

# CURRICULUM VITAE

Federico Giovanni Poloni

## Personal information

**Born:** January 1, 1983 in Treviglio (BG), Italy.

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## Studies

**2008–now:** Attending a Ph.D. course (It: *corso di perfezionamento*) in Mathematics at the *Scuola Normale Superiore*, Pisa, Italy. Thesis (in preparation): *Algorithms for quadratic matrix and vector equations*, supervisors: D. A. Bini and B. Meini. Due to defend at about end 2010–beginning 2011.

**2008:** Final diploma for the five-year *corso ordinario* of the *Scuola Normale Superiore* (info: [http://en.wikipedia.org/wiki/Scuola\\_normale](http://en.wikipedia.org/wiki/Scuola_normale)), complementing the normal bachelor+master programme of the Italian university. Average exam mark during the course: 30/30.

**2007:** Master degree (It: *laurea specialistica*) in Mathematics at the University of Pisa, Italy, mark 110/110 with honours. Thesis (in Italian): *Methods for the fast solution of a class of algebraic Riccati equations*, supervisors: D. A. Bini and B. Meini. Average exam mark during the course: 29.50/30.

**2005:** Bachelor degree (It: *laurea triennale*) in Mathematics at the University of Pisa, Italy, mark 110/110 with honours. Thesis (in Italian): *Discrete Fourier transform and canonical factorization in a queuing theory problem*, supervisor: D. A. Bini. Average exam mark during the course: 29.54/30.

## Research interests

General field: numerical linear algebra and matrix analysis.

- Matrix equations: Algebraic Riccati equations, quadratic matrix equations, matrix and vector equations in applied probability and control theory.
- Matrix structures: displacement structure, Toeplitz and Cauchy-like matrices, fast and superfast algorithms for rank-structured matrices.
- Matrix geometric means and their computational aspects.

## Peer-reviewed publications

**2010:** D. A. Bini, B. Meini, F. Poloni, *Transforming algebraic Riccati equations into unilateral quadratic matrix equations*, Num. Math., online first. DOI: 10-1007/s00211-010-0319-2.

**2010:** F. Poloni, *A note on the  $O(n)$ -storage implementation of the GKO algorithm and its adaptation to Trummer-like matrices*, Numer. Algorithms 55(2010), pp. 115–139.

**2010:** D. A. Bini, B. Meini, B. Iannazzo, F. Poloni, *Nonsymmetric algebraic Riccati equations associated with an  $M$ -matrix: recent advances and algorithms*, in the book *Matrix methods: theory, algorithms and applications*, edited by V. Olshevsky and E. Tyrtyshnikov, World Scientific Publishers.

**2010:** D. A. Bini, B. Meini, F. Poloni, *An effective matrix geometric mean satisfying the Ando–Li–Mathias properties*, Math. Comp. 79 (2010), pp. 437–452.

- 2010:** F. Poloni, *Constructing matrix geometric means*, Electron. J. Linear Algebra 20(2010), pp. 419–435.
- 2009:** D. A. Bini, B. Meini, F. Poloni, *Fast solution of a certain Riccati Equation through Cauchy-like matrices*, Electron. Trans. Numer. Anal. 33 (2009), pp. 84–104.
- 2008:** D. A. Bini, B. Iannazzo, F. Poloni, *A Fast Newton's Method for a Nonsymmetric Algebraic Riccati Equation*, SIAM J. Matrix Anal. Appl. 30 (2008), no. 1, pp. 276–290.

### Preprints and e-prints

- 2010:** B. Meini, F. Poloni, *A Perron iteration for the solution of a quadratic vector equation arising in Markovian Binary Trees*, arXiv:1006.0577 [math.NA], <http://arxiv.org/abs/1006.0577>. Submitted (SIMAX).
- 2010:** F. Poloni, *Quadratic vector equations*, arXiv:1004.1500 [math.NA], <http://arxiv.org/abs/1004.1500>.

