

Curriculum vitae et studiorum of
DONATELLA OCCORSIO

- **Personal data** Birth in Naples on 16 march 1962
- **Education** Degree in Mathematics cum laude in 1987 at the University of Naples "Federico II"
- **Affiliation** University of Basilicata, Department of Mathematics and Computer Science
- **e-mail** donatella.occorsio@unibas.it
- **Position** Associate professor
- **Main research interests**
 1. Polynomial Approximation Theory
 2. Positive Operators
 3. Polynomial Interpolation Processes
 4. Fourier Series
 5. Orthogonal Polynomials
 6. Quadrature Rules
 7. Integral Equations
- **Organizing activity**
 1. Member of the Technical and Scientific Board of the Center Studies on Functional Analysis and Approximation Theory of the University of Basilicata
 2. Member of the Organizing Committee of the "Fifth and Sixth Conference in Functional Analysis and Approximation Theory", which took place in Maratea (Potenza, Italy) in 2004 and 2009, respectively;
 3. Member of the Organizing Committee of the 1⁰ Workshop on "Advanced Special Functions and Application " organized from ENEA (Frascati) in Melfi on 1999.
 4. Member of the Organizing Committee of the 2⁰ Workshop on "Advanced Special Functions and Integration Methods" organized from ENEA in Melfi on june 2000

5. Member of the Organizing Committee "Meeting on Approximation Theory and Numerical Analysis dedicated to Professor G.Mastroianni for his 60th birthday, Vico Equense (Napoli), 1-2 September 1999
6. Member of the Organizing Committee of the Conference "Recent developments on Functional Analysis and Approximation Theory" Lecce 22-24 September 2011.
7. Chair of the "International Workshop on Approximation Theory and Applications", dedicated to Giuseppe Mastroianni on the occasion of his retirement, Rifreddo 12-13 settembre 2013.
8. "First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI" Bilbao, June 30 - July 4, 2014, with Maria Grazia Russo (University of Basilicata, Italy), Antonio J. Durn (University of Sevilla, Spain) Francisco Marcelln (Charles III University of Madrid, Spain), organizers of the special session **Special Functions, Orthogonal Polynomials and Applications** *Scope of the special session* Special functions of mathematical physics, and among them orthogonal polynomials, have been and still are an important research subject of mathematics, both pure and applied. Their applications go from probability to quantum mechanics including number theory. Orthogonal polynomials are nowadays in Italy and Spain a very active research area with an excellent international projection. The aim of this special session is to show some recent trends on this topic at international level. In the last years, an intensive activity was focused on the study of analytic properties of orthogonal polynomials with respect to several patterns of inner products: Sobolev inner products defined by a vector of measures, inner products defined by matrices of measures, inner products defined by measures supported on the unit circle and so on. The asymptotic behavior of these polynomials and the location of their zeros, as well as the spectral analysis of differential/difference operators such that those polynomials are eigenfunctions have attracted the interest of many researchers. Their applications to integrable systems (in particular in the analysis of the Toda hierarchy and the supersymmetry SUSY models), factorization of some structured matrices (Jacobi and CMV) and differential operators (Darboux transformations, bispectrality), Fourier analysis and the connections with numerical methods for boundary value problems have been also studied in such a way that we have an interdisciplinary approach where many branches of mathematics are very useful.

List of publications

Editor with Gradimir Milovanovic and Maria Grazia Ruso of the special Issue

of "PUBLICATIONS DE L'INSTITUT MATHÉMATIQUE NOUVELLE SRIE,
Belgrado, TOME 96 (110), ISSN 0350-1302, (2014).

