico), The strange world of partial differential equations — part III.

- (November 4)

  - Carlos Bispo (Instituto Superior Técnico), Optimality of idling policies: the entangled scheduling and routing problem.
  - Diogo Gomes (Instituto Superior Técnico), The strange world of partial differential equations — part II.

- (October 7)

  - Marco Ribeiro (Instituto Superior Técnico), Estimating camera orientation from video in a Manhattan world.
  - Diogo Gomes (Instituto Superior Técnico), The strange world of partial differential equations.

- (June 3)

  - Alexander Plakhov (Univ. Aveiro), Problema aerodinâmico de Newton e problema de transporte de massa.
  - Diogo Gomes (Instituto Superior Técnico), Some recent problems in stochastic optimal control.

- (May 20)

  - Jorge Nuno Silva (Univ. Lisbon), O jogo dos filósofos.
  - Jorge Silva (Instituto Superior de Engenharia de Lisboa), Manifold learning with tangent bundle approximation.

- (May 6)

  - João Sobrinho (Instituto Superior Técnico), O M(in)istério da Educação: ou o problema da colocação dos docentes 2004/2005.
  - Joachim Erven (Univ. München), To keep a secret — no secret with mathematics!

- (April 8)

  - Francisco Garcia (Instituto Superior Técnico), Local stationarity in passive detection of transient signals.
  - Carlos Florentino (Instituto Superior Técnico), Gröbner bases in geometry and robotics.

- (February 25)

  - Manuel Ricou (Instituto Superior Técnico), The fundamental theorems of calculus.
  - Patrick Flandrin (Ecole Normale Supérieure de Lyon), Chirps everywhere.

- (February 4)

  - Paulo Gonçalves (Instituto de Sistemas e Robótica), Empirical mode decomposition from a filter bank viewpoint.
  - Jorge Buescu (Instituto Superior Técnico), General Inequalities for differentiable reproducing kernels.

Working Seminar on Symplectic/Algebraic Geometry - Spring 2005. The main objective of this seminar was to foster interaction between members of the Center working in Symplectic Geometry and Algebraic Geometry, using Delzant's Conjecture as the unifying theme. There were the following talks:

- Rui Loja Fernandes (Instituto Superior Técnico), Introduction to Delzant's Conjecture, 17/02/05.

- Rui Loja Fernandes and Miguel Abreu (Instituto Superior Técnico), Delzant's classification theorem for symplectic toric manifolds, 10/03/05, 17/03/05, 07/04/05.

- Margarida Mendes Lopes (Instituto Superior Técnico), Toric varieties from the algebraic geometry point of view, 07/04/05, 14/04/05, 28/04/05, 05/05/05.

- Hui Li (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Classification of symplectic 4-dimensional $SO(3)$-manifolds (after P. Iglesias), 12/05/05, 02/06/05, 09/06/05.

- Hui Li (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Classification of completely integrable actions of rank 2 groups (after Delzant), 09/06/05, 21/06/05.

Working Seminar on Groupoids and Noncommutative Geometry.
This introduced four series of talks in 2005:

- Catarina Carvalho (Instituto Superior Técnico), Index theory, 10/11/05*.

- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Locally compact groupoids and C*-algebras, 27/10/05*, 17/11/05.

- Rui Loja Fernandes (Instituto Superior Técnico), Lie groupoids and Lie algebroids, 20/10/05*, 3/11/05*, 20/12/05.

- Pedro Resende (Instituto Superior Técnico), Étale groupoids and quantales, 13/10/05*, 27/10/05*, 24/11/05.

(*) Talks included in the program of the First CAMGSD Thematic Period — Algebraic Geometry and Topological Strings, Instituto Superior Técnico, October 10 to November 12, 2005 (see §3).

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 2005:

Ideal Turbulence

Instituto Superior Técnico, April 12–15, 2005

Lecturer: A. Sharkovsky (Institute of Mathematics, Kiev).

   http://www.math.ist.utl.pt/∼sramos/ideal05.pdf

VI Lisbon Summer Lectures in Geometry

Instituto Superior Técnico, June 14–17, 2005

Lecturers:

- William Goldman (Univ. Maryland),
- Jonathan Weitsman (Univ. California, Santa Cruz).

   http://www.math.ist.utl.pt/SummerLect05/

Workshop on Coagulation-Fragmentation Processes: Theory and Applications

Edinburgh, July 4–8, 2005

Invited speakers:

