

# **Curriculum Vitae - English version**

Ana Paula da Silva Dias

July 2010

# Contents

<b>1</b>	<b>Personal data</b>	<b>3</b>
<b>2</b>	<b>Degrees</b>	<b>3</b>
2.1	Equivalence . . . . .	4
2.2	Prize . . . . .	4
<b>3</b>	<b>Professional activity</b>	<b>4</b>
3.1	Teaching positions . . . . .	4
3.2	Research centres . . . . .	5
3.3	Long term study grants . . . . .	5
<b>4</b>	<b>Research</b>	<b>6</b>
4.1	Publications . . . . .	6
4.2	Work visits . . . . .	10
4.3	Participations in conferences . . . . .	12
4.4	School participations . . . . .	15
4.5	Participations in seminars . . . . .	16
4.6	Supervision . . . . .	17
4.6.1	Post-doctorate . . . . .	17
4.6.2	Doctorate . . . . .	18
4.6.3	Masters . . . . .	18
4.6.4	Others: Seminar . . . . .	19
<b>5</b>	<b>Scientific administration</b>	<b>19</b>
5.1	Research projects . . . . .	19
5.2	Other participations . . . . .	20
5.3	Organization of activities . . . . .	20
<b>6</b>	<b>Teaching</b>	<b>21</b>
6.1	Jury participations . . . . .	21
6.2	Post-graduate teaching . . . . .	23
6.3	Monograph: supervisions . . . . .	23
6.4	Undergraduate teaching . . . . .	24
<b>7</b>	<b>Academic administration</b>	<b>28</b>

<b>8 Other activities</b>	<b>28</b>
8.1 Learned societies . . . . .	28
8.2 Editorial activity . . . . .	28

**Curriculum Vitae**  
**Ana Paula da Silva Dias**

July 2010

## 1 Personal data

- Name: Ana Paula da Silva Dias.
- Birth: Vila Nova de Gaia, March 8, 1969.
- Nationality: Portuguese.
- Address:  
Departamento de Matemática  
Faculdade de Ciências da Universidade do Porto  
Centro de Matemática da Universidade do Porto  
Rua do Campo Alegre, no.687, 4169-007 Porto  
Phone: (+351)220100753  
Fax: (+351)220100708
- E-mail: [apdias@fc.up.pt](mailto:apdias@fc.up.pt)
- Homepage: <http://www.fc.up.pt/cmup/apdias>

## 2 Degrees

- 1987-1991 Licenciatura em Matemática Aplicada - ramo Ciência dos Computadores, Faculdade de Ciências, Universidade do Porto, Portugal. Marks 16, for a maximum of 20.
- 1991-1993 Mestrado em Matemática Aplicada - Equações Diferenciais e Sistemas Dinâmicos, Faculdade de Ciências, Universidade do Porto, Portugal, under the supervision of Professora Isabel Labouriau. Final mark: Muito bom (Very good).

- 1994-1995 Estudante de doutoramento em Matemática (PhD student in Mathematics), Faculdade de Ciências, Universidade do Porto, Portugal, under the supervision of Professora Isabel Labouriau.
- 1995-1998 PhD in Mathematics, Mathematics Institute, University of Warwick, United Kingdom, under the supervision of Professor Ian Stewart.
- October 1998 - September 1999; August 15, 2000 - February 15, 2001; March 1, 2002 - December 31, 2002. Post-doctorate, Mathematics Institute, University of Warwick, United Kingdom, under the supervision of Professor Ian Stewart.
- July 2007 Agregação em Matemática, Departamento de Matemática Pura, Faculdade de Ciências, Universidade do Porto.

## 2.1 Equivalence

- “Doutoramento em Matemática”, Faculdade de Ciências, Universidade do Porto, Portugal. Equivalence given in January 1999.

## 2.2 Prize

- Prize “Engenheiro António de Almeida” for the best final mark of the Licenciatura em Matemática Aplicada - ramo Ciência dos Computadores, Faculdade de Ciências, Universidade do Porto, Portugal, at the school year 1990/1991.

# 3 Professional activity

## 3.1 Teaching positions

1. Departamento (formerly Grupo) de Matemática Aplicada, Faculdade de Ciências, Universidade do Porto:
  - 1991 Monitora (Undergraduate monitor).
2. Departamento (formerly Grupo) de Matemática Pura, Faculdade de Ciências, Universidade do Porto:

- 1991-1993 Assistente estagiária (Beginner assistant lecturer).
- 1993-1998 Assistente (Assistant lecturer).
- Since July, 1998. Professora Auxiliar (Lecturer). Tenure from 2003.

### 3.2 Research centres

- 1994-2001 Member of Centro de Matemática Aplicada da Universidade do Porto.
- Since September, 2001. Member of Centro de Matemática da Universidade do Porto.

### 3.3 Long term study grants

These are only personal study grants. Research projects are listed in Section 5.

- Prodep Portugal, 1991, MSc grant.
- Fundação para a Ciência e a Tecnologia (FCT) Portugal - October 1995 to September 1998 - grant for doctorate abroad (at Mathematics Institute, University of Warwick, United Kingdom). Reference: PRAXIS XXI/BD/4505/94.
- Fundação para a Ciência e a Tecnologia (FCT) Portugal - October 1998 to September 1999; August 15, 2000 to February 15, 2001 (in teaching accumulation period); March 1, 2002 to December 31, 2002 (in teaching accumulation period). Grant for Post-doctorate abroad (at Mathematics Institute, University of Warwick, United Kingdom). Reference: PRAXIS XXI/BPD/18825/98.
- Fundação para a Ciência e a Tecnologia (FCT) Portugal - January to March of 2006. Sabbatical grant for visiting the Mathematics Department, Imperial College of London, United Kingdom. Reference: BSAB-537.

