

Curriculum Vitae of Dott.ssa Maria Carmela De Bonis

Education:

- Degree in Mathematics on February 1, 1995 at the University of Basilicata;
- Scholarship Holder at the Department of Mathematics of the University of Basilicata (grant of the National Research Center (C.N.R.)) in the period March 1, 1995 - February 14, 1996;
- First Level Degree in Computer Sciences on March 31, 2004 at the University of Basilicata;
- PhD in Mathematics, International Doctoral Seminar "János Bolyai" on March 2, 2011 at the University of Basilicata.

Professional Experience:

- Laboratory Technician at the Department of Mathematics of the University of Basilicata in the period September 1, 1997 - September 30, 2004;
- Researcher at the Faculty of Sciences of the University of Basilicata since October 1, 2004.
- Member of the Research Committee of the University of Basilicata since November, 2011.
- Member of the Board of the International Doctoral Seminar "Pythagoras of Samos" of University of Basilicata since 2012 (XXVII cycle).
- Member of the Board of the Doctoral Seminar "Mathematics and Computer Science" of University of Basilicata and University of Salento since 2014 (XXIX cycle).

Research Interests:

- Quadrature rules;
- Approximation of Integral Transforms;
- Polynomial approximation theory;
- Operator theory;
- Numerical treatment of singular integral equations;
- Numerical treatment of system of integral equations;
- Numerical treatment of ordinary differential equations.

Grants:

- "Polinomi ortogonali e loro applicazioni", ex 60% of the Italian Ministry of the University and Research, leader Professor G. Mastroianni (1996);
- "Approximation Theory and its Applications", Hungarian--Italian intergovernmental S&T cooperation program (1996--97);
- "Trattamento numerico di equazioni integrali e connessi problemi di quadratura ed algebra lineare", ex 60% of the Italian Ministry of the University and Research, leader Professor G. Mastroianni (1999);
- "Approssimazione e quadratura numerica in una o più dimensioni", GNIM project, leader Professor G. Mastroianni (2000--01);
- "Trattamento numerico di equazioni integrali e di connessi problemi di algebra lineare", GNCS project, leader Professor G. Rodriguez (2001--02);
- "Metodi Numerici per Equazioni Integrali", GNCS (INDAM) Project, leader Professor Giuseppe Mastroianni (2003);
- "Trattamento numerico di equazioni integrali singolari e connessi problemi di approssimazione e

- quadratura", GNCS project, leader Professor G. Mastroianni (2004);
- "Trattamento numerico di equazioni integrali singolari e connessi problemi di approssimazione e algebra lineare", GNCS project, leader Professor G. Mastroianni (2005);
 - "Metodi numerici per l'algebra lineare strutturata e applicazioni", PRIN project, leader Professor D. Bini (2007--08).
 - "Equazioni integrali con struttura e sistemi lineari", PRIN project, leader Professor D. Bini (2010--11).
 - "Tecniche numeriche per problemi di propagazione di onde elastiche in multidomini", GNCS project, leader Professor A. Aimi (2011).
 - "Metodi Fast per la risoluzione numerica di sistemi di equazioni integro-differenziali". GNCS project, leader Professor A. Aimi (2013).

Organizing Activity:

- Member of the Organizing Committee of the "6-th Conference in Functional Analysis and Approximation Theory", which took place in Acquafredda di Maratea (Potenza, Italy) on September 24-30, 2009.
- Member of the Organizing Committee of the "International Workshop on Approximation Theory and Applications" dedicated to Giuseppe Mastroianni on the occasion of his retirement, which took place in Rifreddo (Potenza, Italy) on September 12-13, 2013.

Referring Activity:

- Acta Applicanda Mathematicae
- Applied Mathematical Modelling
- Applied Mathematics and Computations
- Indian Journal of Pure and Applied Mathematics
- International Journal of Computer Mathematics
- Journal of Computation and Applied Mathematics
- Mathematical and Computer Modelling
- Computers & Mathematics with Applications
- Linear and Multilinear Algebra
- Communications in Nonlinear Science and Numerical Simulations
- Acta Applicandae Mathematicae
- International Journal of Computer Mathematics
- Journal of Integral Equations & Applications

Reviewing Activity:

- Mathematical Reviews

Invited Seminars:

M.C. De Bonis, G. Mastroianni: "Proprietà di mappa di qualche Operatore Singolare", Department of Mathematics of University of Lecce, Lecce, Italy, February 24-26, 2005.

