

Curriculum vitæ

Nicola Guglielmi

General

Current position:

Professor (Italian Professore Ordinario), Facoltà di Biotecnologie,
Chair of Numerical Analysis,
University of L'Aquila, Italy.

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Education

High school Maturità scientifica, Liceo Righi di Bologna (final mark 60/60)
Laurea Electronic Engineering, University of Bologna, 4/12/1991
(summa cum laude)
PhD Computational Mathematics, University of Padova, 12/11/1996

Laurea dissertation:

Pattern recognition for the quality analysis of mechanical machined parts: a neural approach to the recognition problem. (Riconoscimento di pattern per l'analisi di qualità di pezzi meccanici: un approccio neurale al problema del riconoscimento.)
Advisor: Professor G. Baccarani (Università di Bologna).

PhD dissertation

On the stability of one step methods for the numerical solution of delay differential equations. (Sulla stabilità dei metodi a un passo per la soluzione numerica di equazioni differenziali con ritardo). Advisor: Professor A. Bellen (Università di Trieste).

Positions after graduation

From 3/92 to 2/93	Fellowship S.G.S. Thomson Company — D.E.I.S., Università di Bologna
From 2/93 to 1/96	PhD student Dipartimento di Matematica Università di Padova
From 1/97 to 12/97	Post-doctoral fellow Dipartimento di Scienze Matematiche Università di Trieste
From 1/98 to 10/01:	Research associate in Numerical Analysis Faculty of Sciences MM.FF.NN. Università di L'Aquila
From 11/01 to 7/05:	Associate Professor in Numerical Analysis Faculty of Sciences MM.FF.NN. Università di L'Aquila
From 7/05 to 2/06 :	Associate Professor in Numerical Analysis Faculty of Biotechnologies Università di L'Aquila
From 3/06 to present:	Full Professor in Numerical Analysis Faculty of Biotechnologies Università di L'Aquila

Scientific interests

Numerical methods for delay and functional differential equations, stability properties, stiff problems, development of a code for the numerical integration of stiff and implicit systems of delay differential equations, stiff partial differential equations, numerical linear algebra, joint spectral radius of sets of matrices, matrix perturbation theory, pseudospectral and stability measures, mathematical physics, singularly perturbed problems, discontinuous differential equations and their regularization, non-smooth optimization, engineering applications.

Fellowships

1992	C.N.R. Program in Bioelectronics, University of Bologna - SGS Thomson company
1993-1996	University of Padova, PhD fellowship in mathematics
1997	University of Trieste, Post-doc fellowship in mathematics

Honors and Awards

- 1) Selected communication at Volterra Centennial meeting, Tempe (USA), 1996. (young researcher prize of \$300) (see C4)).
- 2) New Talent Award: SciCADE-99 meeting, Fraser Island (Australia), 1999. Awarded plenary lecture (see P1)).

- 3) Selected lecture in numerical analysis at UMI-99 workshop (convegno dell'Unione Matematica Italiana) (see C13)).

Recent grants and research projects

- 2011 InDAM: **Workshop: Recent trends in delay differential equations: models, theory and numerics, June 2012, Scuola Normale Superiore, Cortona** (15000 Euro) (as Director).
- 2010 Fondazione Carispaq: **High Performance Computation Cluster** (20000 Euro) (as Scientific Responsible)
- 2007-9 MIUR/COFIN Project: **Numerical methods for delay and fractional differential equations** (17000 Euro) (as Scientific Responsible of the Research Unit of the University of L'Aquila).

The whole project entitled **Numerical methods for ordinary differential equations** (67000 Euro) is coordinated by Professor A. Bellen (University of Trieste).