## 4 Research

### Main research area:

Mathematics.

### Subject:

Dynamical Systems.

### Research interests:

- Symmetric Dynamical Systems – Bifurcation Theory with Symmetry  
Special interests:  
Role of the symmetry when studying steady-state and Hopf bifurcations of ordinary differential equations symmetric under compact groups.
- Coupled Cell systems  
Special interests:  
The role of the network of connections and the internal cell dynamics in the study of the dynamics and bifurcations of coupled cell systems (systems of coupled ordinary differential equations). The network (graph of connections) can exhibit symmetries, interior symmetries or groupoid symmetries.

### 4.1 Publications

It follows a list of the works that have been concluded. Electronic versions are available at <http://www.fc.up.pt/cmup/apdias/publications.html>

#### Theses

1. A.P.S.Dias, 1993. *Caos instantâneo*, Dissertação de Mestrado, Faculdade de Ciências, Universidade do Porto, Portugal.
2. A.P.S.Dias, 1998. *Bifurcations with wreath product symmetry*, PhD Thesis, Mathematics Institute, Universidade de Warwick, Reino Unido.

## Papers in international scientific journals

3. I.S.Labouriau and A.P.S.Dias. Instant chaos is chaos in slow motion, *Journal of Mathematical Analysis and Applications* **199** (1996) 138-148.
4. A.P.S.Dias. Hopf bifurcation for wreath products, *Nonlinearity* **11** (1998) 247-264.
5. A.P.S.Dias and I.Stewart. Hopf bifurcation on a simple cubic lattice, *Dynamics and Stability of Systems* **14** (1999) 3-55.
6. A.P.S.Dias and I.Stewart. Symmetry-breaking bifurcations of wreath product systems, *Journal of Nonlinear Science* **9** (1999) 671-695.
7. A.P.S.Dias and I.Stewart. Invariant theory for wreath product groups, *Journal of Pure and Applied Algebra* **150** (2000) 61-84.
8. I.Stewart and A.P.S.Dias. Hilbert series for equivariant mappings restricted to invariant hyperplanes, *Journal of Pure and Applied Algebra* **151** (2000) 89-106.
9. I.Stewart and A.P.S.Dias. Toric geometry and equivariant bifurcations, *Physica D* **143** (2000) 235-261.
10. A.P.S.Dias, B.Dionne and I.Stewart. Heteroclinic cycles and wreath product symmetries, *Dynamics and Stability of Systems* **15** (2000) 353-385.
11. A.P.S.Dias and I.Stewart. Secondary bifurcations in systems with All-to-All coupling, *Proceedings of the Royal Society of London A* **459** (2003) 1969-1986.
12. A.P.S.Dias and I.Stewart. Symmetry Groupoids and Admissible Vector Fields for Coupled Cell Networks, *Journal of the London Mathematical Society* **69** (2004) 707-736.
13. A.P.S.Dias and I.Stewart. Linear Equivalence and ODE-equivalence for Coupled Cell Networks. *Nonlinearity* **18** (2005) 1003-1020.
14. F.Antoneli, A.P.S.Dias, M.Golubitsky and Y.Wang. Patterns of Synchrony in Lattice Dynamical Systems. *Nonlinearity* **18** (2005) 2193-2209.

15. S.M.C.Abreu and A.P.S.Dias. Hopf Bifurcation on Hemispheres. *Nonlinearity* **19** (2006) 553-574.
16. A.P.S.Dias and R.C.Paiva. A note on Hopf bifurcation with dihedral group symmetry. *Glasgow Mathematical Journal* **48** (2006) 41-51.
17. A.P.S.Dias and R.C.Paiva. Hopf bifurcation with  $S_3$ -symmetry. *Portugalia Mathematica* **63** (2) (2006) 127-155.
18. A.P.S.Dias and J.S.W.Lamb. Local bifurcation in symmetric coupled cell networks: linear theory. *Physica D* **223** (2006) 93-108.
19. A.P.S.Dias and A.Rodrigues. Secondary Bifurcations in Systems with All-to-All Coupling. Part II. *Dynamical Systems* **21** (4) (2006) 439-463.
20. M.A.D.Aguiar and A.P.S.Dias. Minimal Coupled Cell Networks. *Nonlinearity* **20** (2007) 193-219.
21. M.A.D.Aguiar, A.P.S.Dias, M.Golubitsky and M.C.A.Leite. Homogeneous coupled cell networks with  $S_3$ -symmetric quotient. *Discrete and Continuous Dynamical Systems Supplement* (2007) 1-9.
22. F.Antoneli, A.P.S.Dias and Rui C.Paiva. Hopf Bifurcation in Coupled Cell Networks with Interior Symmetries. *SIAM Journal on Applied Dynamical Systems* **7** (1) (2008) 220-248.
23. F.Antoneli, A.P.S.Dias and P.C.Matthews. Invariants, Equivariants and Characters in Symmetric Bifurcation Theory. *Proc. Roy. Soc. of Edinburgh* **138A** (2008) 477-512.
24. M.A.D.Aguiar, A.P.S.Dias, M.Golubitsky and M.C.A.Leite. Bifurcation from Quotient Coupled Cell Networks. *Physica D* **238** (2009) 137-155.
25. F.Antoneli, P.H. Baptistelli, A.P.S.Dias and M.Manoel. Invariant Theory and Reversible-Equivariant Vector Fields. *Journal of Pure and Applied Algebra* **213** (2009) 649-663.
26. A.P.S.Dias and A.Rodrigues. Hopf bifurcation with  $S_n$  symmetry. *Nonlinearity* **22** (2009) 627-666.

