

Curriculum vitae

Personal data

- o **Born** January 1, 1983 in Treviglio (Bergamo), Italy. Italian citizen.
- o **Current work address** Dipartimento di Informatica; L.go Pontecorvo, 3; 56127 Pisa; Italy.
- o **Contact info** mobile +39 340 2591953, e-mail fpoloni@di.unipi.it.

Academic positions

- 2012–present **Ricercatore universitario**, *University of Pisa, department of Computer Science*, Pisa, Italy.
Research-oriented position at the assistant professor level. Permanent after a tenure-track period ended in 2014.
- 2011–2012 **A. von Humboldt Postdoctoral Fellow**, *Technische Universität Berlin, institute of Mathematics*, Berlin, Germany.
Info: http://en.wikipedia.org/wiki/Humboldt_Foundation.
- 2011 **Wissenschaftlicher Mitarbeiter**, *Technische Universität Berlin, institute of Mathematics*, Berlin, Germany.
Short-term research assistant position.

Education

- 2008–2010 **Perfezionamento (Ph.D.) in Mathematics**, *Scuola Normale Superiore*, Pisa, Italy.
Thesis *Algorithms for Quadratic Matrix and Vector Equations*.
Advisors D. A. Bini and B. Meini.
Legally equivalent to a European PhD and to the Italian title of *dottore di ricerca*.
- 2002–2008 **Diploma (corso ordinario)**, *Scuola Normale Superiore*, Pisa, Italy.
Five-year honours programme, complementing the bachelor/master studies at the University of Pisa. The Scuola Normale is a public higher learning institution on the model of the French *grandes écoles*.
Info: http://en.wikipedia.org/wiki/Scuola_normale.
- 2005–2007 **Laurea Specialistica (M.Sc.) in Mathematics**, *Università di Pisa*, Pisa, Italy.
- 2002–2005 **Laurea (B.Sc.) in Mathematics**, *Università di Pisa*, Pisa, Italy.

Research interests

Field: Numerical linear algebra. Main topic: **matrix equations: numerical algorithms** for their solution and theoretical aspects. In particular, **algebraic Riccati equations** and other nonlinear equations related to generalized eigenvalue and invariant subspace problems.

After my studies in pure and computational mathematics, I have expanded my horizons by collaborating with several researchers from **applications** in which these equations appear (**control theory**, applied probability and **queuing theory, econometric time series**), getting familiar with the problems and the language of these fields.

Publications

Over 25 papers in peer-reviewed journals, including top journals in the field such as *Mathematics of Computation*, *Numerische Mathematik*, *SIAM Journal on Matrix Analysis and Applications*.

Scopus profile: <http://www.scopus.com/authid/detail.url?authorId=56071560300>.

Google Scholar: <https://scholar.google.com/citations?user=Sc-AccMAAAAJ>.

One **research book** based on my PhD thesis: *Algorithms for Quadratic Matrix and Vector Equations* <http://www.springer.com/it/book/9788876423833>.

Other scientific activities

Conference organization

- 2017 **7th Workshop on Matrix Equations and Tensor Techniques (METT)**, *Pisa*, local organizing committee.
- 2016 **Mathematical Models and Computational Methods for Complex Networks**, *Pisa*, local organizing committee.
- 2015 **Minisymposium on Numerical Methods for Markov Chains and Stochastic Models**, *SIAM conference on applied Linear Algebra, Atlanta, USA*, invited minisymposium organizer.
- 2011 **Young Researchers Minisymposium on algebraic Riccati equations**, *17th ILAS Conference, Braunschweig, Germany*, minisymposium co-organizer with T. Reis.
- 2010 **16th ILAS Conference**, *Pisa, Italy*, local organizing committee.

Research visits

- 2017 **J. Strossmayer University of Osijek**, *Croatia*, host: N. Truhar.
- 2014 & 2015 **University of Adelaide**, *Australia*, host: G. Nguyen.
- 2014 **Federal University of Rio De Janeiro**, *Brazil*, host: I. Nisoli.
- 2013 **University of Manchester**, *UK*, host: V. Noferini.
- 2012 & 2013 **Rouen Business School**, *France*, host: G. Sbrana.
- 2010 & 2013 **Technische Universität Berlin**, *Germany*, host: V. Mehrmann.