- 2007: Internationalization Project - University of L'Aquila: **Systems with several preferred states: study of singular behavior due to lack of convexity** (20000 Euro) (coordinated by Prof. G. Fusco (Universita' dell'Aquila, Italy))
- 2006 INDAM Project: **Mathematical modelling and numerical analysis of quantum systems with applications to nanosciences** (38000 Euro) (coordinated by Prof. A. Sacchetti (Universita' di Modena e Reggio Emilia, Italy))
- 2005-6 MIUR/COFIN Project: **Numerical methods for functional differential equations** (42000 Euro) (coordinated by Prof. M. Zennaro (Universita' di Trieste, Italy))
- 2004 Progetto Intergruppo INDAM: **Numerical methods and mathematical software for evolution problems** (coordinated by Prof. M. Zennaro (Universita' di Trieste, Italy))
- 2004 Intergroup INDAM Project: **Integration of complex systems in biomedicine: models and simulation** (coordinated by Prof. A. Quarteroni (Politecnico di Milano, Italy e EPFL Lausanne, Switzerland))
- 2003 GNCS Project: **Problems and interfacing numerical methodologies for ordinary and partial differential equations.** (coordinated by Prof. M. Zennaro (Universita' di Trieste, Italy))
- 2003 Intergroup INDAM Project: **Methods and mathematical models in population dynamics** (coordinated by Prof. M. Iannelli (Universita' di Trento, Italy)).

Referee's activity

- Reviewer for the Mathematical Review.
- Refereed hundreds of papers for the following journals.

SIAM Journal on Numerical Analysis, SIAM Journal on Scientific Computing, Numerische Mathematik, Numerical Algorithms, Advances in Computational Mathematics, Mathematics of Computation, IMA Journal of Numerical Analysis, Journal of Applied and Numerical Mathematics, BIT, Computers and Mathematics with Applications, Applied Numerical Mathematics, Calcolo, International Journal of Computer Mathematics, International Journal of Control, Journal on Differential Equations, and others.

Teaching

Undergraduate: Calculus, Programming, Basic numerical analysis, Advanced numerical analysis, Linear algebra and Laboratory of Biomathematics at the University of L'Aquila. Numerical calculus and Mathematical methods for engineers at the University of Trieste.

Laurea magistralis: Advanced numerical analysis, Numerical analysis of differential equations, Stiff problems.

PhD programs: Implicit integration of differential equations (L'Aquila), Numerics of functional differential equations (University of Bari, 2003 and University of Modena, 2006), Joint spectral radius: theory and applications (Universities of Bologna, 2003 and Padova, 2005), Spectral properties of families of matrices and application to the stability analysis of linear dynamical systems (University of Roma La Sapienza, 2011).

Summer schools: Continuous methods for ordinary differential equations (Perugia, InDAM students, 2003), Numerical integration of delay differential equations (Dobbiaco Summer school, Dobbiaco, 2006), Numerical methods for discontinuous ODEs (Dobbiaco Summer school, Dobbiaco, 2009), Stability of linear problems: joint spectral radius of sets of matrices (CIME-EMS Summer school, Cetraro, 2011).

Administrative responsibilities

- Member (since 2002) of the didactic committee (Italian commissione didattica) of the degree course in Mathematics.
- Till 2006 President of the orientation committee for the Mathematical area at the University of L'Aquila.
- President of the development committee (Italian commissione programmazione e sviluppo) for the faculty of Biotechnology at the University of L'Aquila.
- Member of the PhD council of the Department of Mathematics.

Scientific activity

Main areas

1. Computation of the joint spectral radius of a family of matrices and applications.
2. Numerical methods for ordinary and functional differential equations.
3. Computation of pseudospectra and pseudospectral measures; perturbation theory for eigensystems.
4. Singularly perturbed problems.
5. Software development of a code for *stiff* retarded differential equations.
6. Time integration of gradient systems associated to regularized forward-backward parabolic partial differential equations.
7. Implicit–explicit methods for mixed (stiff–non stiff) differential equations.
8. Preconditioning of large non-linear systems.