27. A.P.S.Dias and E.M.Pinho. Spatially Periodic Patterns of Synchrony in Lattice Networks. *SIAM Journal on Applied Dynamical Systems* **8** (2) (2009) 641-675.
28. A.P.S.Dias, P.C.Matthews and A.Rodrigues. Generating Functions for Hopf Bifurcation with  $\mathbf{S}_n$ -Symmetry. *Discrete and Continuous Dynamical Systems - Series A* **25** (3) (2009) 823-842.
29. A.P.S.Dias and E.M.Pinho. On the enumeration of periodic patterns of synchrony via finite bidirectional networks. *Proceedings A of the Royal Society of London* **466** (2010) 891-910.
30. F.Antoneli, A.P.S.Dias and C.M.A.Pinto. Quasi-periodic States in Coupled Rings of Cells. *Communications in Nonlinear Science and Numerical Simulations* **15** (4) (2010) 1048-1062.

### **Editorial activity**

31. J.Buescu, S.B.S.D.Castro, A.P.S.Dias and I.S.Labouriau (Eds.): (2003) *Bifurcation, Symmetry and Patterns*. Series: Trends in Mathematics. Birkhäuser Verlag, Basel, Switzerland. ISBN 3-7643-7020-3

### **Refereed conference proceedings**

32. F.Antoneli, A.P.S.Dias and C.M.A.Pinto. Rich phenomena in a network of two rings coupled through a ‘buffer’ cell. In: *Proceedings 2nd Conference on Nonlinear Science and Complexity*, ISEP, July 28-31 2008, Porto, Portugal.

### **Unrefereed conference proceedings**

33. F.Antoneli, A.P.S.Dias, M.Golubitsky and Y.Wang. Flow Invariant Subspaces for Lattice Dynamical Systems. In: *Workshop on Bifurcation Theory and Spatio-Temporal Pattern Formation in PDE*. (W. Nagata and N.S. Namachchivaya, eds.) Fields Institute Communications, 2006, 1-8.
34. F.Antoneli, A.P.S.Dias, M.Golubitsky and Y.Wang. Synchrony in lattice differential equations. In: *Some Topics In Industrial and Applied*

*Mathematics.* (R. Jeltsch, T. Li, and I. Sloan, eds.) Contemporary Applied Mathematics Series **8** World Scientific Publ. Co., 2007, 43-56.

35. M.A.D.Aguiar and A.P.S.Dias. Coupled cell networks: minimality. *PAMM Proc. Appl. Math. Mech.* **7** (2007) 1030501-1030502.

### **Preprints**

36. F.Antoneli, A.P.S.Dias and R.C.Paiva. Coupled Cell Networks: Hopf bifurcation and Interior Symmetry. *CMUP preprint 2007-34*.
37. M.Aguiar, P.Ashwin, A.Dias, and M.Field. Robust heteroclinic cycles in coupled cell systems: Identical cells with asymmetric inputs. *CMUP preprint 2008-6*.

### **Abstract of communication**

38. A.P.S.Dias, B.Dionne and I.Stewart. Heteroclinic cycles and wreath product symmetries. In: *Proceedings of the International Conference on Symmetry and Perturbation Theory, Sardinia, Italy.* (D.Bambusi, G.Gaeta and M.Cadoni, eds.) World Scientific, Singapore, 2001, 53-57.

## **4.2 Work visits**

- Mathematics Institute, University of Warwick, United Kingdom. October 1995 - September 1999 (Doctorate and Post-Doctorate works).
- Mathematics Department, University of Houston, United States of America, February of 1997.
- IMA (Institute for Mathematics and Its Applications), University of Minnesota, Minneapolis, United States of America. Visit integrated at the programme “Emerging applications of dynamical systems”, April 29 to June 7 of 1998.
- Mathematics Department, University of Houston, United States of America, February of 1999.
- Mathematics and Statistics, University of Ottawa, Canada, June of 1999.

- Short period visits to the Mathematics Institute, University of Warwick, United Kingdom from December 1999 till April 2000.
- Mathematics Institute, University of Warwick, United Kingdom. August 2000 - February 2001; March 2002 - December 2002. Post-Doctorate work.
- Mathematics Department, Imperial College of London, United Kingdom, April of 2002.
- Departamento de Matemática, Instituto de Ciências Matemáticas e de Computação, São Carlos, Universidade de São Paulo, Brasil, January 6-23, 2003.
- Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brasil, January 19-22, 2003.
- Mathematics Institute of University of Warwick and Mathematics Department of Imperial College of London, United Kingdom, August 24 - September 17, 2003.
- Mathematics Institute, University of Warwick, United Kingdom, April 14-29, 2004.
- Mathematics Department, University of Houston, United States of America, May 31 till June 12 of 2004.
- Mathematics Department, Imperial College of London, United Kingdom, June 29 - July 7 of 2004.
- Isaac Newton Institute for Mathematical Sciences, University of Cambridge, United Kingdom. Visit integrated at the programme “Pattern Formation in Large Domains”, September 14 till December 16 of 2005.
- Mathematics Department, Imperial College of London, United Kingdom, January till March of 2006.
- CIRM, Marseille Luminy, France, June 4-23, 2007.
- Mathematics Department, University of Houston, USA, January 27-February 7, 2009.

- Mathematics Department, University of Exeter, UK, July 14-18, 2009.
- Mathematics Institute, University of Warwick, United Kingdom, September 21-October 2, 2009.

