Alessandro Pugliese
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Curriculum Vitae
of Alessandro Pugliese

[Last update: June 3, 2022]

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.

Academic positions

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

Research Interests

Dynamical systems and bifurcations, numerical continuation of multi-dimensional manifolds of equilibria for ODEs and PDEs, decomposition of parameter dependent matrices and phenomena related to coalescence of their eigenvalues/singular values.

Awards

2009 - Best PhD Thesis Award (School of Mathematics, Georgia Institute of Technology).

2007 - D'Onofrio Fellowship (Georgia Institute of Technology).

List of Publications

[19] L. Dieci, A. Papini, A. Pugliese. *Takagi factorization of matrices depending on parameters and locating degeneracies of singular values.* To appear on SIAM J. Matrix Anal. Appl., 2022.

[18] L. Dieci, A. Papini, A. Pugliese. *Decompositions and coalescing eigenvalues of symmetric definite pencils depending on parameters.* To appear on Numer. Algorithms, 2022.

[17] L. D'Ambrosio, M. Gallo, A. Pugliese. *A note on the Kuramoto-Sivashinsky equation with discontinuity.* Mathematics in Engineering, 2021, 3(5): 1-29. DOI: 10.3934/mine.2021041

List of Publications (continued)

[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. Algorithms, Volume 80, pp. 1241-1266, 2019. 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 multiparameter 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

[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

List of Publications (continued)

[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.

Editorial activity

- Guest editor for special issues: "EEMMAS - Evolution Equations and Mathematical Models in Applied Sciences" appeared on Discrete Contin. Dyn. Syst. Ser. S), "SDS2018 - Structural Dynamical Systems - Computational Aspects" appeared on Discrete Contin. Dyn. Syst. Ser. B, "SDS2020 - Structural Dynamical Systems" appeared on J. Comput. Dyn.

- Peer reviewer for: SIAM Journal of Matrix Analysis and Applications, System and Control Letters, Calcolo, Mediterranean Journal of Mathematics.

Research visits

2022 - May 16 – May 30: Laboratoire de Physique des Lasers, Atomes et Molécules (Lille, France).

- April 25 – May 2: Faculty of Mathematics and Physics, Charles University (Prague, Czech Republic).

2019 - November 15 – 23: Department of Mathematics and Statistics, McGill University (Montreal, Canada).

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

- 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).

Research visits (continued)

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

2019 - November 18, McGill University (Montreal, Canada): *Blow-up profile for a family of nonlinear ODEs.*

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

2022 - Member of the scientific and organizing committee for the workshop "Structural Dynamical Systems: Computational Aspects", Rosa Marina, Brindisi (Italy), June 7 – 10.

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:

2020 - STRUCTAPP2020, University of L'Aquila, January 23–24. Talk: *Coalescence of eigenvalues of Hermitian matrices: a perturbative approach.*

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.*

Conferences, Workshops and Summer Schools (continued)

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.*

Teaching

at Università degli Studi di Bari Aldo Moro:

AY 21/22
- Instructor for *Calcolo Numerico* (Numerical Analysis).
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).

AY 20/21
- 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 19/20
- Instructor for *Calcolo Numerico* (Numerical Analysis).
- Teaching Assistant for *Calcolo Numerico 1* (Numerical Analysis 1).

Teaching (continued)

- Teaching Assistant for *Metodi Numerici per l'Ecologia e l'Ambiente.* (Numerical Methods for Ecology and Environmental Sciences).

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 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);

Teaching (continued)

- 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).