Talks at Conferences:

- M.C. De Bonis, B. Della Vecchia, G. Mastroianni: "Approximation of the Weighted Hilbert Transform on the real line", International Workshop on Approximation Theory and Numerical Analysis, Vico Equense (Naples), Italy, September 9-12, 1997.
- M.C. De Bonis, B. Della Vecchia, G. Mastroianni: "Approximation of the Hilbert Transform on the real axes using Hermite zeros", International Congress on Computational and Applied Mathematics, Leuven, Belgium, July 27-August 1, 1998.
- M.C. De Bonis, M.G. Russo: "Approximation of the Weighted Hilbert Transform", Workshop on Advanced Special Functions and Applications, Melfi (Potenza), Italy, May 9-12, 1999.
- M.C. De Bonis, G. Mastroianni, M. Viggiano: "Best Approximation and Moduli of Smoothness on the semiaxis", Functions, Series, Operators. Alexits Memorial Conference, Budapest, Hungary, August 9-14, 1999.
- M.C. De Bonis, B. Della Vecchia, G. Mastroianni: "Best Approximation on the semiaxis and some applications", Meeting on Approximation Theory and Numerical Analysis, Vico Equense (Naples), Italy, August 31-September 1, 1999.
- M.C. De Bonis, B. Della Vecchia, G. Mastroianni: "Some Integration Rules on the real semiaxis", 2nd Workshop on Advanced Special Functions and Integration Methods, Melfi (Potenza), Italy, June 18-23, 2000.
- M.C. De Bonis, B. Della Vecchia, G. Mastroianni: "Approximation of the Hilbert Transform on the Real Semiaxis using Laguerre zeros", Ninth International Congress on Computational and Applied Mathematics, Leuven, Belgium, July 17-21, 2000.
- M.C. De Bonis, G. Mastroianni: "Numerical Problems in the Evaluation of the Hilbert Transform", Workshop on Quadrature and Numerical Methods for integral equations, Rifreddo (Potenza), Italy, September 16-20, 2000.
- M.C. De Bonis, G. Mastroianni: "Numerical Evaluation of the Hilbert Transform on the real axes", Sixth International Symposium on Orthogonal Polynomials, Special Functions and Applications, Lido di Ostia (Rome), Italy, June 18-22, 2001.
- M.C. De Bonis, G. Mastroianni: "Some simple Quadrature Rules to evaluate the Hilbert Transform on the Real Line", Meeting on Numerical Integration and its Complexity, Oberwolfack, Germany, November 18-24, 2001.
- M.C. De Bonis, C. Frammartino, G. Mastroianni: "Numerical methods for some special Fredholm integral equations on the Real line", Tenth International Congress on Computational and Applied Mathematics, Leuven, Belgium, July 22-26, 2002.
- M.C. De Bonis, M.C. Russo: "Interpolation of functions having inner singularity in $[-1,1]$ ", IV Encuentro Internacional de Aproximacion de la Universidad de Jaen, Ubeda, Spain, June 13-16, 2003.
- M.C. De Bonis, G. Mastroianni: "Nyström and projection methods for CSIE on finite interval", IWOTA 2003, Cagliari, Italy, June 24-27, 2003.
- M.C. De Bonis, G. Mastroianni: "Projection methods for CSIE on finite interval, Workshop on Applied Orthogonal Systems", Constructive Approximation and Numerical Methods, Kragujevac, Serbia, October 10, 2003.
- M.C. De Bonis, G. Mastroianni: "Polynomial approximation of the solutions of Cauchy Singular Integral Equations", IV Encuentro Internacional de Aproximacion de la Universidad de Jaen, Ubeda, Spain, June 9-14, 2004.
- M.C. De Bonis, G. Mastroianni: "Numerical Methods for CSIE in $[-1,1]$ ", 5th International Conference on Functional Analysis and Approximation Theory, Acquafredda di Maratea (Potenza), Italy, June 16-23, 2004.
- M.C. De Bonis, G. Mastroianni: "Un Metodo di Nyström per sistemi di equazioni di Fredholm sulla semiretta reale", Equazioni integrali: recenti sviluppi numerici e nuove applicazioni, Parma, Italy, September 27-28, 2007.
- M.C. De Bonis, G. Mastroianni: "Nyström Method for systems of Fredholm integral equations on