### 4.3 Participations in conferences

#### With communication

1. “Equadiff 95”, Lisboa, Portugal, July of 1995. Title of the communication: *Instant chaos is chaos in slow motion*.
2. “A Newton Institute Workshop on Dynamics and symmetry”, Cambridge, United Kingdom, November of 1995. Title of the talk: *Instant chaos is chaos in slow motion*.
3. “Workshop on empirical and analytical reduction of nonlinear symmetric systems”, Tübingen, Germany, March of 1997. Title of the talk: *Hopf bifurcation for wreath products*.
4. “The 5th workshop on real and complex singularities”, Instituto de Ciências Matemáticas e de Computação, São Carlos, Universidade de São Paulo, Brasil, July 27-31, 1998. Title of the talk: *Hopf bifurcation for wreath products*.
5. “CAIMS (Canadian Applied and Industrial Mathematics Society) meeting”, University of Laval, Québec, Canada, June 11-13 of 1999. Title of the talk: *Hilbert series for equivariant mappings restricted to invariant hyperplanes*.
6. “Workshop on Skew-products and synchronization of coupled systems”, University of Surrey, United Kingdom, July 12-13 of 1999. Title of the seminar: *Hilbert series for equivariant mappings restricted to invariant hyperplanes*.
7. “Workshop on Dynamics and intermittency”, School of Mathematical Sciences, University of Exeter, United Kingdom, January 15, 2001. Title of the talk: *Heteroclinic cycles and wreath product symmetries*.
8. “Conference on Symmetry and Perturbation Theory”, Sardinia, Italy, May 6-13, 2001. Title of the talk: *Heteroclinic cycles and wreath product symmetries*.

9. “International Conference on Differential Equations”, Equadiff, Hasselt, Belgium, July 22-26, 2003. Title of the seminar: *Symmetry Groupoids and Admissible Vector Fields for Coupled Cell Networks*.
10. “Workshop on Coupled Cell Systems - A London Dynamical Systems Group workshop”, Imperial College of London, United Kingdom, November 4, 2004. Title of the talk: *Patterns of Synchrony in Lattice Dynamical Systems*.
11. “Workshop on Theory and Applications of Coupled Cell Networks”, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, United Kingdom, September 26-30, 2005. Title of the talk: *Linear and ODE-equivalence for coupled cell networks*.
12. “Workshop on Connections for Women: Dynamical Systems”, Mathematical Sciences Research Institute, Berkeley, United States of America, January 18-19, 2007. Title of the talk: *Coupled Cell Networks: ODE-Equivalence, Minimality and Quotients*.
13. “SIAM Conference on Applications of Dynamical Systems (DS07)”, Snowbird, Utah, United States of America, May 28-June 1, 2007. Title of the talk: *Quotient coupled cell networks*.
14. “Workshop on Bifurcations and Symmetries in Genetics and Neuroscience & Statistical Properties of Dynamical Systems”, CIRM, Marseille Luminy, France, June 11-12, 2007. Title of the talk: *Coupled cell networks: linear equivalence and quotients*.
15. “Dynamics Days Europe 2007”, Loughborough University, Loughborough, United Kingdom, July 9-13, 2007. Title of the talk: *Local bifurcation theory in symmetric and interior symmetric coupled cell networks*.
16. “Equadiff”, Vienna University of Technology, Vienna, Austria, August 5-11, 2007. Title of the talk: *Group theory, synchrony-breaking bifurcations and coupled cell networks*.
17. “SIAM Conference on Applications of Dynamical Systems (DS09)”, Snowbird, Utah, USA, May 16-22, 2009. Title of the talk: *Hopf bifurcation in coupled cell networks*.

18. “Workshop on Network Dynamics”, Exeter, UK, July 15, 2009. Title of the talk: *Hopf bifurcation and synchrony in coupled cell networks*.

### **Without communication**

1. “Workshop on time-reversal symmetry in dynamical systems”, University of Warwick, United Kingdom, December of 1996.
2. “Workshop on symmetric chaos and dynamical systems”, University of Surrey, United Kingdom, June 16-17, 1997.
3. “Surrey Autumn workshop - Symmetry in Hamiltonian systems”, University of Surrey, United Kingdom, September 4-5, 1997.
4. “Workshop on Pattern formation in continuous and coupled systems”, University of Minnesota, Minneapolis, United States of America, May 11-15, 1998.
5. “Workshop on Animal locomotion and robotics”, University of Minnesota, Minneapolis, United States of America, June 1-5, 1998.
6. “International conference on dynamical systems”, Centro de Matemática Aplicada da Universidade do Porto (CMAUP), Porto, May 8-13, 2000.
7. “Conference on Bifurcations, Symmetry and Patterns (in honour of Martin Golubitsky and Ian Stewart)”, Centro de Matemática Aplicada da Universidade do Porto (CMAUP), Porto, June 29 - July 4 of 2000. Member of the organizing committee.
8. “Workshop on Recent Trends in Dynamics III”, Centro de Matemática da Universidade do Porto (CMUP), Porto, May 2002.
9. “Workshop on Geometry, Symmetry and Mechanics II”, Mathematics Institute, University of Warwick, United Kingdom, July 21-27, 2002.
10. “Workshop on Geometric and Probabilistic Aspects of Dynamical Systems”, Mathematics Institute, University of Warwick, United Kingdom, December 9-13, 2002.
11. “Workshop on Recent Trends in Dynamics 2003”, Centro de Matemática da Universidade do Porto (CMUP), Porto, July 7-11, 2003.