- Peter Coveney (Univ. College London),
- Fereydoon Family (Emory Univ.),
- Antonio Fasano (Univ. Florence),
- Ian Ford (Univ. College London),
- Nicholas Fournier (Institut Elie Cartan),
- Philippe Laurençot (Univ. Paul Sabatier),
- François Leyvraz (Univ. Mexico),
- Alexey Lushnikov (Univ. Helsinki),
- Barbara Niethammer (Humboldt Univ. Berlin),
- Robert Pego (Carnegie Mellon Univ.),
- Sotiris Pratsinis (ETH-Zentrum, Zürich),
- Derek Richardson (Univ. Maryland),
- Wolfgang Wagner (Weierstrass Institute, Berlin),

- Peter Walde (ETH-Höggerberg, Zürich),
- Robert Ziff (Univ. Michigan).

http://www.icms.org.uk/meetings/2005/coagfrag/

Workshop on Symplectic Topology (SYMAT05)

Instituto Superior Técnico, July 7–9, 2005

Lecturers:

- Denis Auroux (Massachusetts Institute of Technology),
- Frederic Bourgeois (Univ. Libre de Bruxelles),
- Ciprian Manolescu (Princeton Univ.),
- Ivan Smith (Univ. Cambridge).

http://www.math.ist.utl.pt/∼sanjos/SYMAT05/

XIVth Oporto Meeting on Geometry, Topology and Physics — Mathematical Aspects of Quantum Field Theory

Faculdade de Ciências da Univ. Porto, July 21–24, 2005

Main speakers:

- Klaus Fredenhagen (Univ. Hamburg),
- Gerald Johnson (Univ. Nebraska, Lincoln),
- David McComb (Univ. Edinburgh),
- Graeme Segal (Univ. Oxford).

http://www.fc.up.pt/oldcfp/omgtp2005/index.html

First CAMGSD Thematic Period — Algebraic Geometry and Topological Strings

Instituto Superior Técnico, October 10 to November 12, 2005

Short courses by:

- Jim Bryan (Univ. British Columbia),
- Marcos Mariño (Instituto Superior Técnico & CERN),
- Albrecht Klemm (Univ. Wisconsin, Madison),
- Rahul Pandharipande (Princeton Univ.).

Seminar talks by:

- João Baptista (Cambridge Univ.),
- Ralph Cohen (Stanford Univ.),
- Tom Graber (Univ. California, Berkeley),
- Sergei Gukov (Harvard Univ.),
- Yuan-Pin Lee (Univ. Utah),
- Marco Mackaay (Univ. Algarve),
- Davesh Maulik (Princeton Univ.),
- Andy Neitzke (Harvard Univ.),
- Andrei Okounkov (Princeton Univ.),
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos),
- Victor Przyjalkowski (Steklov Mathematical Institute),
- Leonardo Rastelli (Princeton Univ.),
- Vyacheslav S. Rychkov (Scuola Normale Superiore di Pisa),
- Emanuel Scheidegger (Univ. Piemonte Orientale).

Working seminar sessions: see §2.

   http://www.math.ist.utl.pt/∼strings/AGTS/

Combinatorial Geometry and its Applications: Oriented Matroids, Matroids

Centre International de Rencontres Mathématiques (CIRM), Luminy, November 7–11, 2005

Speakers:

- Eric Babson (Univ. Seattle),
- Louis Billera (Cornell Univ.),
- Alexandre Borovik (Univ. Manchester),
- Jürgen Borowski (Tech. Univ. Darmstadt),
- Graham Denham (Univ. Western Ontario),
- Jack Edmonds (Ontario),
- Eva-Maria Feichtner (ETH Zürich),
- David Forge (Univ. Paris Sud),
- Emeric Gioan (Univ. Montpellier I),
- Isodoro Gitler (Cinvestav Mexico),

- Bodo Lass (Univ. Lyon I),
- Michel Las Vergnas (Univ. Paris VI),
- Jim Lawrence (George Mason Univ.),
- Manoel Lemos (Univ. Federal de Pernambuco),
- Frank Lutz (Tech. Univ. Berlin),
- Arnaldo Mandel (Univ. São Paulo),
- Nikolai Mnëv (Steklov Mathematical Institute),
- Ilda Perez da Silva (Univ. Lisboa),
- Andràs Recski (Budapest Univ. Tech.),
- Jean-Pierre Roudneff (Univ. Paris VI),
- Bruce Sagan (Michigan State Univ.),
- Lars Schewe (Tech. Univ. Darmstadt),
- Ileana Streinu (Smith College),
- Adrien Vieilleribière (Univ. Paris Sud),
- Neil White (Univ. Florida),
- Geoffrey Whittle (Victoria Univ.),
- Thomas Zaslavski (Binghampton Univ.).

http://www.cirm.univ-mrs.fr/web.ang/liste_rencontre/Rencontres2005/
LasVerg05/LasVerg05.html

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 date of the opening 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.