- the real semiaxis", Approximation & Computation, Conference dedicated to Prof. Gradimir V. Milovanovic on the occasion of his 60-th anniversary, Nis, Serbia, August 25-29, 2008.
- M.C. De Bonis, G. Mastroianni: "Nyström Method for Fredholm integral equations on bounded intervals via orthogonal polynomials", 4-th Workshop Advanced Special Functions and solution of PDEs, Sabaudia, Italy, May 24-28, 2009.
 - M.C. De Bonis, P. Pastore: "Numerical treatment of integrals of highly oscillatory functions", 6-th International Conference on Functional Analysis and Approximation Theory, Acquafredda di Maratea, Italy, September 24-30, 2009.
 - M.C. De Bonis: "Quadrature Rules for high-oscillatory and periodic functions", 6-th International Conference on Functional Analysis and Approximation Theory, Acquafredda di Maratea, Italy, September 24-30, 2009.
 - M.C. De Bonis, C. Laurita: "A Nyström Method for Cauchy Singular integral equations with negative index", 6-th International Conference on Functional Analysis and Approximation Theory, Acquafredda di Maratea, Italy, September 24-30, 2009.
 - M.C. De Bonis, G. Mastroianni: "Nyström Method for systems of Fredholm integral equations on the real axis", Workshop on Advances and Trends in Integral Equations. Dedicated to the memory of Siegfried Prössdorf, Chemnitz, Germany, October 5-9, 2009.
 - M.C. De Bonis, G. Mastroianni: "Numerical treatment of systems of Fredholm integral equations on the real axis", Workshop on Integral Equations: recent numerical developments and new applications, Parma, Italy, October 29-30, 2009.
 - M.C. De Bonis, G. Mastroianni: "A numerical method for systems of Fredholm integral equations on the real line", Second International Conference on Numerical Analysis and Approximation Theory, Cluj-Napoca, Romania, September 23--26, 2010.
 - M.C. De Bonis, C. Laurita: "Numerical treatment of systems of Cauchy singular integral equations", Workshop on Functional Analysis and Operator Theory, Dedicated to Bernd Silbermann on his 70th birthday, Altenberg, Germany, March 29-April 1, 2011.
 - M.C. De Bonis, C. Laurita: "Risoluzione Numerica di sistemi di equazioni integrali di Cauchy con coefficienti costanti", Giornata di studio conclusiva del progetto INdAM-GNCS "Tecniche numeriche per problemi di propagazione di onde elastiche in multidomini"
Responsabile: A. Aimi, Parma, January 31, 2012.
 - M.C. De Bonis, G. Mastroianni: "Direct methods for CSIE in weighted Zygmund spaces with uniform norm", Congresso Nazionale SIMAI, Torino, Italy, June 25--28, 2012.
 - M.C. De Bonis, G. Mastroianni: "Numerical treatment of systems of Fredholm integral equations on unbounded intervals", International Congress on Computational and Applied Mathematics (ICCAM), Gent (Belgium), July 9-13, 2012.
 - M.C. De Bonis: "Remarks on two integral operators and numerical methods for Cauchy singular integral equations, 25th Biennial Conference on Numerical Analysis", Glasgow (UK), June 25-28, 2013.
 - M.C. De Bonis, D. Occorsio: "Numerical evaluation of hypersingular integrals on the semi-axis", 6th International Conference on Numerical Analysis, Chania, Crete, Greece, September 2-5, 2014.