12. “School and Workshop on Dynamical Systems and Applications”, Centro Internacional de Matemática (CIM), Porto, May 2-7, 2004.
13. “Encontro Nacional da Sociedade Portuguesa de Matemática”, Instituto Politécnico do Porto, Porto, May 6-8, 2004.
14. “An Isaac Newton Institute Satellite Meeting on Theoretical Aspects of Pattern Formation”, University of Surrey, United Kingdom, September 19-23, 2005.
15. “Workshop on Pattern Formation in Fluid Mechanics”, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, United Kingdom, December 2-16, 2005.
16. “Introductory Workshop on Dynamical Systems with Emphasis on Extended Systems”, Mathematical Sciences Research Institute, Berkeley, United States of America, January 22-26, 2007.
17. “The future of Mathematics education in Europe”, Lisbon, December 17-18, 2007.
18. Workshop “O que se sabe e o que não se sabe sobre Educação Matemática”, Fundação Calouste Gulbenkian, Lisboa, March 28, 2008.
19. 5th European Congress of Mathematics, Amsterdam, Holland, 14-18 of July of 2008 (co-organizer of a minisymposium).
20. “Workshop on networks: dynamics ad flows”, Mathematics Institute, University of Warwick, September 28-October 2, 2009.

#### 4.4 School participations

1. “School on Dynamical systems”, Centro de Matemática Aplicada da Universidade do Porto (CMAUP), Porto, Portugal, May 2-5, 2000.
2. “Summer School on Bifurcations, Symmetry and Patterns”, Centro Internacional de Matemática (CIM), Coimbra, Portugal, July 5-14, 2000. Member of the organizing committee.
3. “Summer School on Dynamical Systems”, Centro de Matemática da Universidade do Porto (CMUP), Porto, Portugal, June 30 - July 4, 2003.

4. “Second Summer School on Mathematics in Biology and Medicine”, Instituto Gulbenkian de Ciência, Oeiras, Portugal, September 11-15, 2006.

## 4.5 Participations in seminars

1. “Nonlinear Systems Laboratory meetings”, Mathematics Institute, University of Warwick, United Kingdom, November 1995. Title of the talk: *Instant chaos is chaos in slow motion*.
2. “Dynamical Systems seminars”, Department of Mathematics, University of Manchester, United Kingdom, March 1998. Title of the talk: *Hopf bifurcation for wreath products*.
3. Mathematics Institute, University of Warwick, United Kingdom, October 1998. Title of the talk: *Invariant theory for wreath product groups*.
4. Mathematics and Statistics Department, University of Ottawa, Canada, June 1999. Title of the talk: *Hilbert series for equivariant mappings restricted to invariant hyperplanes*.
5. Centro de Matemática Aplicada da Universidade do Porto, Porto, Portugal, November 1999. Title of the talk: *Séries de Hilbert para funções equivariantes restritas a hiperplanos invariantes*.
6. Seminar integrated at the project “Projecto Álgebra, Geometria e Combinatória”, Centro de Matemática da Universidade do Porto, Porto, Portugal, November 3, 1999. Title of the talk: *Séries de Hilbert para funções equivariantes restritas a hiperplanos invariantes*.
7. Seminar in “Sistemas Dinâmicos”, Centro de Matemática da Universidade do Porto, Porto, Portugal, November 5, 1999. Title of the talk: *Geometria tórica e bifurcações equivariantes*.
8. Seminar in “Dynamics and Symmetry”, Mathematics Department, Imperial College of London, United Kingdom, January 31, 2001. Title of the talk: *Heteroclinic cycles and wreath product symmetries*.
9. Seminar integrated at the programme “XX Programa de Verão”, Departamento de Matemática, Instituto de Ciências Matemáticas e de

Computação, São Carlos, Universidade de São Paulo, Brasil, January 16, 2003. Title of the talk: *Bifurcações secundárias em sistemas de equações com simetria  $S_N$* .

10. Seminar in “Análise, Geometria e Sistemas Dinâmicos”, Departamento de Matemática, Instituto Superior Técnico, Lisboa, Portugal, September 30, 2003. Title of the talk: *Symmetry groupoids, synchrony, and coupled cell networks*.
11. Seminar in “Sistemas Dinâmicos”, Centro de Matemática da Universidade do Porto, Portugal, March 18, 2005. Title of the talk: *Padrões de sincronia em reticulados de sistemas dinâmicos*.
12. Seminar integrated in the programme “Pattern Formation in Large Domains”, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, United Kingdom, November 15, 2005. Title of the talk: *Hopf bifurcation on hemispheres*.
13. Seminar in “Dynamics and Symmetry”, Mathematics department, Imperial College of London, United Kingdom, March 3, 2006. Title of the talk: *Invariants, equivariants and characters in symmetric bifurcation theory*.
14. Seminar at the Instituto Superior de Engenharia do Porto (ISEP), Porto, Portugal, April 5, 2006. Title of the talk: *Padrões de sincronia em reticulados de sistemas dinâmicos*.
15. Seminar integrated in the PhD in Mathematics Programme Coimbra/Porto, Porto, March 27, 2008. Title of the talk: *Coupled cell networks*.
16. Seminar integrated in part I of the mini-course *Sistemas de células acopladas*, CMUP, Porto, May 23, 2008.

## 4.6 Supervision

### 4.6.1 Post-doctorate

1. Stella Maria Costa de Abreu, January-December of 2005. Co-supervised by Sofia Castro (Porto) and Isabel Labouriau (Porto). Title of the

project: *Simetrias em problemas de bifurcação e redes de células acopladas*.

2. Fernando Antoneli Júnior. September 2006-March 2007; April 2008-February 2009. Title of the project: *Hopf bifurcation with interior symmetry*.
3. Eliana Pinho, October of 2006-September of 2009, co-supervised by Martin Golubitsky (Houston, USA). Title of the project: *Patterns in lattice differential equations*.
4. Célia Sofia Mota da Cunha Moreira, February of 2010. Title of the project: *Robust Bifurcations in Coupled Cell Networks*. Ongoing.

