

Alessandro Pugliese  
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# Curriculum Vitae

## of Alessandro Pugliese

[Last update: March 22, 2019]

### Education

- 2008 - **Ph.D. in Mathematics**, Georgia Institute of Technology (U.S.A.). Thesis' title: *Theoretical and numerical aspects of coalescing of eigenvalues and singular values of parameter dependent matrices*. Advisor: Prof. Luca Dieci.
- 2002 - **Laurea in Matematica – Indirizzo applicativo**, Università degli Studi di Bari Aldo Moro (Italy). Thesis' title: *Metodi numerici per problemi di biforcazione*. Advisor: Prof. Luciano Lopez.

### Academic positions

- 2005 - Since June 14: **Assistant Professor** in Numerical Analysis at Università degli Studi di Bari Aldo Moro (Italy).

### Research Interests

Dynamical systems and bifurcation, numerical continuation of multi-dimensional manifolds of equilibria for ODEs and PDEs, decomposition of matrices that depend on parameters, coalescence of eigenvalues/singular values for matrices that depend on parameters.

### Teaching

*at Università degli Studi di Bari Aldo Moro:*

- AY 18/19 - Instructor for *Calcolo Numerico* (Numerical Analysis).  
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).  
- Teaching Assistant for *Metodi Numerici per l'Ecologia e l'Ambiente*. (Numerical Methods for Ecology and Environmental Sciences).
- AY 17/18 - Instructor for *Calcolo Numerico* (Numerical Analysis).  
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).
- AY 16/17 - Instructor for *Calcolo Numerico* (Numerical Analysis).  
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).
- AY 15/16 - Instructor for *Calcolo Numerico* (Numerical Analysis).  
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).
- AY 14/15 - Instructor for *Calcolo Numerico* (Numerical Analysis).

## Teaching (continued)

- Teaching Assistant for *Calcolo Numerico 2* (Numerical Analysis 2)
- AY 13/14 - Instructor for *Laboratorio di Programmazione e Calcolo* (Scientific Programming and Numerical Analysis).
  - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 12/13 - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 11/12 - Instructor for *Calcolo Numerico* (Numerical Analysis).
  - Instructor for *Strumenti Matematici per l'Informatica* (Mathematical Tools for Computer Science).
- AY 10/11 - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 09/10 - Instructor for *Calcolo Numerico* (Numerical Analysis).
  - Instructor for *Matematica, II modulo* (Calculus II-III).
  - Teaching Assistant for *Matematica* (Calculus I-II).
- AY 08/09 - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 07/08 - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 06/07 - Instructor for *Calcolo Numerico* (Numerical Analysis).
- AY 05/06 - Instructor for *Calcolo Numerico* (Numerical Analysis).

### *at Georgia Institute of Technology (U.S.A.):*

- 2012 - Fall: Instructor for MATH 2401 (Calculus III);
- 2007 - Fall: Teaching Assistant for MATH1502 (Calculus II).
- 2006 - Summer: Instructor and Teaching Assistant for MATH 1502 (Calculus II);
  - Fall: Teaching Assistant for MATH1502 (Calculus II).
- 2005 - Fall: Teaching Assistant for MATH1502 (Calculus II).
- 2004 - Spring: Teaching Assistant for MATH2605 (Calculus III for CS);
  - Summer: Teaching Assistant for MATH2403 (Differential Equations);
  - Fall: Teaching Assistant for MATH1502 (Calculus II).
- 2003 - Summer: Teaching Assistant for MATH2401 (Calculus III);
  - Fall: Teaching Assistant for MATH1502 (Calculus II).

## Awards

- 2009 - Best PhD Thesis Award (School of Mathematics, Georgia Institute of Technology).
- 2007 - D'Onofrio Fellowship (Georgia Institute of Technology).

## Research visits

- 2018 - November 6 – 13: Department of Mathematics and Statistics, McGill University (Montreal, Canada).

## Research visits (continued)

- April 3 – 12: School of Mathematics, Georgia Institute of Technology (Atlanta, Stati Uniti).
- 2016 - January 14 – 24: School of Mathematics, Georgia Institute of Technology (Atlanta, US).
- 2014 - November 27 – December 8: School of Mathematics, Georgia Institute of Technology (Atlanta, US).
- 2013 - August 30 – September 8: Département de Mathématiques et de Statistique, Université Laval (Québec, Canada).
- 2012 - August 15 – December 31: Visiting Assistant Professor at the School of Mathematics, Georgia Institute of Technology (Atlanta, US).
- July 15 – 19: School of Mechanical Engineering, École Polytechnique Fédérale de Lausanne (Lausanne, Switzerland).
- January 16 – 24: Instituto de Ciências Matemáticas e de Computação, Universidade de São Paulo (São Carlos, Brazil).
- 2011 - October 14 – November 10: School of Mathematics, Georgia Institute of Technology (Atlanta, US).
- May 25 – June 7: School of Mathematics, Georgia Institute of Technology (Atlanta, US).
- February 12 – 19: Basque Center for Applied Mathematics (Bilbao, Espana).
- 2009 - August 19 – September 19: School of Mathematics, Georgia Institute of Technology (Atlanta, US).