Main visits at foreign institutions

- 1996 4–6 June: IBM T.J Watson Research Center, Yorktown-Heights (NY) (invited by Dr. Albert Ruehli)
- 1997 1–25 June: IBM T.J Watson Research Center, Yorktown-Heights (NY) (invited by Dr. Albert Ruehli)
- 1998 13–23 May: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 1999 6 November–4 December: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2000 27 February–1 April, 11 June–1 July, 23 September–7 October: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2002 30 June–5 July: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2002 8 July–20 July: Department of Mathematics, Universität Bremen (invited by Professor Fabian Wirth)
- 2003 7 January–12 January: Department of Mathematics, Universität Tübingen (invited by Professor Christian Lubich)
- 2003 23 November–20 December: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)

- 2004 11 January–20 March: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2004 12 September–24 September: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2004 6 December–21 December: Bolyai Institut of University of Szeged, Hungary (invited by Professor Laszlo Hatvani)
- 2005 18 April–23 April: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2007 7 September–22 September: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer)
- 2008 15 May–18 May: Department of Mathematics, Michigan State University (invited by Professor P. Bates).
- 2008 21 May–23 May: School of Mathematics, Emory University (invited by Professor M. Benzi).
- 2009 15 January–12 March: Courant Institute, New York University (invited by Professor Michael Overton).
- 2009 12 March–10 April: Department of Mathematics, Mc Gill University (invited by Professor T. Humphries).
- 2009 1 May–30 June: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer).
- 2009 15 August–15 December: School of Mathematics, Georgia Tech (invited by Professor Luca Dieci as visiting professor teaching a class).
- 2010 3 May–8 May: Department of Mathematics, Universität Tübingen (invited by Professor Christian Lubich)
- 2010 30 June–12 July: ETH Zürich (invited by Professor Daniel Kressner)
- 2010 4 September–1 October: Courant Institute, New York University (invited by Professor Michael Overton).
- 2011 7 February–9 March: Section de Mathématiques, Université de Genève (invited by Professor Ernst Hairer).
- 2011 16 May–20 May: Department of Mathematics, Universität Tübingen (invited by Professor Christian Lubich).
- 2011 26 October–29 October: Department of Mathematics, Technische Universität Berlin (invited by Professor Volker Mehrmann).
- 2012 29 October–4 November: Department of Computer Science, University K.U. Leuven (invited by Professor Wim Michiels).
- 2012 16 January–3 February: Mathematisches Forschungsinstitut Oberwolfach, Research in pairs program with Daniel Kressner (EPFL, Lausanne) and Christian Lubich (Universität Tübingen).

Organization of Conferences and Schools

- (1) Member of the organizing committee of the International Conference “SciCADE97” (Grado (Italy), 15 September– 19 September 1997).
- (2) Organizer of the minisymposium **Delay differential equations**, at the International Conference “SciCADE03” (Trondheim (Norway), 30 June– 4 July 2003).
- (3) Member of the organizing committee of the International Conference “Sixth IFAC Workshop on Time-Delay Systems”, (L’Aquila (Italy), 10 July– 12 July 2006) (www.diel.univaq.it/IFACTDS06).
- (4) Organizer of the minisymposium **Delay differential equations**, at the International Conference “SciCADE07” (Saint Malo (Francia), 9 July– 13 July 2007) (scicade07.irisa.fr).
- (5) Member of the scientific committee of the International Conference “Seventh IFAC Workshop on Time-Delay Systems” (Nantes (Francia), 17 September – 19 September 2007) (www2.irccyn.ec-nantes.fr/TDS07).
- (6) Member of the organizing committee of the Workshop “Recent advances in Biomathematics” (L’Aquila (Italy), 31 January– 1 February 2008).
- (7) Director (with L. Dieci) of the CIME-EMS Summer School in applied mathematics **Current challenges in stability issues for numerical differential equations** (Cetraro, Italy, 27 June – 1st July 2011).
- (8) Organizer (with A.R. Humphries) of the minisymposium **Numerical methods for delay differential equations**, at the International Conference “ICIAM 2011” (Vancouver, Canada, 18-22 July 2011).