#### 4.6.2 Doctorate

1. Ana Margarida da Silva Afonso Rodrigues, PhD in Mathematics, Faculdade de Ciências, Universidade do Porto. Title of the dissertation: *Bifurcations of Dynamical Systems with Symmetry*. Completed at November 14, 2007.
2. Rui Castanheira de Paiva, PhD in Mathematics, Faculdade de Ciências, Universidade do Porto. Title of the dissertation: *Hopf bifurcation in coupled cell networks*. Completed at January 23, 2009.

#### 4.6.3 Masters

1. Rui Castanheira de Paiva. Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto. Dissertation: *Bifurcação de Hopf com simetria*. Completed in December 4, 2003.
2. Elvina Cláudia Lopes Rosas. Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto. Dissertation: *Séries de Hilbert de equivariantes restritos a espaços invariantes*. Completed in April 7, 2004.
3. Hugo Liberal Fernandes. Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto. Dissertation: *Soluções espacialmente periódicas em equações diferenciais parciais com simetria euclidiana*. Completed in April 7, 2004.

4. Eduardo Conde Silva de Sousa. Mestrado em Matemática – Fundamentos e Aplicações, Faculdade de Ciências, Universidade do Porto. Dissertation: *Grupóides e sincronização em sistemas de equações acopladas*. Completed in October 22, 2004.

#### 4.6.4 Others: Seminar

1. Seminar (third term, first year) of Mestrado em Matemática Aplicada:
  - (a) School year 01/02: supervised the work of two students. Titles: *Soluções espacialmente periódicas em equações diferenciais parciais com simetria euclidiana* and *Bifurcação de Hopf com simetria*.
  - (b) School year 02/03: supervised the work of one student. Title: *Séries de Hilbert de equivariantes restritos a espaços invariantes*.
2. Seminar (third term, first year) of Mestrado em Matemática – Fundamentos e Aplicações:
  - (a) School year 02/03: supervised the work of one student. Title: *Grupóides e sincronização em sistemas de equações acopladas*.

## 5 Scientific administration

### 5.1 Research projects

- Scientific coordinator of the project: Projecto POCI/MAT/60154/2004 - Matemática- “Redes de células acopladas (Coupled cell networks)”. Duration: three years and three months (03/2005-05/2008). Final report: <http://www.fc.up.pt/cmup/apdias/FCTrelatoriofinalccn.pdf>
- Member of the coordinating committee of Centro de Matemática da Universidade do Porto (CMUP) in 2003 and 2004 taking care of the Pure Mathematics Library matters concerning CMUP and organizing the colloquium seminars (*Seminário Geral*) of CMUP.
- Member of the coordinating committee of Centro de Matemática da Universidade do Porto (CMUP), since January of 2009.

## 5.2 Other participations

- Member of the project “Geometria e singularidades em dinâmica não linear”, programme PRAXIS XXI, proj. 2/2.1/MAT/407/94, with the scientific coordination of Professora Isabel Labouriau, from 1998 to 2001.

## 5.3 Organization of activities

### International conferences and school

- Member of the organizing committee of the “Conference on Bifurcations, Symmetry and Patterns (in honour of Martin Golubitsky and Ian Stewart)”, Centro de Matemática Aplicada da Universidade do Porto (CMAUP), Porto, June 29 - July 4, 2000. The proceedings book was published in the book 22. of the Section Editorial activity of the List of Publications (see page 7).
- Member of the organizing committee of the “Summer School on Bifurcations, Symmetry and Patterns”, Centro Internacional de Matemática (CIM), Coimbra, July 5-14, 2000.
- Member of the organizing committee of the international conference “The future of Mathematics education in Europe”, Lisbon, December 17-18, 2007.
- Co-organization with Peter Ashwin (Exeter, U.K.) and Jeroen Lamb (Imperial College, U.k.) of the Minisymposium Coupled Cell Networks, at the 5th European Congress of Mathematics, Amsterdam, Holland, 14-18 of July of 2008.

### Local activities: seminars and mini-courses organization

- The weekly seminars of Centro de Matemática Aplicada da Universidade do Porto (CMAUP) during the period March-September of 2000.
- “Seminário geral’ (Colloquium seminars) of Centro de Matemática da Universidade do Porto (CMUP) during the period March 2003 till December of 2004.

- Mini-course given by Professor David Chillingworth (University of Southampton, United Kingdom). Title of the course: “Bifurcation from a Manifold”. Days: 17, 18, 20 e 25 of June of 2003, Centro de Matemática da Universidade do Porto (CMUP), Porto.
- “Tardes de Matemática” (Mathematics afternoons), in Lisboa and Porto, initiative of the Sociedade Portuguesa de Matemática (Portuguese Mathematics Society), during one year starting from September of 2004.

## Others

- Joint coordination with João Nuno Tavares (Porto) of the edition 08/09 of the Programme SigMatemática directed to secondary school students, Faculdade de Ciências da Universidade do Porto:  
<http://cmup.fc.up.pt/cmup/sigmat/>
- Co-organization with João Nuno Tavares (Porto) of the Summer Schools in Mathematics directed to secondary school students, Faculdade de Ciências da Universidade do Porto, editions 2008 and 2009:
  - September 1-5, 2008. <http://www.fc.up.pt/cmup/evmat/2008/>
  - September 6-11, 2009. <http://www.fc.up.pt/cmup/evmat/2009/>

# 6 Teaching

## 6.1 Jury participations

1. Member of the jury of *Exame Extraordinário de Avaliação de Capacidade para Acesso ao Ensino Superior*, school year 01/02.
2. President of the jury of the master Mestrado em Matemática – Fundamentos e Aplicações, Faculdade de Ciências, Universidade do Porto, dissertation *Centralizadores de Difeomorfismos*, Ana Isabel Branco do Nascimento Pereira da Costa, December 2, 2003.
3. Member of the jury of the master Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto, dissertation *Bifurcação de Hopf com Simetria*, Rui Castanheira de Paiva, December 4, 2003.