The following fellows have stayed in the Center, under this program, during the whole or part of 2005:

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

- R. Czaja, PhD in Mathematics, Univ. Silesia, Poland, 2004. Research areas: semilinear abstract parabolic equations. (Sep. 1, 2005–Aug. 31, 2006)

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

- M. Panthee, PhD in Mathematics, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: partial differential equations, harmonic analysis. (Dec. 15, 2004–Jan. 14, 2006)

- B. Van Steirteghem, PhD in Mathematics, Columbia Univ., USA, 2004. Research areas: algebraic groups, symplectic geometry. (Nov. 1, 2004–Jan. 31, 2006 — continued supported directly by FCT)

- G. Iommi, PhD in Mathematics, Univ. Warwick, UK, 2004. Research areas: dynamical systems. (Nov. 1, 2004–Dec. 31, 2005 — continued supported directly by FCT)

- H. Li, PhD in Mathematics, Univ. Illinois, Urbana-Champaign, USA, 2003. Research areas: symplectic geometry. (Sep. 1, 2003–Aug. 31, 2005)

The research activities of the Center have also attracted postdoctoral fellows supported directly by FCT. The following have stayed in the Center, at least partially, in 2005:

- S.S. Kim, PhD in Mathematics, Stanford Univ., USA, 2001. Research areas: symplectic and contact geometry. (Jul. 2005–)

- N. Luzia, Doutorado em Matemática, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: dynamical systems. (May 2005–)

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

- J. Agapito, PhD in Mathematics, Univ. California, Santa Cruz, USA, 2004. Research areas: symplectic geometry, discrete mathematics. (Jan. 2005–)

- J. Martins, PhD in Mathematics, Nottingham Univ., UK, 2004. Research areas: quantum topology, quantum groups, knot theory, applications of categorical groups to low dimensional topology. (Jan. 2005–)

- C. Valls, Doctor in Matematics, Univ. Barcelona, Spain, 1999. Research areas: dynamical systems. (Oct. 2003–)

- D. Krejčiřík, PhD in Mathematics, Univ. Toulon et du Var, France, 2001, and PhD in Theoretical Physics, Charles Univ. Prague, Czech Republic, 2001. Research areas: mathematical physics, quantum mechanics, spectral geometry. (Feb. 2003–Jan. 2005)

- R. Hric, PhD in Mathematics, Comenius Univ. in Bratislava, Slovakia, 1999. Research areas: dynamical systems. (Jan. 2003–Dec. 2005)

5 Publications in 2005

Publications which appeared in 2005

Books

J. Labastida and M. Mariño. *Topological Quantum Field Theory and Four Manifolds.* Mathematical Physics Studies 25. Springer, 2005.

M. Mariño. *Chern–Simons Theory, Matrix Models and Topological Strings.* International Series of Monographs on Physics 131. The Clarendon Press, Oxford University Press, 2005.

Chapters in books

L. Barreira. Hiperbolicidade, recorrência e dimensão. Supplement to the Portuguese translation of the book by A. Katok and B. Hasselblatt, Introduction to the Modern Theory of Dynamical Systems, Cambridge University Press, 1995, Fundação Calouste Gulbenkian, 2005, pp. 665–724.

Articles in international journals with referees

M. Aganagic, A. Klemm, M. Mariño and C. Vafa. The topological vertex. *Comm. Math. Phys.*, 254 (2005), 425–478.

J. Agapito and J. Weitsman. The weighted Euler–Maclaurin formula for a simple integral polytope. *Asian J. Math.*, 9 (2005), 199–211.

J. Alves, J. Fachada and J. Sousa Ramos. Detecting topological transitivity of piecewise monotone interval maps. *Topology Appl.*, 153 (2005), 680–697.

J. Alves, M. Graça, M. Sousa Dias and J. Sousa Ramos. A linear algebra approach to the conjecture of Collatz. *Linear Algebra Appl.*, 394 (2005), 277–289.

J. Alves, R. Hric and J. Sousa Ramos. Topological entropy, homological growth and zeta functions on graphs. *Nonlinearity*, 18 (2005), 591–607.

L. Barreira and C. Silva. Lyapunov exponents for continuous transformations and dimension theory. *Discrete Contin. Dyn. Syst.*, 13 (2005), 469–490.

L. Barreira and C. Valls. Center manifolds for nonuniformly partially hyperbolic diffeomorphims. *J. Math. Pures Appl. (9)*, 84 (2005), 1693–1715.

L. Barreira and C. Valls. Higher regularity of invariant manifolds for nonautonomous equations. *Nonlinearity*, 18 (2005), 2373–2390.

L. Barreira and C. Valls. Smoothness of invariant manifolds for nonautonomous equations. *Comm. Math. Phys.*, 259 (2005), 639–677.

L. Barreira and C. Valls. Stability of nonautonomous differential equations in Hilbert spaces. *J. Differential Equations*, 217 (2005), 204–248.