Seminars and Conference Presentations

Plenary Lectures

- P1) **Novel results of numerical stability for delay differential equations.**
Lecture for the conferring of the New Talent Award presented at the International Conference “SciCADE99”, (Fraser Island, Australia, 9–13 August 1999).
- P2) **Automatic detection of breaking points in delay differential equations.**
“2nd International Workshop on the Technological Aspects of Mathematics”, (Montecatini, Italy, 1–3 April 2004).
- P3) **Numerical delay differential equations.**
“Joint AARMS-CRM Workshop: Recent Advances in Functional and Delay Differential Equations”, (Halifax, Canada, 1–5 November 2007).

- P4) **Joint spectral radius: theory, applications and computation.**
 “Congress of the Gruppo Nazionale di Calcolo Scientifico 2007”, (Montecatini, Italy, 4–6 February 2008).
- P5) **On singular perturbations of neutral delay differential equations.**
 “Conference on Scientific Computing and Differential Equations celebrating Ernst Hairer’s 60th birthday” (Geneva, June 17-20, 2009).
- P6) **Asymptotic expansions for regularized state dependent neutral delay differential equations.** “Workshop on delay differential equations” (Bristol, 7 – 9 September 2009).
- P7) **Regularization of discontinuous ODEs with application to neutral delay differential equations.** 12th Seminar ”NUMDIFF” on Numerical Solution of Differential and Differential-Algebraic Equations (Halle, 14 - 18 September 2009).
- P8) **Regularization approaches for discontinuous differential equations**
 ‘Structural dynamical systems: Computational Aspects SDS2010 ’ (Capitolo, 8 - 11 June 2010).

Invited Lectures

- C1) **Metodi Numerici per l’Analisi Stazionaria di Circuiti Analogici Nonlineari** (in Italian).
 Presented at the Congress “Convegno Nazionale di Analisi Numerica”, (Montecatini, Italy, 27–29 April 1994).
- C2) **Numerical Methods for the Simulation of Nonlinear Circuits in the Frequency Domain.**
 Presented at the International Congress “SIMAF’94”, (Capri, Italy, 30 May–3 June 1994).
- C3) **Stability properties of Numerical Methods for Delay Differential Equations.**
 Presented at the International Congress “ODE to NODE”, (Geiranger, Norway, 19–22 June 1995).
- C4) **On the Stability Properties of Runge–Kutta Methods for Delay Differential Equations.**
 Presented at the International Congress “Volterra Centennial”, (Tempe, Arizona (USA), 27–30 May 1996).
- C5) **Contractivity and asymptotic stability of linear delay differential systems of the neutral type.**
 Presented at the International Congress “SciCADE97”, (Grado, Italy, 15–19 September 1997).
- C6) **Contractivity and stability of numerical methods for systems of neutral delay differential equations.**
 Presented at the International Congress “NMDE98”, (Coimbra, Portugal, 25–27 February 1998).

- C7) **Sulla contrattività e la stabilità dei metodi numerici per sistemi di equazioni differenziali neutrali.**
Presented at the Congress “Convegno Nazionale di Analisi Numerica”, (Montecatini, Italy, 15 April 1998).
- C8) **On the Stability Properties of Runge–Kutta Methods for Delay Differential Equations.**
Presented at the Section de Mathématiques, Université de Genève, (Geneva, Switzerland, 19 May 1998).
- C9) **Contractivity and stability of numerical methods for systems of neutral delay differential equations.**
Presented at the International Congress “SIMAI-1998”, (Taormina, Italy, 1–5 June 1998).
- C10) **Sulla stabilità dei metodi Runge-Kutta nella soluzione di equazioni con ritardo.**
Presented at the Congress “Workshop Metodi numerici per ODEs”, (Bari, Italy, 9–10 June 1998).
- C11) **The joint spectral radius of families of matrices with applications to stability theory.**
Short course of 3 lectures presented (jointly M. Zennaro) at International Congress “ANODE-99”, (Auckland, New Zealand, 16–20 August 1999).
- C12) **Sulla stabilità dei metodi numerici per equazioni differenziali con ritardo.**
Selected communication at the Congress “UMI-99”, (Napoli, Italy, 13–18 September 1999).
- C13) **Families of matrices and polytope norms with applications to stability analysis of numerical ODE methods.**
Presented at the International Congress “Workshop on stability”, (Frostavallen, Sweden, 11–15 October 1999).
- C14) **On the instabilities of Runge-Kutta methods when applied to retarded differential equations.**
Presented at the International Congress “British Applied Mathematics Conference at the Millennium, 2000”, (Manchester, England, 25–28 April 2000).
- C15) **The numerical solution of stiff delay differential equations.**
Presented at the International Congress “WCNNA 2000”, (Catania, Italy, 17–26 July 2000).
- C16) **Polytope norms for families of matrices with application to stability of numerical methods for ODEs.**
Presented at the International Congress “BIT Anniversary Conference”, (Lund, Sweden, 9–12 August 2000).
- C17) **Developing a code for stiff delay differential equations.**
Presented at the International Congress “IFAC conference on Time Delay Systems”, (Ancona, Italy, 11–13 September 2000).