Posters at Conferences:

- M.C. De Bonis, C. Laurita: "A Nyström method for integral equations with Mellin type kernels", Dolomites Research Week on Approximation, Alba di Canazei, Trento, Italy, September 8-12, 2014.
- M.C. De Bonis, D. Occorsio: "A method to approximate Hadamard Vnite part transforms on the positive semi-axis", New Trends in Numerical Analysis: Theory, Methods, Algorithms and Applications, Falerna, Catanzaro, Italy, June 18-21, 2015

List of Publications:

1. **De Bonis M.C.:** *An algorithm for the evaluation of two-dimensional Hilbert transform*, Journal of Electrotechnics and Mathematics (Pristina), **4** (1999), 1-34.
2. **De Bonis M.C.:** *An algorithm for the evaluation of two-dimensional Hilbert transform with non-standard weight functions*, Facta Universitatis (Nis), Ser. Math. Inform. **14** (1999), no. 14, 109-134.
3. **De Bonis M.C., Russo M.G.:** *Computation of the Cauchy principal value integrals on the real line*, Proceedings of the "Workshop on Advanced Special Functions and Applications", Melfi (PZ), Italy, 9-12 May 1999, eds. D. Cocolicchio, G. Dattoli and H.M. Srivastava (ARACNE, Rome) 2000, 197-210.
4. **De Bonis M.C., Della Vecchia B., Mastroianni G.:** *Approximation of the Hilbert transform on the real line using Hermite zeros*, Mathematics of Computation, **71** (2002), no. 239, 1169-1188.
5. **De Bonis M.C., Della Vecchia B., Mastroianni G.:** *Approximation of the Hilbert transform on the real semiaxis using Laguerre zeros*, Proceedings of the 9th International Congress on Computational and Applied Mathematics (Leuven, 2000), Journal of Computation and Applied Mathematics, **140** (2002), no. 1-2, 209-229. doi: [10.1016/S0377-0427\(01\)00529-5](https://doi.org/10.1016/S0377-0427(01)00529-5).
6. **De Bonis M.C., Mastroianni G., Viggiano M.:** *K-functionals, Moduli of Smoothness and Weighted Best Approximation on the semiaxis*, Functions, Series, Operators (L. Leindler, F. Schipp, J. Szabados, eds.) Janos Bolyai Mathematical Society, Budapest, Hungary, Alexits Memorial Conference (2002), 181-211.
7. **De Bonis M.C., Mastroianni G., Russo M.G.:** *Polynomial approximation with special doubling weights*, Acta Scientiarum Mathematicarum (Szeged), **69** (2003), no. 1-2, 159-184.
8. **De Bonis M.C., Mastroianni G.:** *Some simple quadrature rules for evaluating the Hilbert transform on the real line*, Archives of Inequalities and Applications, **1** (2003), no. 3-4, 475-494.
9. **De Bonis M.C., Frammartino C., Mastroianni G.:** *Numerical methods for some special Fredholm integral equations on the real line*, Proceedings of the 10th International Congress on Computational and Applied Mathematics (ICCAM-2002), Journal of Computation and Applied Mathematics, **164/165**, (2004), 225-243. doi: [10.1016/S0377-0427\(03\)00652-6](https://doi.org/10.1016/S0377-0427(03)00652-6).
10. **Cvetkovic A., De Bonis M.C.:** *Projection methods for Cauchy singular integral equations on the bounded intervals*, Facta Universitatis (Nis), Ser. Math. Inform., Special Issue dedicated to Prof. Giuseppe Mastroianni for his 65th birthday, **19** (2004), 123-144.
11. **De Bonis M.C., Mastroianni G.:** *Mapping properties of some singular operators in Besov type subspaces of $C(-1,1)$* , Integral Equations Operator Theory, **55** (2006), no. 3, 387-413. doi: [10.1007/s00020-005-1396-y](https://doi.org/10.1007/s00020-005-1396-y).
12. **De Bonis M.C., Mastroianni G.:** *Projection methods and condition numbers in uniform norm for Fredholm and Cauchy singular integral equations*, SIAM Journal on Numerical Analysis, **44** (2006), no. 4, 1351-1374. doi: [10.1137/050626934](https://doi.org/10.1137/050626934).
13. **De Bonis, M.C., Laurita, C.:** *Numerical treatment of second kind Fredholm integral equations systems on bounded intervals*, Journal of Computational and Applied Mathematics, **217** (2008), no. 1, 64-87. doi: [10.1016/j.cam.2007.06.014](https://doi.org/10.1016/j.cam.2007.06.014).
14. **De Bonis, M.C., Laurita, C.:** *Nyström methods for Cauchy singular integral equations. A survey*, Riv. Mat. Univ. Parma (7), **8** (2008), 139-169.
15. **De Bonis, M.C., Mastroianni, G.:** *Nyström method for systems of integral equations on the real semiaxis*, IMA Journal of Numerical Analysis, **29** (2009), no. 3, 632-650. doi: [10.1093/imanum/drn035](https://doi.org/10.1093/imanum/drn035).
16. **De Bonis, M.C., Laurita, C.:** *Nyström method for Cauchy Singular Integral Equations with negative index*, Journal of Computational and Applied Mathematics, **232** (2009), no. 2, 523-538. doi: [10.1016/j.cam.2009.06.028](https://doi.org/10.1016/j.cam.2009.06.028).
17. **De Bonis, M.C., Pastore, P.:** *A quadrature formula for integrals of highly oscillatory*