4. Member of the jury of the PhD in Mathematics, Faculdade de Ciências, Universidade do Porto, dissertation *Coupled Oscillators*, Carla Manuela Alves Pinto, January 16, 2004.
5. Member of the jury of the master Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto, dissertation *Séries de Hilbert de equivariantes restritos a espaços invariantes*, Elvina Cláudia Lopes Rosas, April 7, 2004.
6. Member of the jury of the master Mestrado em Matemática Aplicada, Faculdade de Ciências, Universidade do Porto, dissertation *Soluções espacialmente periódicas em equações diferenciais parciais com simetria euclidiana*, Hugo Liberal Fernandes, April 7, 2004.
7. Member of the jury of the master Mestrado em Matemática Aplicada, Instituto Superior Técnico, Universidade Técnica de Lisboa, dissertation *Estabilidade em Equações Diferenciais Não-Autónomas*, Raquel Alexandra Lopes da Silva, May 19, 2004.
8. Member of the jury of the master Mestrado em Matemática – Fundamentos e Aplicações, Faculdade de Ciências, Universidade do Porto, dissertation *Grupóides e sincronização em sistemas de equações acopladas*, Eduardo Conde Silva de Sousa, October 22, 2004.
9. President of the jury of the master Mestrado em Matemática – Fundamentos e Aplicações, Faculdade de Ciências, Universidade do Porto, dissertation *Duplicação de período, renormalização e entropia em sistemas unidimensionais*, Maria de La Salette Dias Esteves, November 26, 2004.
10. President of the jury of the master Mestrado em Matemática – Fundamentos e Aplicações, Faculdade de Ciências, Universidade do Porto, dissertation *Teoria de feixes aplicada ao estudo de gerbes munidos de conexão*, Ana Cristina Castro Ferreira, December 3, 2004.
11. Member of the jury of the PhD in Mathematics, Faculdade de Ciências, Universidade do Porto, dissertation *Symmetries of Projected Symmetric Patterns*, Eliana Manuel de Matos Oliveira Pinho, May 25, 2006.
12. Member of the jury of the PhD in Mathematics, Faculdade de Ciências, Universidade do Porto, dissertation *Bifurcations of Dynamical Systems*

*with Symmetry*, Ana Margarida da Silva Afonso Rodrigues, November 14, 2007.

13. Member of the jury of the PhD in Mathematics, Faculdade de Ciências, Universidade do Porto, dissertation *Hopf Bifurcation in Coupled Cell Networks*, Rui Castanheira de Paiva, January 23, 2009.
14. Member of the jury of the PhD in Mathematics, Faculdade de Ciências, Universidade do Porto, dissertation *Generic Singularities of the Optimal Averaged Profit for Polydynamical Systems*, Célia Sofia Mota da Cunha Moreira, January 22, 2010.

## 6.2 Post-graduate teaching

- Mestrado em Matemática Aplicada, Departamento de Matemática Aplicada, Faculdade de Ciências, Universidade do Porto. Course taught: *Bifurcação com Simetria*. School years: 01/02, 02/03, 03/04.
- Mini-course *Bifurcação com simetria* integrated in the programme “XX Programa de Verão”, Departamento de Matemática, Instituto de Ciências Matemáticas e de Computação, São Carlos, Universidade de São Paulo, Brasil. Days: 7, 8, 10, 13 and 15 of January of 2003.
- PhD Coimbra/Porto in Mathematics. Course: *Differential Equations with Symmetry*. School years: 07/08, 08/09, 09/10.

## 6.3 Monograph: supervisions

1. School year 99/00: supervised one group of seven students, integrated in the 4th year of the Mathematics degree, about the theme: *Teoria Invariante e Simetria (Invariant theory and symmetry)*. The work of the group gave rise to three monographs with titles: *Teoria invariante e geometria tórica*, *Teorema de Hilbert-Weyl* and *Teorema de Molien*, Biblioteca do Departamento de Matemática Pura, Faculdade de Ciências, Universidade do Porto.
2. School year 03/04: supervised one group of eight students, integrated in the 4th year of the Mathematics degree, about the themes: *Grupos de Reflexão (Reflection groups)* and *Representações de Grupos Finitos*

(*Representations of finite groups*). The work of the group gave rise to four monographs about these themes.

## 6.4 Undergraduate teaching

I have been responsible for ‘theoretical’ lectures and also for exercise classes of Mathematics courses for which the Departamento de Matemática Pura, Faculdade de Ciências, Universidade do Porto is responsible or partially responsible. For each course I mention the degree/branch to which it applies, the year when students are meant to take the course and the academic years that I taught the course.