A. Barroso and J. Matias. Necessary and sufficient conditions for existence of solutions of a variational problem involving the curl. *Discrete Contin. Dyn. Syst.*, 12 (2005), 97–114.

J. Bojarczuk and P. Lopes. Quandles at finite temperatures. III. *J. Knot Theory Ramifications*, 14 (2005), 275–373.

P. Bordalo, L. Cornalba and R. Schiappa. Towards quantum dielectric branes: curvature corrections in abelian beta function and non-abelian Born–Infeld action. *Nuclear Phys. B*, 710 (2005), 189–254.

V. Bouchard, B. Florea and M. Mariño. Topological open string amplitudes on orientifolds. *J. High Energy Phys.*, 2005, no. 2, 002, 35 pp.

X. Carvajal and M. Panthee. Unique continuation property for a higher order nonlinear Schrödinger equation. *J. Math. Anal. Appl.*, 303 (2005), 188–207.

R. Cordovil and D. Forge. Gröbner and diagonal bases in Orlik–Solomon type algebras. *Cubo*, 7 (2005), 1–20.

L. Cornalba, M. Costa and R. Schiappa. *D*-brane dynamics in constant Ramond–Ramond potentials, *S*-duality and noncommutative geometry. *Adv. Theor. Math. Phys.*, 9 (2005), 355–406.

J. Costa and J. Natário. Homogeneous cosmologies from the quasi-Maxwell formalism. *J. Math. Phys.*, 46 (2005), 82501, 17 pp.

M. Crainic and R. Loja Fernandes. Ridigity and flexibility in Poisson geometry. *Trav. Math.*, 16 (2005), 53–68.

J. Duarte and J. Sousa Ramos. Topological invariants in forced piecewise-linear FitzHugh–Nagumo-like systems. *Chaos Solitons Fractals*, 23 (2005), 1553–1565.

P. Exner, P. Freitas and D. Krejčiřík. A lower bound to the spectral threshold in curved tubes. *Proc. Roy. Soc. London Ser. A*, 460 (2005), 3457–3467.

J. Faria Martins. Knot theory with the Lorentz group. *Fund. Math.*, 188 (2005), 59–93.

J. Faria Martins. On the analytic properties of the z-coloured Jones polynomial. *J. Knot Theory Ramifications*, 14 (2005), 435–466.

J. Ferreira and S. Pinelas. Nonoscillations in retarded systems. *J. Math. Anal. Appl.*, 308 (2005), 714–729.

C. Florentino, P. Matias, J. Mourão and J. Nunes. Geometric quantization, complex structures and the coherent state transform. *J. Funct. Anal.*, 221 (2005), 303–322.

J. Freitas and J. Sousa Ramos. Star-product on Newton map for quintic polynomials. *Int. J. Pure Appl. Math.*, 20 (2005), 437–447.

L. Godinho. On certain symplectic circle actions. *J. Symplectic Geom.*, 3 (2005) 357–383.

D. Gomes. A variational formulation for the Navier–Stokes equation. *Comm. Math. Phys.*, 257 (2005), 227–234.

D. Gomes. Viscosity solution methods and the discrete Aubry–Mather problem. *Discrete Contin. Dyn. Syst.*, 13 (2005), 103–116.

G. Iommi. Multifractal analysis for countable Markov shifts. *Ergodic Theory Dynam. Systems*, 25 (2005), 1881–1907.

J. Lampreia, R. Severino and J. Sousa Ramos. Irreducible complexity of iterated symmetric bimodal maps. *Discrete Dyn. Nat. Soc.*, 2005, 69–85.

H. Li. On the construction of certain 6-dimensional symplectic manifolds with Hamiltonian circle actions. *Trans. Amer. Math. Soc.*, 357 (2005), 983–998.

J. Llibre and C. Valls. Formal and analytic integrability of the Lorenz system. *J. Phys. A*, 38 (2005), 2681–2686.

J. Llibre and C. Valls. Integrability of the Bianchi IX system. *J. Math. Phys.*, 46 (2005), 072901, 13 pp.

J. Llibre and C. Valls. Formal and analytic first integrals of Einstein–Yang–Mills equations. *J. Phys. A*, 38 (2005), 8155–8168.

P. Lopes and C. Morales. The knot group and the fundamental group of the embedding 3-manifold. *J. Knot Theory Ramifications*, 14 (2005), 265–273.

M. Mariño. Chern–Simons theory and topological strings. *Rev. Modern Phys.*, 77 (2005), 675–720.

M. Mariño. Chern–Simons theory, matrix integrals, and perturbative three-manifold invariants. *Comm. Math. Phys.*, 253 (2005), 25–49.