## Invited seminars

- 2018 - November 12, McGill University (Montreal, Canada): *Coalescence of eigenvalues for symmetric and Hermitian matrix functions.*
- 2013 - September 6, Université Laval (Québec, Canada): *Coalescence of Eigenvalues for Matrices Depending on Several Parameters.*
- 2011 - February 17, Universidad del País Vasco (Bilbao, Espana): *Eigenvalue coalescence for parameter dependent matrices.*
- February 14, Basque Center for Applied Mathematics (Bilbao, Espana): *Eigenvalue coalescence for parameter dependent matrices.*

## Conferences organized

- 2018 - Member of the scientific and organizing committee for the workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo, Monopoli (Italy), June 12 – 15.
- 2016 - Member of the scientific and organizing committee for the workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo, Monopoli (Italy), June 14 – 17.
- 2009 - Member of the scientific and organizing committee for the conference “Evolution Equations and Mathematical Models in the Applied Sciences”, Taranto (Italy), June 29 – July 3.

## Conferences, Workshops and Summer Schools

### *Invited talks:*

- 2014 - ICMC Summer Meeting on Differential Equations, Universidade de São Paulo, São Carlos (Brazil) February 3 – 7. Talk in the *Computational Dynamics* session: *Rigorous numerics for nonlinear PDEs*.
- 2013 - International Conference on Dynamics of Differential Equations, Georgia Institute of Technology, Atlanta (U.S.A) March 16 – 20. Talk: *Coalescence of Eigenvalues for Matrices Depending on Several Parameters*.

### *Contributed talks:*

- 2014 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 10 – 13. Talk: *Perturbation of coalescing eigenvalues for Hermitian matrix functions*.
- 2012 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 12 – 15. Talk: *Eigenvalues coalescence for Hermitian matrices depending on three parameters: theoretical results*.
- 2009 - Workshop “Trends in Bifurcation Analysis: Methods and Applications”, Milano (Italy), June 3-5. Poster: *Coalescing of singular values for matrices that depend on parameters*.
  - Annual meeting of the GNCS (Italian Group for Scientific Computation). Montecatini Terme (Italy), February 3-5. Talk: *Localizzare coppie di valori singolari coincidenti per matrici reali di grandi dimensioni dipendenti da due parametri*.
- 2008 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 17-20. Talk: *Coalescing singular values: Theoretical results and algorithms*.
- 2006 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 13-16. Talk: *Considerations on the Singular Value Decomposition of Matrices Depending on Two Parameters*.
- 2005 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 26-29. Poster: *Multiparameter continuation methods*.
  - VI Conference of the Pan-American Advanced Studies Institute (PASI) on Differential Equations and Nonlinear Analysis, Universidad de Chile, Santiago (Chile), January 10-21. Poster: *Multiparameter continuation methods*.
- 2004 - Eleventh International Congress on Computational and Applied Mathematics (ICCAM), Katholieke Universiteit Leuven (Belgium), July 26-30. Talk: *On the decay behavior of the entries of matrix functions*.

### *Conferences attended:*

- 2010 - Workshop “Structural Dynamical Systems: Computational Aspects”, Capitolo–Monopoli (Italy), June 8 – 11.

### *Summer Schools attended:*

## Conferences, Workshops and Summer Schools (continued)

- 2011 - CIME-EMS Summer School in Applied Mathematics “Current challenges in stability issues for numerical differential equations”, Cetraro (CS), June 27 – July 2. Lecturers: Professors W-J. Beyn (University of Bielefeld), L. Dieci (Georgia Institute of Technology), N. Guglielmi (University of L’Aquila), E. Hairer (Université de Genève), C. Sanz-Serna (Universidad de Valladolid), M. Zennaro (University of Trieste).
- 2009 - Summer School “ODEs with Discontinuous Right-Hand Side: Theory and Applications”, Dobbiaco (Italy), July 22-26. Lecturers: Prof. L. Dieci (Georgia Institute of Technology), Prof E. Usai (University of Cagliari) and Prof. Nicola Guglielmi (University of L’Aquila).
- 2002 - Summer School “Numerical Treatment of Dynamical Systems”, Dobbiaco (Italy), July 17-21. Speakers: Prof. L. Dieci (Georgia Institute of Technology) and Prof T. Humphries (University of Sussex).
- 2001 - *Scuola Matematica Interuniversitaria*, Perugia (Italy), July 29 – September 1. Courses attended: Numerical Analysis (Prof. I.G. Graham, University of Bath), Operations Research (Prof R. Becker, University of Cape Town).