1. G. CRISCUOLO, G. MASTROIANNI and D. OCCORSIO, *Convergence of extended Lagrange interpolation*, Math. Comp. **55** (1990), 197-212.
2. G. CRISCUOLO, G. MASTROIANNI and D. OCCORSIO, *Some convergence estimates for the extended interpolation*, Approximation, Optimization and Computing, Theory and Applications (A.G.Law and C.L.Wang eds.), Proceedings of ISAOC'89 (Dalian 1989), 63-65.
3. G. CRISCUOLO, G. MASTROIANNI and D. OCCORSIO, *Uniform convergence of derivatives of the extended Lagrange interpolation*, Numer. Math. **60** (1991), 195-218.
4. D.OCCORSIO, *Bernstein polynomials of matrices*, Revue d'Anal.Numerique et de theorie de l'Approx.(Cluj-Napoca), **22**, 1 (1993), 73-82.
5. D.OCCORSIO, *Una buona matrice di nodi*, Calcolo **30** n.2 (1993) 107-126.
6. D.OCCORSIO, *Convergence of extended Lagrange interpolation in weighted L_p norm*, Calcolo **31** (1994) 47-61.
7. G.MASTROIANNI, D.OCCORSIO, *Interlacing properties of the zeros of the orthogonal polynomials and approximation of the Hilbert transform*, Computers and Mathematics with Applications vol. **30**, n. 3-6 (1995) 155-168
8. N.MASTRONARDI, D.OCCORSIO, *Some Numerical algorithms to evaluate Hadamard finite part integrals*, Journal of Comput. and Appl. Math. **70** (1996), 75-93
9. D.OCCORSIO, A.C.SIMONCELLI, *How to go from Bézier to Lagrange curves by means of generalized Bézier curves*, Facta Universitatis Ser. Math. Inform. **11** (1996), 101-111
10. G.MASTROIANNI, D.OCCORSIO, *Legendre polynomials of the second kind, Fourier series and Lagrange interpolation*, Journal of Comput. and Appl. Math. **75** (1996) 305-327
11. B.M. DELLA VECCHIA, D.OCCORSIO, *Some algorithms for the numerical evaluation of Hadamard finite parts integrals on the semi-axis*, Scientific Review (1996), n. 21-22, pp.23-35
12. Li. KÓCIC, D.OCCORSIO, A.C SIMONCELLI, *Comparison between two possible generalizations of Bézier curves*, Facta Universitatis (Niš) Ser. Math. Inform. **12** (1997) 217-232

13. D.OCCORSIO, A.C SIMONCELLI, *Generalized Polya curves*, Revue d'Analyse Numerique et de theorie de l'Approximation(Cluj-Napoca), tomo XXVII n.1 (1998), pp. 127-146.
14. G. MASTROIANNI, D.OCCORSIO, *Lagrange interpolation at Laguerre zeros in some weighted uniform spaces*, Acta Math. Hungar. **91** (1-2),(2001) 27-52
15. N. MASTRONARDI, D.OCCORSIO, *Product integration rules on the semi-axis*, Rendiconti del Circolo Matematico di Palermo, serie II, suppl. 52 (1998), pp 605–618
16. N. MASTRONARDI, D.OCCORSIO, *The numerical computation of some integrals on the real line*, JCAM **115**(2000) pp 433–450.
17. G. MASTROIANNI, D.OCCORSIO, *Optimal systems of nodes for Lagrange interpolation on bounded intervals. A survey*, Journal of Comput. and Appl.Math.134 1-2 (2001), pp 325-341
18. C. LAURITA, D.OCCORSIO, *Numerical solution of the generalized airfoil equation*, (2000) Proceedings del Workshop "Advanced Special Functions and Applications" (Melfi 9–12 maggio 1999), Aracne editore.
19. G. MASTROIANNI, D.OCCORSIO, *Numerical approximation of weakly singular integrals on the half line*, Journal of Comput. and Appl.Math **140** (2002), pp 587–598.
20. D. OCCORSIO, W. THEMISTOCLAKIS, *Numerical computation of a weakly singular integral operator on the real axis*, Advanced special functions and integration methods (Melfi, 2000), 271–290, Proc. Melfi Sch. Adv. Top. Math. Phys., 2, Aracne, Roma (2001) .
21. G. MASTROIANNI, D.OCCORSIO, *Lagrange interpolation based at Sonin-Markov zeros*, Rendiconti del Circolo Matematico di Palermo Serie II Suppl. **68** (2002) pp 683–697.
22. G. MASTROIANNI, D.OCCORSIO *Markov-Sonin gaussian rule for singular functions* , Journal of Computational and Applied Mathematics (Belgio) (2004)**169**, 197–212
23. G.MASTROIANNI, D.OCCORSIO, *Fourier sums in Markov-Sonin polynomials*, sottomesso per la pubblicazione nei Proceedings della 5–th International Conference in Functional Analysis and Approximation Theory, 16-23 giugno 2004 (Maratea), (2005) p.469-485.
24. G. MASTROIANNI, D.OCCORSIO, *An extension of Bernstein polynomials on the semi-axis* Mediterranean Journal of Mathematics (2005)