- C18) **Sviluppo di un codice per equazioni con ritardo di tipo stiff.**
Presented at the Congress “Convegno GNIM”, (Bertinoro, Italy, 11–13 December 2000).
- C19) **Implementation issues in the numerical solution of stiff delay differential equations.**
Presented at the International Congress “SciCADE 2001”, (Vancouver, Canada, 29 July–3 August 2001).
- C20) **Radau IIA methods for the numerical integration of stiff delay differential equations.**
Presented at the International Congress “Numerical methods for ODEs”, (Peschici, Italy, 17–20 September 2001).
- C21) **A software tool for the numerical integration of stiff retarded differential equations.**
Presented at the International Congress “SIMAI 2002”, (Chia Laguna, Italy, 27–31 May 2002).
- C22) **On the limit products of a family of matrices.**
Presented at the International Congress “Conference on Scientific Computation celebrating Gerhard Wanner’s 60th birthday”, (Geneva, Switzerland, 26–29 June 2002).
- C23) **Polytope norms of families of matrices with application to numerical stability analysis.**
“Numerical Analysis Seminar, University of Hamburg”, (Hamburg, Germany, 11 July 2002).
- C24) **Open issues in devising software for the numerical solution of implicit delay differential equations.**
“International Workshop on the Technological Aspects of Mathematics”, (Bari, Italy, 18–20 December 2002).
- C25) **Stability of Θ -methods for the variable coefficient pantograph equation.**
“Numerical Analysis Seminar, University of Tübingen”, (Tübingen, Germany, 9 January 2003).
- C26) **Sulla stabilità dei Θ -metodi per equazioni con ritardo proporzionale.**
Presented at the Congress “Due giorni di algebra lineare numerica 2003”, (Pisa, Italy, 6–7 March 2003).
- C27) **Sull’integrazione numerica di un modello con memoria dell’interazione antigene-anticorpo.**
Presented at the Congress “Convegno dell’Unione Matematica Italiana 2003”, (Milano, Italy, 8–13 September 2003).
- C28) **On stepsize control in the numerical integration of implicit delay differential equations.**
Presented at the International Congress “Tenth Numdiff Conference”, (Halle, Germany, 8–11 September 2003).