Grants

- 2015 & 2017 **Progetto di Ricerca di Ateneo, Università di Pisa**.
Participant of two research projects funded by the university (1-year and 2-year respectively, ca. 15 people each).
- 2014 & 2017 **Progetto di Ricerca, GNCS/INDAM**.
Participant of two 1-year research projects funded by an Italian funding agency, INDAM (ca. 8 people).
- 2013 **Progetto di Ricerca, GNCS/INDAM**.
Principal investigator of a 1-year research project.
- 2012 & 2014 **Progetto Giovani Ricercatori, GNCS/INDAM**.
Recipient of a small single-person grant for young researchers, in two separate years.

Teaching activities

Video recordings of my lectures are available for several courses; links on <http://fph.altervista.org/dida/index.html>.

- 2016 **Numerical Methods and Optimization**, *Università di Pisa*, graduate course for Computer Science students, main instructor of the numerical linear algebra module. Taught in English.
- 2015 & 16 **Matematica Discreta e Algebra Lineare (lezioni)**, *Università di Pisa*, undergraduate course for computer science students, main instructor of the linear algebra module.
- 2013–2017 **Calcolo Numerico (esercitazioni)**, *Università di Pisa*, undergraduate course on numerical computing for biomedical engineering students, exercise classes supporting the course.
- 2014 **Laboratorio di Matematica Computazionale (lezioni)**, *Università di Pisa*, graduate lab course on applications of numerical mathematics and linear algebra, main instructor.

- 2008,09,10,12 **Laboratorio di Analisi Numerica (laboratorio)**, *Università di Pisa*, computer lab classes supporting an undergraduate numerical analysis course for maths students.
- 2008–10 **Complementi di Analisi (tutorato)**, *Scuola Normale Superiore, Pisa*, weekly tutoring activities and advanced exercises for a group of first-year Maths and Physics honours students of the Scuola Normale.

Awards

- 2011 **Shortlisted for the XIV Householder Award**.
Shortlist = qualified in the top 6. The Householder award is a prize for the best dissertation in numerical linear algebra in a 3-year period. Nominations are gathered worldwide.
- 2007 **2nd Matrix Prize for Young Speakers**, *International Conference in Matrix Methods and Operator Equations, Moscow*.
- 2003 **Championnat International de Jeux Mathématiques**, *1st place*, category L2 (undergrad).
The CIJM is an international contest in elementary and recreational mathematical problems.
- 2002 **43rd International Mathematical Olympiad**, *Bronze Medal (17 points)*.
Highest score *ex aequo* among the 6-people Italian team. The IMO, held annually, is the most important international problem-solving contest in mathematics for pre-collegiate students.
- 2001 **42nd International Mathematical Olympiad**, *Honorable Mention (9 points)*.
- 2001–2002 **National scientific Olympiads** Italian Math Olympiad: 2nd place in 2002, 3rd place in 2001.
Finalist in the Italian physics (2002) and informatics (2001) Olympiads.

Other relevant activities

- 2009–present **Member, Commissione Olimpiadi**, *Unione Matematica Italiana*.
Since 2003, I take part actively in the training activities, the organization, and the grading of the Italian Mathematical Olympiad, after several participations as a contestant (see *Awards*). Since 2009, I am a member of the organizing board. I was **deputy leader** of the Italian team in the 2014 International Mathematical Olympiad, and followed the Italian team to several other international competitions as a member of the scientific staff. I taught in over 20 local and national **training camps** for high-school students or teachers.
- 2010 **Referee, CISIA admission tests**, reviewer for the Mathematics part.
Unified entry test used for admission in the schools of engineering of many Italian universities.

Skills

Languages

In parentheses: European reference levels, estimated from the levels of courses attended.

- **Italian** Mother tongue.
- **English** Excellent (C2).
- **German** Good (C1).
- **French** Adequate/rusty (B1).

Computer skills

- OS Linux: very good knowledge (use and system administration).
- Programming Very good knowledge of Matlab. Short and medium-size programs in several languages: C, C++, Python (including Sagemath), Fortran, Mathematica. Some SQL.
- Markup Very good knowledge of LaTeX. Basic HTML with CSS.
- Tools Experience with revision control (Git, Mercurial) and open source software development.

Last update: 2017-06-26.

Full list of publications

Pdf files and a more up-to-date list are available on <http://fph.altervista.org/>.

The most common practice in mathematics is that the author order is alphabetical and does not reflect a difference in contribution.