### Conference talks

- 2010:** *Algorithms for quadratic matrix equations in probability - with an eye to similarities with control theory*, Doktoranden- und Diplomanden-Seminar Numerische Mathematik — TU Berlin (Germany).
- 2009:** *Geometric means of more than two matrices*, SIAM Applied Linear Algebra Conference — Monterey, CA (USA). In the minisymposium on functions of matrices.
- 2009:** *An efficient matrix means satisfying the Ando-Li-Mathias properties*, GNCS congress — Montecatini Terme (Italy), and Two days of numerical linear algebra — Perugia (Italy). In Italian.
- 2008:** *Some implementation issues on the GKO algorithm*, Structured Linear Algebra Problems: Analysis, Algorithms, and Applications — Cortona (Italy).
- 2008:** *SDA and cyclic reduction for a rank-structured algebraic Riccati equation*, Two days of numerical linear algebra — Bologna (Italy).
- 2007:** *Old and new algorithms for algebraic Riccati equations*, Dagstuhl seminar 07461: Numerical Methods for Structured Markov Chains — Schloss Dagstuhl (Germany).
- 2007:** *Exploiting displacement structure in the solution of a class of nonsymmetric algebraic Riccati equations*, 2nd International Conference on Matrix Methods and Operator Equations — Moscow.
- 2007:** *Fast Newton method for an algebraic Riccati equation*, Two days of numerical linear algebra — Padua (Italy). In Italian.

### Other research activities

- 2010:** Gene Golub SIAM Summer School 2010 – International Summer School on Numerical Linear Algebra — Selva di Fasano (Italy).
- 2010:** Visiting student at the Technische Universität in Berlin (April–May)
- 2009:** Summer School and Advanced Workshop on Trends and Developments in Linear Algebra — Trieste (Italy).
- 2008:** SIAG/LA–SIMUMAT International Summer School on Numerical Linear Algebra — Castro Urdiales (Spain).

## Teaching activities

**2008–2010:** Tutoring activities for first-year students of the Scuola Normale.

**2009:** Several lectures as teaching assistant for the graduate course Institutions of Numerical Analysis (master degree in Mathematics) at the University of Pisa in academic year 2009–2010.

**2008–2009:** Computer lab classes supporting the Numerical Analysis course (bachelor degree in Mathematics) at the University of Pisa in academic years 2008–2009 and 2009–2010.

**2004–now:** Many teaching activities for the preparation of high-school students to the Italian and international mathematical Olympiads: lecturer in seminars held in Udine (2010), Campobasso (2009), Brescia (2008–2009), Perugia (2007–2008), and Pavia (2005), and in advanced seminars held in Pisa (2004–2005, 2007–2009).

## Other work experiences

**2003–now:** Collaborations with the organising committee of the Italian mathematical Olympiad: taking part in the Italian Olympiads as organiser and judge (2004–2008); proposing problems; correcting exam papers. Member of the organizing committee since 2009. Member of the scientific staff following the Italian team to several international competitions: Romanian Master of Mathematics 2009, international mathematical Olympiad 2009.

**2004–2007:** System administrator of a small computer lab (12 Linux+Windows workstations, 500+ users, Linux and Windows servers), in collaboration with the computing centre of the Scuola Normale.

## Awards

**2007:** *2nd matrix prize for young speakers*, for the talk presented during the 2nd ICMOE in Moscow (see **Conferences and workshops**).

**2004:** *Championnat international de jeux mathématiques (CIJM)*: 1st place in the Italian stage, 1st place in the international finals (Paris, France).

**2003:** CIJM: 4th place in the Italian stage.

**2002:** International mathematical Olympiad (IMO): 2nd place in the Italian Olympiad; 1st place in the Italian team selection test; bronze medal with 17 points (best result *ex aequo* in the Italian team) in the 43rd international mathematical Olympiad in (Glasgow, UK).

**2001:** IMO: 3rd place in the Italian Olympiad; 1st place in the Italian team selection test; honourable mention in the 42nd international mathematical Olympiad (Washington D.C., USA) with 9 points.

Also finalist in the Italian physics Olympiad (2002) and informatics Olympiad (2001).

## Language skills

**Italian:** Mother tongue.

**English:** Excellent, both written and spoken.

June 2002: University of Cambridge's *First Certificate in English*, grade A.

**French:** Good, both written and spoken.

## Computer skills

**Operating systems:** GNU/Linux: excellent knowledge (use and administration). Windows: good knowledge (use and administration).

**Office apps:** Good knowledge (word processing, spreadsheets, database).

**Programming:** Good knowledge of C++, C, Matlab. Basic knowledge of FORTRAN 90, Perl, shell scripting, Pascal. Programming experiences with the following libraries: Boost, GTK+, GTKmm, TNT Template Numerical Toolkit, ncurses.

**Typesetting:** Good knowledge of L<sup>A</sup>T<sub>E</sub>X, basic HTML with CSS.

## Hobbies

Programming, learning and using GNU/Linux; juggling; basketball; contract bridge; strategy games; reading science-fiction books.

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