- C29) **Asymptotic stability of numerical methods for a class of linear variable coefficient delay equations.**
Presented at the Section de Mathématiques, Université de Genève, (Geneva, Switzerland, 4 and 11 December 2003).
- C30) **Complex polytope extremality results for families of matrices.**
Presented at the Section de Mathématiques, Université de Genève, (Geneva, Switzerland, 30 January 2004).
- C31) **Studio numerico della dinamica gradiente per funzionali non convessi.**
Presented at the International Congress “Convegno GNCS”, (Montecatini, Italy, 9–11 February 2003).
- C32) **Computing breaking points of implicit delay differential equations.**
Presented at the International Congress “Fifth IFAC Workshop on Time-Delay Systems ”, (Leuven, Belgium, 8-10 September 2004).
- C33) **Asymptotic stability of numerical methods for a class of variable coefficient delay equations.**
Presented at the Eotvos Lorand University of Budapest, (Budapest, Hungary, 13 December 2004).
- C34) **Complex polytope extremality results for families of matrices.**
Presented at the Bolyai Institut of the University of Szeged, (Szeged, Hungary, 16 December 2004).
- C35) **Numerical experiments and conjectures on the dynamics of some singularly perturbed non-convex functionals.**
Presented at Centro De Giorgi – Scuola Normale Superiore (Pisa, Italy, 2 May 2005).
- C36) **Numerical periodic orbits of neutral delay differential equations.**
Presented at the International Congress “SciCADE 2005”, (Nagoya, Japan, 23-27 May 2005).
- C37) **Automatic computation of breaking points in implicit delay differential equations by the code Radar5.**
Presented at the International Congress “SciCADE 2005”, (Nagoya, Japan, 23-27 May 2005).
- C38) **A model of antigen antibody dynamics based on delay differential equations with state dependent delays.**
Presented at the International Congress “The Fourth China-Italy Conference on Mathematical Models in Life Science: Theory and Simulation”, (Peking, China, 31 May-2 June 2005).
- C39) **Numerical periodic orbits of neutral delay differential equations.**
Presented at the International Congress “Structural dynamical systems: Computational Aspects SDS2005 ”, (Capitolo, Italy, 26-29 June 2005).
- C40) **Solving delay differential equations by the code Radar5.**
Presented at the International Congress “Workshop: Computational Life Sciences ”, (Innsbruck, Austria, 12-15 October 2005)

- C41) **Polytope norms and related algorithms for the computation of the joint spectral radius.**
Presented at the International Congress “44th IEEE Conference on Decision and Control and European Control Conference 2005”, (Seville, Spain, 12-15 December 2005).
- C42) **Algorithms for the computation of the joint spectral radius.**
Presented at the International Congress “Structural dynamical systems: Computational Aspects SDS2006”, (Capitolo, Italy, 12-16 June 2006).
- C43) **On the numerical integration of neutral state dependent delay equations.**
Presented at the International Congress “Workshop: Innovative integrators for differential and delay equations”, (Innsbruck, Austria, 10-15 September 2006).
- C44) **Multiple scales in the dynamics of forward-backward parabolic equations.**
Presented at the International Congress “Joint International Meeting UMI - DMV”, (Perugia, Italy, 18-22 June 2007).
- C45) **Numerical integration of state dependent neutral delay equations.**
“8th Colloquium on the Qualitative Theory of Differential Equations”, (Szeged, Hungary, 25-28 June 2007).
- C46) **Computation of the joint spectral radius of real matrices.**
Presented at the Section de Mathématiques, Université de Genève, (Geneva, Switzerland, 19 September 2007).
- C47) **Computing the joint spectral radius of a family of matrices.**
Presented at the Workshop “Gene Golub Day in Pisa”, (Pisa, Italy, 29 February 2008).
- C48) **A regularization for discontinuous differential equations with application to state-dependent delay differential equations.**
Presented at the “7th AIMS Conference on Dynamical Systems and Differential Equations”, (University of Texas at Arlington, Texas, USA, 18-21 May 2008).
- C49) **On finiteness properties of sets of matrices.**
Presented at the International Conference “Structured Numerical Linear Algebra Problems: Analysis, Algorithms, and Applications”, (Cortona, Italy, 15-19 September 2008).
- C50) **The joint spectral radius of a matrix family: computation and applications (part 2).**
Presented at the International Conference “3rd Workshop Stability and Discretization Issues in Differential Equations”, (University of Technology, Vienna, 17-20 September 2008).
- C51) **Fast algorithms for approximating the pseudospectral abscissa and radius.**

Presented at the “SIAM Conference on Applied Linear Algebra 09” (Monterey (USA), 26–30 October 2009).