Journal papers

- 2017 GA Di Luna, P Flocchini, S Gan Chaudhuri, F Poloni, N Santoro, and G Viglietta. "Mutual Visibility by Luminous Robots Without Collisions". In: *Information and Computation* 254.3, pp. 392–418. DOI: 10.1016/j.ic.2016.09.005.
- T Haqiri and F Poloni. "Methods for verified stabilizing solutions to continuous-time algebraic Riccati equations". In: *J. Comput. Appl. Math.* 313, pp. 515–535. DOI: 10.1016/j.cam.2016.09.021.
- 2016 V Mehrmann and F Poloni. "An inverse-free ADI algorithm for computing Lagrangian invariant subspaces". In: *Numer. Linear Algebra Appl.* 23.1, pp. 147–168. DOI: 10.1002/nla.2018.
- F Poloni and T Reis. "A structure-preserving doubling algorithm for Lur'e equations". In: *Numer. Linear Algebra Appl.* 23.1, pp. 169–186. DOI: 10.1002/nla.2019.
- F Poloni and G Sbrana. "Multivariate trend-cycle extraction with the Hodrick-Prescott filter". In: *Macroeconomic Dynamics*, pp. 1–25. DOI: 10.1017/S1365100515000887.
- F Poloni and N Strabić. "Principal pivot transforms of quasidefinite matrices and semidefinite Lagrangian surfaces". In: *Electron. J. Linear Algebra* 31, pp. 200–231. DOI: 10.13001/1081-3810.3132.
- 2015 V Noferini and F Poloni. "Duality of matrix pencils, Wong chains and linearizations". In: *Linear Algebra Appl.* 471, pp. 730–767. DOI: 10.1016/j.laa.2015.01.015.
- F Poloni and G Sbrana. "A note on forecasting demand using the multivariate exponential smoothing framework". In: *Int. J. of Prod. Econ.* 162, pp. 143–150. DOI: 10.1016/j.ijpe.2015.01.017.
- 2014 GT Nguyen and F Poloni. "Componentwise accurate fluid queue computations using doubling algorithms". In: *Numer. Math.* 130.4, pp. 763–792. DOI: 10.1007/s00211-014-0675-4.
- F Poloni and G Sbrana. "Feasible generalized least squares estimation of multivariate GARCH(1,1) models". In: *J. Multivariate Anal.* 129, pp. 151–159. DOI: 10.1016/j.jmva.2014.04.015.
- 2013 B Iannazzo and F Poloni. "A subspace shift technique for nonsymmetric algebraic Riccati equations associated with an M-matrix". In: *Numer. Linear Algebra Appl.* 20.3, pp. 440–452. DOI: 10.1002/nla.1836.
- V Mehrmann and F Poloni. "A generalized structured doubling algorithm for the numerical solution of linear quadratic optimal control problems". In: *Numer. Linear Algebra Appl.* 20.1, pp. 112–137. DOI: 10.1002/nla.1828.
- V Mehrmann and F Poloni. "Using permuted graph bases in \mathcal{H}_∞ control". In: *Automatica J. IFAC* 49.6, pp. 1790–1797. DOI: 10.1016/j.automatica.2013.02.039.
- F Poloni. "An algorithm for solving systems of quadratic equations in branching processes". In: *Boll. Unione Mat. Ital. (9)* 6.2, pp. 481–486.
- F Poloni. "Quadratic vector equations". In: *Linear Algebra and its Applications* 438.4, pp. 1627–1644. DOI: 10.1016/j.laa.2011.05.036.
- G Sbrana and F Poloni. "A closed-form estimator for the multivariate GARCH (1,1) model". In: *J. Multivariate Anal.* 120, pp. 152–162. DOI: 10.1016/j.jmva.2013.05.005.
- 2012 F Greco, B Iannazzo, and F Poloni. "The Padé iterations for the matrix sign function and their reciprocals are optimal". In: *Linear Algebra Appl.* 436.3, pp. 472–477. DOI: 10.1016/j.laa.2011.04.016.
- V Mehrmann and F Poloni. "Doubling Algorithms with Permuted Lagrangian Graph Bases". In: *SIAM J. Matrix Anal. Appl.* 33.3, pp. 780–805. DOI: 10.1137/110850773.