P. Martins Rodrigues and J. Sousa Ramos. Bowen–Franks groups as conjugacy invariants for $\mathbb{T}^n$ automorphisms. *Aequationes Math.*, 69 (2005), 231–249.

C. Mulvey and P. Resende. A noncommutative theory of Penrose tilings. *Internat. J. Theoret. Phys.*, 44 (2005), 655–689.

J. Nelson and R. Picken. Constant connections, quantum holonomies and the Goldman bracket. *Adv. Theor. Math. Phys.*, 9 (2005), 407–433.

M. Panthee. On the compact support of solutions to a nonlinear long internal waves model. *Nepali Math. Sci. Rep.*, 24 (2005), 49–58.

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A. Pumariño and C. Valls. Instability in Hamiltonian systems. *Electr. J. Qual. Theory Diff. Equ., Monograph Series*, 1 (2005), 204 pp.

J. Santos. Framed holomorphic bundles on rational surfaces. *J. Reine Angew. Math.*, 589 (2005), 129–158.

R. Schiappa and N. Wyllard. D-brane boundary states in the pure spinor superstring. *J. High Energy Phys.*, 2005, no. 7, 070, 40 pp.

A. Serra. New examples of non-complete Pick kernels. *Integral Equations Operator Theory*, 53 (2005), 553–572.

M. Stošić and R. Picken. Parasupersymmetric quantum mechanics of order three and a generalized Witten index. *Modern Phys. Lett. A*, 20 (2005), 1395–1407.

C. Valls. The Boussinesq system: dynamics on the center manifold. *Commun. Pure Appl. Anal.*, 4 (2005), 839–860.

C. Valls. Rikitake system: analytic and Darbouxian integrals. *Proc. Roy. Soc. Edinburgh Sect. A*, 135 (2005), 1309–1326.

J. Ventura. Homological algebra for the representation Green functor for abelian groups. *Trans. Amer. Math. Soc.*, 357 (2005), 2253–2289.

S. Vinagre, R. Severino and J. Sousa Ramos. Topological invariants in nonlinear boundary value problems. *Chaos Solitons Fractals*, 25 (2005), 65–78.

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J. Agapito. A weighted version of quantization commutes with reduction for a toric manifold. In *Integer points in polyhedra—geometry, number theory, algebra, optimization*, Contemp. Math., vol. 374, Proceedings of the AMS-IMS-SIAM Joint Summer Research Conference held in Snowbird, Utah, July 13–17, 2003, edited by A. Barvinok, M. Beck, C. Haase, B. Reznick and V. Welker, Amer. Math. Soc., 2005, pp. 1–14.

J. Alves, J. Fachada and J. Sousa Ramos. A condition for transitivity of Lorenz maps. In *Proceedings of the Eighth International Conference on Difference Equations and Applications*, Masaryk University, Brno, July 28–August 1, 2003, edited by S. Elaydi, G. Ladas, B. Aulbach and O. Došlý, Chapman & Hall/CRC, 2005, pp. 7–13.

J. Buescu, M. Campagnolo and D. Graça. Robust simulations of Turing machines with analytic maps and flows. In *First Conference on Computability in Europe*, Lecture Notes in Computer Science, vol. 3526, Amsterdam 2005, edited by S. Cooper, B. Lowe and L. Torenvliet, Springer, 2005, pp. 169–179.

M. Crainic and R. Loja Fernandes. Secondary characteristic classes of Lie algebroids. In *Quantum Field Theory and Noncommutative Geometry*, Lecture Notes in Physics, vol. 662, papers from the workshop held at Tohoku University, Sendai, November 26–30, 2002, edited by U. Carow-Watamura, Y. Maeda and S. Watamura, Springer, 2005, pp. 157–176.

J. Duarte, L. Silva and J. Sousa Ramos. Symbolic dynamics in the study of bursting electrical activity. In *Difference equations and discrete dynamical systems*, Proceedings of the 9th Annual International Conference on Difference Equations and Applications, University of Southern California, Los Angeles, August 2–7, 2004, edited by L. Allen, B. Aulbach, S. Elaydi and R. Sacker, World Sci. Publ., 2005, pp. 313–324.

D. Evans and P. Pinto. Modular invariants and the double of the Haagerup subfactor. In *Advances in Operator Algebras and Mathematical Physics*, Theta Series in Advanced Mathematics, Proceedings of the Conference Operator Algebras and Mathematical Physics, Sinaia 2003, edited by J. Boca, O. Bratelli, R. Longo and H. Siedentop, Amer. Math. Soc., 2005, pp. 67–88.