- C52) **Robust stability of linear dynamical systems by pseudospectral analysis**
Presented at the Universität Tübingen, (Tübingen, 6 May 2010).
- C53) **Computing the joint spectral radius in some subdivision schemes**,
Presented at the International Conference “16th Conference of the International Linear Algebra Society (ILAS)” (21–25 June 2010)
- C54) **Fast algorithms for approximating the pseudospectral abscissa and pseudospectral radius**, Presented at the Courant Institute, New York University, (New York, 17 September 2010).
- C55) **Una regolarizzazione di equazioni differenziali discontinue**, Seminario di Modellistica differenziale numerica, Dipartimento di Matematica, Università di Roma La Sapienza, (Roma 25 January 2011).
- C56) **Computing joint spectral characteristics of sets of nonnegative matrices.**
Presented at the Section de Mathématiques, Université de Genève, (Geneva, Switzerland, 22 February 2011).
- C57) **Fast computation of extremal points of the pseudospectrum and the distance to instability of a stable matrix.**
Presented at EPFL de Lausanne, (Lausanne, Switzerland, 2 March 2011).
- C59) **Regularization and asymptotic expansions for neutral DDEs.**
Presented at the International Conference “Delay Differential Equations in Applications: Common Themes and Methods” (Vancouver, Canada, 14-16 July 2011).
- C59) **Differential equations leading to the pseudospectral abscissa and radius.**
Presented at the International Conference “ICIAM 2011” (Vancouver, Canada, 18-22 July 2011).
- C60) **Regularization of neutral state dependent delay differential equations.**
Presented at the International Conference “ICIAM 2011” (Vancouver, Canada, 18-22 July 2011).
- C60) **Regularization of neutral state dependent delay differential equations.**
Presented at the International Conference “ICIAM 2011” (Vancouver, Canada, 18-22 July 2011).
- C61) **Novel methods to compute the distance to instability of a stable matrix and the H-infinity norm of a linear system..**
Presented at TU Berlin (Berlin, Germany, 27 October 2011).

C62) **Numerical integration of implicit delay differential equations and accurate computation of breaking points.**

Presented at the Conference “SFB 910 Symposium Differential equations and numerical methods” (Berlin, Germany, 28 October 2011).

C63) **Computing extremal points of the pseudospectrum of a matrix and the distance to instability.**

Presented at Universität Zürich (Zürich, Switzerland, 24 November 2011).

List of publications - Research papers

PhD) N. Guglielmi: **Sulla stabilità dei metodi a un passo per la soluzione numerica di equazioni differenziali con ritardo, (On the stability of one-step methods for delay differential equations)** Tesi di Dottorato (PhD Dissertation), febbraio 1996 (available at the National Bibliothèques of Roma and Firenze).

Articles published in international journals

- 1) N. Guglielmi, R. Guerrieri, G. Baccarani: **Highly-Constrained Neural Networks for Industrial Quality Control**, “IEEE Transactions on Neural Networks”, vol. 7, no. 1, pp. 206–213, 1996.
- 2) N. Guglielmi: **Inexact Newton methods for the steady-state analysis of nonlinear circuits**, “Mathematical Models and Methods in Applied Sciences”, vol. 6, no. 1, pp. 43–57, 1996.
- 3) A. Montanari, N. Guglielmi: **Gli indici di proiezione nella projection pursuit**, “Statistica”, anno LVI, no. 1, pp. 63–86, 1996.
- 4) N. Guglielmi: **On the asymptotic stability properties of Runge-Kutta methods for delay differential equations**, “Numerische Mathematik”, vol. 77, no. 4, pp. 467–485, 1997.
- 5) A. Bellen, N. Guglielmi and L. Torelli: **Asymptotic stability properties of Θ -methods for the pantograph equation**, “Applied Numerical Mathematics”, vol. 24, no. 2–3, pp. 279–293, 1997.
- 6) N. Guglielmi: **Delay dependent stability regions of Theta-methods for delay differential equations**, “IMA Journal of Numerical Analysis”, vol. 18, pp. 399–418, 1998.
- 7) A. Bellen, N. Guglielmi and M. Zennaro: **On the contractivity and asymptotic stability of systems of delay differential equations of neutral type**, “BIT”, vol. 39, pp. 1–24, 1999.
- 8) A. Bellen, N. Guglielmi and A. Ruehli: **Methods for linear systems of circuit delay differential equations of neutral type**, “IEEE Transactions on Circuits and Systems-I: Fundamental theory and applications”, vol. 46, no. 1, pp. 212–216, 1999.
- 9) N. Guglielmi and E. Hairer: **Order stars and stability for delay differential equations**, “Numerische Mathematik”, vol. 83, no. 3, pp. 371–383, 1999.
- 10) N. Guglielmi: **An analytic proof of numerical stability of Gaussian collocation for delay differential equations**, “Boll. UMI Sez. B.”, vol. 1-B, pp.95–116, 2000.
- 11) N. Guglielmi and E. Hairer: **Geometric proofs of numerical stability for delay equations**, “IMA Journal of Numerical Analysis”, vol. 21, no. 1, pp. 439–450, 2001.