- F Poloni and T Reis. "A Deflation Approach for Large-Scale Lur'e Equations". In: *SIAM J. Matrix Anal. Appl.* 33.4, pp. 1339–1368. DOI: 10.1137/120861679.
- 2011 DA Bini, B Meini, and F Poloni. "On the solution of a quadratic vector equation arising in Markovian binary trees". In: *Numer. Linear Algebra Appl.* 18.6, pp. 981–991. DOI: 10.1002/nla.809.
- B Meini and F Poloni. "A Perron iteration for the solution of a quadratic vector equation arising in Markovian binary trees". In: *SIAM J. Matrix Anal. Appl.* 32.1, pp. 248–261. DOI: 10.1137/100796765.
- 2010 DA Bini, B Meini, and F Poloni. "An effective matrix geometric mean satisfying the Ando-Li-Mathias properties". In: *Math. Comp.* 79.269, pp. 437–452. DOI: 10.1090/S0025-5718-09-02261-3.
- DA Bini, B Meini, and F Poloni. "Transforming algebraic Riccati equations into unilateral quadratic matrix equations". In: *Numer. Math.* 116.4, pp. 553–578. DOI: 10.1007/s00211-010-0319-2.
- F Poloni. "A note on the $O(n)$ -storage implementation of the GKO algorithm and its adaptation to Trummer-like matrices". In: *Numer. Algorithms* 55.1, pp. 115–139. DOI: 10.1007/s11075-010-9361-5.
- F Poloni. "Constructing matrix geometric means". In: *Electron. J. Linear Algebra* 20, pp. 419–435.
- 2009 DA Bini, B Meini, and F Poloni. "Fast solution of a certain Riccati equation through Cauchy-like matrices". In: *Electron. Trans. Numer. Anal.* 33, pp. 84–104.
- 2008 DA Bini, B Iannazzo, and F Poloni. "A fast Newton's method for a nonsymmetric algebraic Riccati equation". In: *SIAM J. Matrix Anal. Appl.* 30.1, pp. 276–290. DOI: 10.1137/070681478.
- [Book chapters, proceedings, preprints and other publications](#)
- 2016 GT Nguyen and F Poloni. *Componentwise accurate Brownian motion computations using Cyclic Reduction*. eprint: arXiv:1605.01482. URL: <https://arxiv.org/abs/1605.01482>.
- FD Terán, B Iannazzo, F Poloni, and L Robol. *Uniqueness of solution of generalized Sylvester-like equations with rectangular coefficients*. eprint: arXiv:1608.01183. URL: <https://arxiv.org/abs/1608.01183>.
- 2015 E Jarlebring and F Poloni. *Iterative methods for the delay Lyapunov equation with T-Sylvester preconditioning*. arXiv.org eprint. Submitted to APNUM. eprint: arXiv:1507.02100. URL: <http://arxiv.org/abs/1507.02100>.
- F Poloni. "Permuted Graph Matrices and Their Applications". In: *Numerical Algebra, Matrix Theory, Differential-Algebraic Equations and Control Theory*. Ed. by P Benner, M Bollhöfer, D Kressner, C Mehl, and T Stykel. Springer International Publishing, pp. 107–129. ISBN: 978-3-319-15259-2. DOI: 10.1007/978-3-319-15260-8_5.
- 2014 GA Di Luna, P Flocchini, F Poloni, N Santoro, and G Viglietta. "The Mutual Visibility Problem for Oblivious Robots". In: *Proceedings of the 26th Canadian Conference on Computational Geometry*. URL: <https://projects.cs.dal.ca/cccg2014/proceedings/>.
- 2013 T Brüll, F Poloni, G Sbrana, and C Schröder. *Enforcing solvability of a nonlinear matrix equation and estimation of multivariate ARMA time series*. Tech. rep. Matheon Preprint #1027. DFG-Forschungszentrum Matheon. URL: <http://nbn-resolving.de/urn:nbn:de:0296-matheon-12409>.
- 2010 DA Bini, B Iannazzo, B Meini, and F Poloni. "Nonsymmetric algebraic Riccati equations associated with an M-matrix: recent advances and algorithms." In: *Matrix Methods: Theory, Algorithms and Applications*. Ed. by V Olshevsky and E Tyrtshnikov. World Scientific Publishing. Chap. 10, pp. 176–209. ISBN: 978-981-283-601-4. DOI: 10.1142/9789812836021_0010.
- 2006 DA Bini and F Poloni. *A note on the location of polynomial roots*. arXiv.org eprint. Never submitted to a peer-reviewed journal. eprint: arXiv:math/0609297. URL: <http://arxiv.org/abs/math/0609297>.

Books

- 2011 F Poloni. *Algorithms for quadratic matrix and vector equations*. Vol. 16. Theses of Scuola Normale Superiore di Pisa (New Series). Book based on my Ph.D. Thesis. Publications of the Scuola Normale Superiore, Pisa (distributed by Birkhäuser), pp. xvi+239. ISBN: 978-88-7642-383-3. URL: <http://www.springer.com/birkhauser/mathematics/scuola+normale+superiore/book/978-88-7642-383-3>.

Software

- 2012 F Poloni. *PGDoubling – A MATLAB package to solve algebraic Riccati equations and optimal control problems using permuted graph bases*. URL: <https://bitbucket.org/fph/pgdoubling>.