- functions*, Rendiconti del Circolo di Matematico di Palermo Serie II, Suppl. 82 (2010), 279-303
18. **De Bonis, M.C., Mastroianni, G.:** *Direct methods for CSIE in weighted Zygmund spaces with uniform norm*, Riv. Mat. Univ. Parma., Vol. 2 (2011), 29-55
 19. **De Bonis, M.C., Mastroianni, G., Notarangelo, I.:** *Gaussian quadrature rules with exponential weights on $(-1, 1)$* , Numerische Mathematik, **120** (2012), no.3, 433-464. [doi: 10.1007/s00211-011-0417-9](https://doi.org/10.1007/s00211-011-0417-9).
 20. **De Bonis, M.C., Laurita, C.:** *A quadrature method for systems of Cauchy Singular Integral Equations*, Journal of Integral Equations and Applications, **24** (2012), no.2, 241-271. [doi:10.1216/JIE-2012-24-2-241](https://doi.org/10.1216/JIE-2012-24-2-241).
 21. **De Bonis, M.C., Laurita, C.:** *Numerical solution of systems of Cauchy singular integral equations with constant coefficients*. Applied Mathematics and Computation, **219** (2012), no. 4, 1391-1410. [doi: 10.1016/j.amc.2012.08.022](https://doi.org/10.1016/j.amc.2012.08.022).
 22. **De Bonis, M.C.:** *Remarks on two integral operators and numerical methods for CSIE*. Journal of Computational and Applied Mathematics, **260** (2014), 117-134. [doi: 10.1016/j.cam.2013.09.063](https://doi.org/10.1016/j.cam.2013.09.063).
 23. **De Bonis, M.C., Mastroianni, G.:** *Numerical Treatment of a class of systems of Fredholm integral equations on the real line*. Mathematics of Computation, **83** (2014), no. 286, 771–788. [doi: 10.1090/S0025-5718-2013-02727-5](https://doi.org/10.1090/S0025-5718-2013-02727-5)
 24. **De Bonis, M.C., Laurita, C.:** *A modified Nystrom method for integral equations with Mellin type kernels*, submitted.
 25. **De Bonis, M.C., Occorsio, D.:** *Numerical computation of the Hadamard finite part of \mathbb{H} hypersingular integrals over $(0, +\infty)$* , submitted.
 26. **De Bonis, M.C., Laurita, C.:** *A Nyström method for integral equations with fixed singularities of Mellin type in weighted L^p spaces*, in progress
 27. **De Bonis, M.C., Occorsio, D.:** *Approximation of Hadamard finite part transforms on $(0, +\infty)$* , in progress.