S. Fernandes and J. Sousa Ramos. Second smaller zero of kneading determinant for iterated maps. In *Proceedings of the Eighth International Conference on Difference Equations and Applications*, Masaryk University, Brno, July 28–August 1, 2003, edited by S. Elaydi, G. Ladas, B. Aulbach and O. Došlý, Chapman & Hall/CRC, 2005, pp. 137–144.

D. Gomes. Duality principles for fully nonlinear elliptic equations. In *Trends in Partial Differential Equations of Mathematical Physics*, Progress in Nonlinear Differential Equations and their Applications, vol. 61, selected contributions from the International Conference on Trends in Partial Differential Equations of Mathematical Physics, Óbidos 2003, edited by J. Rodrigues, G. Seregin and J. Urbano, Birkhäuser, 2005, pp. 125–136.

D. Gomes and A. Oberman. Computing the effective Hamiltonian using a variational approach. In *Proceedings of the 44th IEEE Conference on Decision and Control, and the European Control Conference*, Seville 2005, CDC–ECC 2005, pp. 729–733.

R. Loja Fernandes. A note on proper Poisson actions. In *Proceedings of the 10th International Conference in Modern Group Analysis*, Larnaca, Cyprus, October 2004, edited by N. Ibragimov, C. Sophocleous and P. Damianou, 2005, pp. 77–84.

J. Nelson and R. Picken. Classical and quantum geometry of moduli spaces in three-dimensional gravity. In *Proceedings of XIII Fall Workshop on Geometry and Physics*, Murcia 2004, edited by L. Linares, A. Izquierdo, M. Cifre and J. González, Publ. de la RSME, 2005, pp. 104–114.

H. Oliveira and J. Sousa Ramos. Iterates of the tangent map—the bifurcation scheme. In *Proceedings of the Eighth International Conference on Difference Equations and Applications*, Masaryk University, Brno, July 28–August 1, 2003, edited by S. Elaydi, G. Ladas, B. Aulbach and O. Došlý, Chapman & Hall/CRC, 2005, pp. 209–217.

R. Picken. A cohomological description of abelian bundles and gerbes. In *Twenty years of Bialowieza: a mathematical anthology*, World Sci. Monogr. Ser. Math., 8, edited by S. Ali, G. Emch, A. Odzijewicz, M. Schlichenmaier and S. Woronowicz, World Sci. Publ., 2005, pp. 217–228.

T. Ratiu, R. Tudoran, L. Sbano, E. Sousa Dias and G. Terra. A crash course in geometric mechanics. In *Geometric Mechanics and Symmetry: the Peyresq Lectures*, London Mathematical Society Lecture Notes Series, 306, Lecture Notes from the European Summer Schools in Geometric Mechanics, Peyresq 2000/2001, edited by J. Montaldi and T. Ratiu, Cambridge University Press, 2005, pp. 23–156.

C. Rocha. Transversality in semilinear parabolic equations on the circle. In *Equadiff 2003, International Conference on Differential Equations*, Hasselt 2003, edited by F. Dumortier, H. Broer, J. Mawhin, A. Vanderbauwhede and S. Lunel, World Scientific, 2005, pp. 672–677.

S. Vinagre and J. Sousa Ramos. Symbolic dynamics generated by an idealized time-delayed Chua's circuit. In *Proceedings of the Eighth International Conference on Difference Equations and Applications*, Masaryk University, Brno, July 28–August 1, 2003, edited by S. Elaydi, G. Ladas, B. Aulbach and O. Došlý, Chapman & Hall/CRC, 2005, pp. 273–280.

Accepted publications (submitted or accepted in 2005)

Books

A. Corso, P. Gimenez, M. Pinto and S. Zarzuela, editors. *Commutative Algebra. Geometric, Homological, Combinatorial and Computational Aspects.* Lecture Notes in Pure and Applied Mathematics, vol. 244. Proceedings of the 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. To appear.

Chapters in books

L. Barreira and Ya. Pesin. Smooth ergodic theory and nonuniformly hyperbolic dynamics. To appear in Handbook of Dynamical Systems 1B, edited by B. Hasselblatt and A. Katok, Elsevier, pp. 57–263.

Articles in international journals with referees

M. Abreu, G. Granja and N. Kitchloo. Moment maps, symplectomorphism groups and compatible complex structures. *J. Symplectic Geom.*, 3 (2005), in press.

J. Agapito. Weighted Brianchon–Gram decomposition. To appear in Canad. Math. Bull.

X. Arsiwalla, R. Boels, M. Mariño and A. Sinkovics. Phase transitions in q-deformed $2D$ Yang–Mills theory and topological strings. To appear in Phys. Rev. A.

S. Bandyopadhyay, A. Barroso, B. Dacorogna and J. Matias. Differential inclusions for differential forms and applications to the calculus of variations. To appear in Calc. Var. Partial Differential Equations.