- 12) N. Guglielmi and M. Zennaro: **On the zero-stability of variable step-size multistep methods: the spectral radius approach**, “Numerische Mathematik”, vol. 88, no. 3, pp. 445–458, 2001.
- 13) N. Guglielmi: **On the qualitative behaviour of numerical methods for delay differential equations of neutral type. A case study: Θ -methods**, “Recent Trends in Numerical Analysis”, edited by L. Brugnano and D. Trigiante.
- 14) N. Guglielmi and M. Zennaro: **On the asymptotic properties of a family of matrices**, “Linear Algebra and its Applications”, vol. 322, no. 1–3, pp. 169–192, 2001.
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- p3) N. Guglielmi and M. Zennaro: **Stability of linear problems: joint spectral radius of sets of matrices**, 2011-2012.
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- L1) N. Guglielmi, R. Guerrieri and G. Baccarani: **Neural networks techniques for the optical inspection of machined parts**, Computer-Aided Design, Engineering and Manufacturing (CADEM) Systems Techniques and Applications, C. T. Leondes (editor), Gordon & Breach, 2003.
- L2) A. Bellen, N. Guglielmi and S. Maset: **Numerical methods for delay models in biomathematics**, in Integration of Complex Systems in Biomedicine, A. Quarteroni (editor), Springer Verlag, 2005.

Software Codes

- S1) N. Guglielmi and E. Hairer: **RADAR5**: a Fortran-90 code for the numerical integration of stiff and implicit systems of delay differential equations; the software is available at the internet web-site:
“<http://www.unige.ch/math/folks/hairer>”.

Editorial activity

- Associate editor of the International Journal **Bollettino della Matematica Italiana, New Series 2008**. (<http://bumi.dm.unibo.it>).
- Associate editor of the International Journal **Journal of Applied Mathematics** . (<http://www.hindawi.com/journals/jam/>).

Former PhD students

- Antonio Cicone, Dottorato in Matematica - Università di L’Aquila, 2007–2010 (advisor).

Current PhD students

- Manuela Manetta, Dottorato in Matematica - Università di L’Aquila, 2009–.
- Anton Tuzov, Dottorato in Matematica - Università di Padova, 2009–.
- Linda Laglia, Dottorato in Matematica - Università di L’Aquila, 2010–.

Some further activities

- Member of the committee of the PhD program in Mathematics of the University of L'Aquila, 2004–present.
- Member of the committee of the PhD program in Computational Fluid-dynamics of the University of Trieste, 2005–present.
- Member of the didactic committee of the degree program in Mathematics of the University of L'Aquila, 2002–present.
- Member of the final committee of the PhD in Mathematics at the University of Catania, 20 October 2006.
- Member of the final committee of the PhD in "Matematica Computazionale" at the University of Padova, 25 November 2006.
- Member of the final committee of the PhD in "Ingegneria e Modellistica Fisico-Matematica - XIX ciclo" at the University of L'Aquila, 30 January 2007.
- Member of the final committee of the PhD in Mathematics - VIII ciclo, Nuova serie - at the University of Salerno, 19 March 2010.
- Member of the final committee of the PhD in Mathematics - VIII ciclo, Nuova serie - at the University of Padova, 18 November 2011.

12 January 2012,

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