Teaching Activity:

Exercises for the following courses:

- Calcolo Numerico (c.d.l. Matematica Triennale) a.a. 2003/2004
- Calcolo Numerico (c.d.l. Matematica Triennale) a.a. 2004/2005
- Metodi di Approssimazione (c.d.l. Matematica Specialistica) a.a. 2004/2005
- Laboratorio di Calcolo Numerico (c.d.l. Matematica Specialistica e c.d.l. Informatica Specialistica) a.a. 2005/2006
- Algebra Lineare Numerica (c.d.l. Matematica Specialistica) a.a. 2005/2006
- Laboratorio di Calcolo Numerico (c.d.l. Matematica Specialistica e c.d.l. Informatica Specialistica) a.a. 2006/2007
- Trattamento Numerico di Equazioni Funzionali II (c.d.l. Matematica Specialistica) a.a. 2006/2007
- Trattamento Numerico di Equazioni Funzionali I (c.d.l. Matematica Specialistica) a.a. 2007/2008
- Trattamento Numerico di Equazioni Funzionali I (c.d.l. Matematica Specialistica) a.a. 2008/2009
- Analisi Numerica (c.d.l. Matematica Triennale) a.a. 2009/2010
- Metodologie Informatiche per la chimica (c.d.l. Chimica Triennale) a.a. 2010/2011
- Matematica per la Chimica (c.d.l. Chimica Triennale) a.a. 2011/2012
- Teoria dell'approssimazione e trattamento numerico di equazioni funzionali (c.d.l. Matematica Magistrale) a.a. 2012/2013

Courses:

- Abilità Informatiche II (c.d.l. Matematica Triennale) a.a. 2003/2004
- Abilità Informatiche II (c.d.l. Matematica Triennale) a.a. 2004/2005
- Calcolo Numerico (c.d.l. Ingegneria Meccanica) a.a. 2004/2005
- Abilità Informatiche II (c.d.l. Matematica Triennale) a.a. 2005/2006
- Calcolo Numerico (c.d.l. Ingegneria Meccanica) a.a. 2005/2006
- Abilità Informatiche II (c.d.l. Matematica Triennale) a.a. 2006/2007
- Calcolo Numerico (c.d.l. Ingegneria Meccanica) a.a. 2006/2007
- Abilità Informatiche II (c.d.l. Matematica Triennale) a.a. 2007/2008
- Calcolo Numerico (c.d.l. Ingegneria Meccanica) a.a. 2007/2008
- Laboratorio di Calcolo Numerico (c.d.l. Matematica Specialistica e c.d.l. Informatica Specialistica) a.a. 2007/2008
- Laboratorio di Calcolo Numerico (c.d.l. Matematica Specialistica) a.a. 2008/2009
- Laboratorio di Calcolo Numerico (c.d.l. Informatica Specialistica) a.a. 2008/2009
- Metodologie Informatiche per la chimica (c.d.l. Chimica Triennale) a.a. 2009/2010
- Laboratorio di Calcolo Numerico (c.d.l. Matematica Specialistica) a.a. 2009/2010
- Complementi di Analisi Numerica (c.d.l. Matematica Triennale) a.a. 2010/2011
- Trattamento Numerico di Equazioni Funzionali (c.d.l. Matematica Magistrale) a.a. 2011/2012
- Complementi di Analisi Numerica (c.d.l. Matematica Triennale) a.a. 2011/2012
- Calcolo Scientifico (c.d.l. Informatica Triennale) a.a. 2012/2013
- Complementi di Analisi Numerica (c.d.l. Matematica Triennale) a.a. 2012/2013
- Matematica per la Chimica (c.d.l. Chimica) a.a. 2013/14
- Matematica per la Chimica (c.d.l. Chimica) a.a. 2014/15
- Complementi di Analisi Numerica (c.d.l. Matematica Triennale) a.a. 2014/2015
- Trattamento Numerico di Equazioni Differenziali (Doctoral Seminar "Mathematics and Computer Science") (15 hour) XXIX cycle.

Supervisor of the following degree theses:

- "Approssimazione della Trasformata di Hilbert sulla Retta Reale", a.a. 2012/13
- "Metodi numerici per l'approssimazione delle soluzioni di problemi differenziali con condizioni al contorno sull'intervallo $[-1,1]$ ", a.a. 2013/14.