L. Barreira. Nonadditive thermodynamic formalism: equilibrium and Gibbs measures. To appear in Discrete Contin. Dyn. Syst.

L. Barreira and V. Saraiva. Explicit formulas for the average density of conformal repellers. To appear in Ergodic Theory Dynam. Systems.

L. Barreira and C. Valls. Existence of stable manifolds for nonuniformly hyperbolic C^1 dynamics. To appear in Discrete Contin. Dyn. Syst.

L. Barreira and C. Valls. Multifractal structure of two-dimensional horseshoes. To appear in Comm. Math. Phys.

L. Barreira and C. Valls. Stable manifolds for nonautonomous equations without exponential dichotomy. To appear in J. Differential Equations.

L. Barreira and C. Valls. A Grobman–Hartman theorem for nonuniformly hyperbolic dynamics. To appear in J. Differential Equations.

L. Barreira and C. Wolf. Pointwise dimension and ergodic decompositions. To appear in Ergodic Theory Dynam. Systems.

M. Borges. Dimension and ergodic decompositions for hyperbolic flows. To appear in European J. Appl. Math.

J. Buescu, M. Kulczycki and I. Stewart. Liapunov stability and adding machines revisited. To appear in Dyn. Syst.

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

J. Buescu and A. Paixão. Eigenvalue distribution of Mercer-like kernels. To appear in Math. Nachr.

J. Buescu and A. Paixão. Eigenvalues of positive definite integral operators on unbounded intervals. To appear in Positivity.

J. Buescu and A. Paixão. Inequalities for differentiable reproducing kernels and an application to positive integral operators. To appear in J. Inequal. Appl.

26

J. Buescu and A. Paixão. Positive definite matrices and differentiable reproducing kernel inequalities. To appear in J. Math. Anal. Appl.

A. Calabri, C. Ciliberto and M. Mendes Lopes. Numerical Godeaux surfaces with an involution. To appear in Trans. Amer. Math. Soc.

R. Cordovil and D. Forge. An Orlik–Solomon type algebra for matroids with a fixed linear class of circuits. To appear in Portugal. Math.

F. da Costa, H. van Roessel and J. Wattis. Long-time behaviour and self-similarity in a coagulation equation with input of monomers. To appear in Markov Process. Related Fields.

J. Duarte, L. Silva and J. Sousa Ramos. Computation of the topological entropy in chaotic biophysical bursting models for excitable cells. To appear in Discrete Dyn. Nat. Soc.

S. Fernandes and J. Sousa Ramos. Second eigenvalue of transition matrix associated to iterated maps. To appear in Chaos Solitons Fractals.

C. Florentino, P. Matias, J. Mourão and J. Nunes. On the BKS pairing for Kähler quantizations of the cotangent bundle of a Lie group. To appear in J. Funct. Anal.

P. Girão and T. Weth. The shape of extremal functions for Poincaré–Sobolev–type inequalities in a ball. To appear in J. Funct. Anal.

G. Iommi. Ergodic optimization for renewal type shifts. To appear in Monatsh. Math.

G. Iommi and B. Skorulski. Multifractal analysis for the exponential family. To appear in Discrete Contin. Dyn. Systems.

F. Knop and B. Steirteghem. Classification of smooth affine spherical varieties. To appear in Transform. Groups.

M. Kobayashi and W. Oliva. Nonholonomic systems and the geometry of constraints. To appear in Qual. Theor. Dynamical Systems.

J. Llibre and C. Valls. Formal and analytical integrability of the Bianchi IX system. To appear in J. Math. Phys.

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

N. Luzia. A variational principle for dimensions for a class of non-conformal repellers. To appear in Ergodic Theory Dynam. Systems.

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. The degree of the bicanonical map of a surface with $p_g = 0$. To appear in Proc. Amer. Math. Soc.

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

M. Panthee and J. Silva. Well-posedness for the Cauchy problem associated to the Hirota–Satsuma equation: periodic case. To appear in J. Math. Anal. Appl.

G. Pizarro, J. Teixeira and D. Noguera. Bitwise implementation of a two-dimensional cellular automata biofilm model. To appear in J. Comput. Civil Eng.

P. Resende. Étale groupoids and their quantales. To appear in Adv. in Math.

P. Resende. A note on infinitely distributive inverse semigroups. To appear in Semigroup Forum.

J. Silva. An accuracy improvement in Egorov's theorem. To appear in Publ. Mat.

C. Valls. Analytical first integrals of the Halphen system. To appear in J. Geom. Phys.

C. Valls. Stability of some waves in the Boussinesq system. To appear in Commun. Pure Appl. Anal.

C. Valls. Quasiperiodic solutions for dissipative Boussinesq system. To appear in Comm. Math. Phys.

C. Valls. On the non-integrability of a generalized Darboux Halphen system. To appear in J. Geom. Phys.

Communications in proceedings with referees

L. Barreira. Poincaré recurrence: old and new. In XIVth International Congress on Math. Physics, (Lisboa 2003), edited by J.-C. Zambrini, World Scientific, to appear.