## List of Publications

- [16] L. Dieci, A. Papini, A. Pugliese. *Coalescing points for eigenvalues of banded matrices depending on parameters with application to banded random matrix functions*. Numer. Algor., 2018. DOI: 10.1007/s11075-018-0525-z
- [15] A. Colombo, N. Del Buono, L. Lopez, A. Pugliese. *Computational techniques to locate crossing/sliding regions and their sets of attraction in non-smooth dynamical systems*. Discrete Contin. Dyn. Syst. Ser. B, Volume 23, Issue 7, pp. 2911-2934, 2018. DOI: 10.3934/dcdsb.2018166
- [14] M. Gameiro, J.P. Lessard, A. Pugliese. *Computation of smooth manifolds via rigorous multi-parameter continuation in infinite dimensions*. Found. Comput. Math., Volume 16, Issue 2, pp 531-575, 2016. DOI: 10.1007/s10208-015-9259-7
- [13] L. D’Ambrosio, J.P. Lessard, A. Pugliese. *Blow-up profile for solutions of a fourth order nonlinear equation*. Nonlinear Anal., Volume 121, pp. 280-335, 2015. DOI: 10.1016/j.na.2014.12.026
- [12] L. Dieci, A. Pugliese. *Hermitian matrices of three parameters: perturbing coalescing eigenvalues and a numerical method*. Math. Comp., Volume 84, pp. 2763-2790, 2015. DOI: 10.1090/mcom/2977
- [11] A. Pugliese, S. Pomes, S. Ferilli, D. Redavid. *A novel model-based dewarping technique for advanced Digital Library systems*. Procedia Computer Science, Volume 38, pp. 108-115, 2014. DOI: 10.1016/j.procs.2014.10.018
- [10] L. Dieci, A. Papini, A. Pugliese, A. Spadoni. *Continuous decompositions and coalescing eigenvalues for matrices depending on parameters*. Current Challenges in Stability Issues for Numerical Differential Equations, Lecture Notes in Mathematics, pp. 173–264. Springer International Publishing, 2014. DOI: 10.1007/978-3-319-01300-8
- [9] L. Dieci, A. Papini, A. Pugliese. *Approximating coalescing points for eigenvalues of hermitian matrices of three parameters*. SIAM J. Matrix Anal. Appl., Volume 34, Issue 2, pp. 519-541, 2013. DOI: 10.1137/120898036
- [8] L. Dieci, A. Pugliese. *Hermitian matrices depending on three parameters: Coalescing eigenvalues*. Linear Algebra Appl., Volume 436, Issue 11, pp. 4120-4142, 2012. DOI: 10.1016/j.laa.2012.01.009

## List of Publications (continued)

- [7] L. Dieci, M.G. Gasparo, A. Papini, A. Pugliese. *Locating Coalescing Singular Values of Large Two-Parameter Matrices*. Mathematics and Computers in Simulation 81, pp. 996-1005, 2011. DOI: 10.1016/j.matcom.2010.10.005
- [6] L. Dieci, A. Pugliese. *Two-Parameter SVD: Coalescing Singular Values and Periodicity*. SIAM J. Matrix Anal. Appl., Volume 31, Issue 2, pp. 375-403, 2009. DOI: 10.1137/07067982X
- [5] L. Dieci, A. Pugliese. *Singular Values of Two-Parameter Matrices: An Algorithm To Accurately Find Their Intersections*. Mathematics and Computers in Simulation 79, pp. 1255-1269, 2008. DOI: 10.1016/j.matcom.2008.03.012
- [4] T. Politi, A. Pugliese. *On the Solution of Skew-Symmetric Shifted Linear Systems*. Lecture Notes in Computer Science, 3994 LNCS - IV:732-739, 2006. DOI: 10.1007/11758549\_99
- [3] T. Politi, A. Pugliese. *Numerical Methods for Computing the SVD in the D-orthogonal Group*. Future Generation Computer Systems, Volume 22, Issue 4, pp. 423-429, 2006. DOI: 10.1016/j.future.2004.11.025
- [2] L. Lopez, C. Mastroserio, A. Pugliese. *Semi-explicit time-stepping methods for dynamical systems with complementary constraints*. Applied and Industrial Mathematics in Italy, 381-392, Ser. Adv. Math. Appl. Sci., 69, World Sci. Publ., Hackensack, NJ, 2005. DOI: 10.1142/9789812701817-0035
- [1] L. Lopez, A. Pugliese. *Decay behaviour of functions of skew-symmetric matrices*. Proceedings of HERCMA 2005, Athens 20-24 September 2005, Editor E.A. Lipitakis, 2005.