List of abbreviations for the degrees:

A (Licenciatura em Física/Matemática Aplicada (Astronomia) - Bachelor in Physics/Applied Mathematics (Astronomy));

B (Licenciatura em Biologia - Bachelor in Biology);

CC (Licenciatura em Ciência de Computadores - Bachelor in Computer Science);

EBG (Licenciatura em Ensino de Biologia e Geologia - Bachelor in Biology and Geology Teaching);

EF (Mestrado integrado em Engenharia Física - Msci in Physics Engineering);

EG (Licenciatura em Engenharia Geográfica - Bachelor in Surveying);

ERSI (Licenciatura em Engenharia de Redes e Sistemas Informáticos - Bachelor in Networks Engineering and Informatic Systems);

M (Licenciatura em Matemática - Bachelor in Mathematics);

MAT (Licenciatura em Matemática Aplicada a Tecnologia - Bachelor in Mathematics Applied to Technology);

F (Licenciatura em Física - Bachelor in Physics);

FA (Licenciatura em Física Aplicada - Bachelor in Applied Physics);

F+FA (Licenciatura em Física +Física Aplicada - Bachelor in Physics+Applied Physics);

FTM (Licenciatura em Física e Tecnologia dos Materiais - Bachelor in Physics+Material Technology);

OL (Licenciatura em Optoelectrónica e Lasers - Bachelor in Optoelectronic and Lasers).

- **Lectures**

Álgebra Linear e Geometria Analítica I:

(One semester Linear Algebra course, compulsory, 1st year, 1st semester)

99/00 (for A and EG),

01/02 (for A, EG and MAT),

03/04 (for A and M),

04/05 (for A and M);

Álgebra Linear e Geometria Analítica II:

(One semester Linear Algebra course, compulsory, 1st year, 2nd semester)

99/00 (for A and EG),

00/01 (for A, EG and MAT);

Elementos de Álgebra Linear:

(One semester Linear Algebra course, compulsory, 1st year, 2nd semester)

00/01 (for CC and ERSI);

Álgebra Linear e Geometria Analítica:

(One semester Linear Algebra course, compulsory, 1st year, 1st semester)

01/02 (for F, FA, FTM and OL);

Cálculo Infinitesimal I:

(One semester One Variable Calculus course, compulsory, 1st year, 1st semester)

01/02 (for CC and ERSI),

04/05 (for A, EG, F, FA, FTM, MAT and OL),

06/07 (for A, EG, F, FA, F+FA, FTM, MAT and OL);

Matemática I:

(One semester One Variable Calculus and Linear Algebra course, compulsory, 1st year, 1st semester)

01/02 (for B and EBG);

Álgebra Linear II:

(One semester Linear Algebra course, compulsory, 1st year, 2nd semester)

02/03 (for M);

Cálculo Infinitesimal II:

(One semester Several Variables Calculus course, compulsory, 1st year, 2nd semester)

02/03 (for EG, F, FA, FTM, MAT e OL);

07/08 (for A, EF, F and M)

08/09 (for A, EF, F and M)

09/10 (for A, EF, F and M)

Representações de Grupos Finitos:

(One semester Representations of Finite Groups course, option, 4th year)

03/04 (for M).

- **Example classes**

Inteligência Artificial:

(One semester Artificial Intelligence course, compulsory, 3th year, 2nd semester)

90/91 (3o. ano CC);

Álgebra Linear e Geometria Analítica I:

(One semester Linear Algebra course, compulsory, 1st year, 1st semester)

91/92 (for M),

99/00 (for A and EG),

01/02 (for A, EG and MAT);

Álgebra Linear e Geometria Analítica II:

(One semester Linear Algebra course, compulsory, 1st year, 2nd semester)

91/92 (for M),

99/00 (for A and EG),

00/01 (for A, EG and MAT);

Cálculo Infinitesimal I:

(One semester One Variable Calculus course, compulsory, 1st year, 1st semester)

92/93 (for M),

93/94 (for M),

94/95 (for all bachelors except Mathematics),  
04/05 (for A, EG, F, FA, FTM, MAT and OL),  
06/07 (for A, EG, F, FA, F+FA, FTM, MAT and OL);

Cálculo Infinitesimal II:

(One semester One/Several Variables Calculus course, compulsory, 1st year, 2nd semester)

92/93 (for M),

94/95 (for all bachelors except Mathematics),

02/03 (for EG, F, FA, FTM, MAT and OL);

07/08 (for A, EF, F and M)

08/09 (for A, EF, F and M)

09/10 (for A, EF, F and M)

Geometria:

(One semester Geometry course, compulsory, 1st year, 1st semester)

93/94 (for M);

Elementos de Álgebra Linear:

(One semester Linear Algebra course, compulsory, 1st year, 2nd semester)

00/01 (for CC and ERSI);

Matemática I:

(One semester One Variable Calculus and Linear Algebra course, compulsory, 1st year, 1st semester)

06/07 (for B and EBG).

## 7 Academic administration

- Member of the coordinating committee of the master *Mestrado em Matemática - Fundamentos e Aplicações*, Departamento de Matemática Pura, Faculdade de Ciências da Universidade do Porto. Editions: 01/02, 02/03, 03/04 and 04/05. Coordinator at 04/05.
- Member of the restricted scientific committee of Departamento de Matemática Pura, Faculdade de Ciências da Universidade do Porto, January of 2008-December of 2009.
- Member of “Comissão Executiva” of Departamento de Matemática Pura, Faculdade de Ciências da Universidade do Porto, January of 2008-December of 2009.
- Member of the steering committee of the PhD programme Coimbra/Porto in Mathematics, September of 2008-December of 2010.

## 8 Other activities

### 8.1 Learned societies

- Member of the direction of the Sociedade Portuguesa de Matemática for the years 2004-06. Responsible for the organization of the colloquiums “Tardes de Matemática’ in Lisbon and Porto.
- Second delegate representing the Comissão Nacional de Matemática Portuguesa in the General Assembly of the International Mathematics Union (IMU), Santiago de Compostela, Spain, August 19-20, 2006.
- Since January of 2007. Vice-president of the Comissão Nacional de Matemática Portuguesa.

### 8.2 Editorial activity

- Since 1998. Referee reports for *Mathematical Reviews* and several more international journals.