J. Buescu and A. Paixão. Algebraic, differential, integral and spectral properties of Mercer-like kernels. In Proceedings of the 5th ISAAC 2005, Catania 2005, World Scientific, to appear.

C. Florentino, J. Mourão and J. Nunes. Theta functions, geometric quantization and unitary Schottky bundles. In The Geometry of Riemann Surfaces and Abelian Varieties, Proceedings of the III Iberoamerican Congress on Geometry, Salamanca 2004, edited by J. Porras, S. Popescu and R. Rodriguez, Contemporary Math., to appear.

Other publications

W. Oliva. Aulas de Marie Curie. Portuguese translation of the book Leçons de Marie Curie, Recuillis par Isabelle Chavannes en 1907, EDP Sciences 2003, Editora USP, to appear.

Preprints submitted in 2005 (not yet accepted)

L. Barreira and K. Gelfert. Multifractal analysis for Lyapunov exponents on nonconformal repellers.

L. Barreira and L. Radu. Multifractal analysis for nonconformal repellers: a model case.

L. Barreira and C. Wolf. Pointwise dimension and ergodic decompositions.

M. Borges. Chaotic behavior of the solutions for a singular Hamiltonian system.

A. Calabri, M. Mendes Lopes and R. Pardini. Involutions on numerical Campedelli surfaces.

J. Faria Martins. On 2-dimensional homotopy invariants of complements of knotted surfaces.

L. Godinho. Equivariant cohomology of S^1-actions on 4-manifolds.

L. Godinho and E. Sousa Dias. The fundamental group of S^1-manifolds.

D. Gomes. On a variational principle for the Navier–Stokes equation.

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D. Gomes and E. Valdinoci. Entropy penalization methods for Hamilton–Jacobi equations.

L. Kauffman and P. Lopes. Color spectra and coloring conjectures.

N. Luzia. Hausdorff dimension for a class of multidimensional repellers.

M. Mendes Lopes and R. Pardini. On the algebraic fundamental group of surfaces with $K^2 \leq 3\chi$.

M. Perlmutter, M. Rodríguez-Olmos and E. Sousa Dias. The Witt–Artin decomposition of a cotangent-lifted action.

C. Rocha. Realization of period maps of planar Hamiltonian systems.

J. Teixeira. Local-in-time existence of strong solutions of the n-dimensional Burgers equation via discretizations.

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 basic schools, which together enroll more than 38000 students, aiming at the promotion of Mathematics at these education levels through a set of activities oriented to 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.

Colloquia. The following lectures were given at secondary schools:

- "Fractais", Escola Secundária Quinta do Marquês, Oeiras, January 2005 (Diogo Gomes)

- "A Matemática e o Universo", Escola Secundária de Odivelas, February 2005 (João Pimentel Nunes)

- "Dido e o Cálculo de Variações", Escola Secundária D. Luísa de Gusmão, March 2005 (Maria João Borges)

- "O Papel Fundamental da Matemática", Colégio Marista de Carcavelos, April 2005 (Miguel Abreu)

- "Dido e o Cálculo de Variações", Escola Secundária da Portela, April 2005 (Maria João Borges)

- "Geometria e Relatividade", Escola Secundária D.Filipa de Lencastre, April 2005 (José Natário)

- "A Matemática das Partículas Elementares", Colégio Marista de Carcavelos, December 2005 (João Pimentel Nunes)

Portuguese mathematical olympiad. Training session for the final of the "Olimpíadas de Matemática, categoria B, região Sul", March 5, 2005 (Diogo Gomes with Rui Loja Fernandes, Leonor Godinho, and José Natário).

Summer school. "A Geometria da Relatividade", Instituto Superior Técnico, July 11–15, 2005, http://www.math.ist.utl.pt/cam/estagio/ (Sílvia Anjos, José Natário, and João Pimentel Nunes with Carlos Florentino, Pedro Girão, and Pedro Ferreira dos Santos).

Ciência Viva. "Relatividade: a geometria do Universo" (José Natário) and "A Matemática das Partículas Elementares" (João Pimentel Nunes), Instituto Superior Técnico, November 24, 2005, Dia Nacional da Cultura Científica and Semana da Ciência e da Tecnologia.
(http://www.cienciaviva.pt/actividades/semanact2005/)

Activities for secondary school teachers. Working session devoted to the portuguese mathematical olympiad, Instituto Superior Técnico, November 26, 2005 (Diogo Gomes) (Six teachers from Lisbon and Faro participated.)