25. D. OCCORSIO, M.G. RUSSO, *The L^p weighted Lagrange interpolation on Markov-Sonin zeros*, Acta Math. Hungar. 112 (2006), no. 1-2, 57–84
26. G. MASTROIANNI, D. OCCORSIO, *Mean Convergence of Fourier Sums on unbounded intervals*, STUDIA UNIVERSITATIS BABES-BOLYAI. MATHEMATICA. vol. LII, pp. 89-103 (2007).
27. G. MASTROIANNI, D. OCCORSIO *Some quadrature formulae with non standard weights*, Jour. of Comput and Appl. Math. **235** n.3, pp. 602-614, (2010).
28. D. OCCORSIO, *Extended Lagrange interpolation in weighted uniform norm*, APPLIED MATHEMATICS AND COMPUTATION. **211**, ISSUE 1, pp. 10-22, (2009).
29. D. OCCORSIO *A method to evaluate the Hilbert transform on $(0, \infty)$* , APPLIED MATHEMATICS AND COMPUTATION, **217** (12), (2011), pp. 5667-5679
30. OCCORSIO D., MARIA GRAZIA RUSSO , *Numerical methods for Fredholm integral equations on the square*, APPLIED MATHEMATICS AND COMPUTATION, **218**, (2011) 2318-2333.
31. OCCORSIO D., *Some new properties of Generalized Bernstein polynomials*, Stud. Univ. Babes-Bolyai Math. 56(2011), No. 3, 147–160
32. OCCORSIO D, *Lagrange interpolation on the semiaxis. A survey*, Journal of Interpolation and Approximation in Scientific Computing Volume 2012 (2012), p.1–17 doi: 10.5899/2012/jiasc-00009
33. OCCORSIO D., *Interlacing properties of Laguerre zeros and some applications. A survey*, Lecture Notes of Seminario Interdisciplinare di Matematica (2011) ISBN:9788897478089, p.1–43
34. OCCORSIO D., MARIAGRAZIA RUSSO , *Generalized Bernstein polynomials: an application to Fredholm integral equations*, FILOMAT (2014)
35. OCCORSIO D., MARIAGRAZIA RUSSO , *Mean convergence of extended Lagrange interpolation on $[0, +\infty)$* , to appear in Acta Mathematica Hungarica (2012)
36. MASTROIANNI G., MILOVANOVIC G., OCCORSIO D., *A Nyström method for two variables Fredholm integral equations on triangles*, Applied Mathematics and Computation, 219 (14) (2013), 7653–7662.
37. OCCORSIO D., MARIAGRAZIA RUSSO , *Extended Lagrange Interpolation on the real line*, Journal of Computational and Applied Mathematics (2013), doi:10.2016/j.cam.2013.01.019

38. M.C. DE Bonis, D. Occorsio, Long Abstract *Numerical evaluation of hypersingular integrals on the semiaxis* in 6-th INTERNATIONAL CONFERENCE ON NUMERICAL ANALYSIS NumAn 2014, Recent Approaches to Numerical Analysis: Theory, Methods and Applications, Crete, September 2-5, 2014.
39. D. Occorsio, M.G. Russo, Long Abstract *Nyström methods for two-dimensional Fredholm integral equations on unbounded domains*, in 6-th INTERNATIONAL CONFERENCE ON NUMERICAL ANALYSIS NumAn 2014, Recent Approaches to Numerical Analysis: Theory, Methods and Applications, Crete, September pp. 2–5, 2014.
40. M.C. De Bonis, D. Occorsio, Long Abstract *Numerical evaluation of hypersingular integrals on the semiaxis*, in 6-th INTERNATIONAL CONFERENCE ON NUMERICAL ANALYSIS NumAn 2014, Recent Approaches to Numerical Analysis: Theory, Methods and Applications, Crete, September, pp. 91–96, 2014.
41. Donatella Occorsio and Maria Grazia Russo, Bivariate Generalized Bernstein Operators and their application to Fredholm Integral Equations, (submitted).
42. M.C. De Bonis, D. Occorsio, Numerical computation of the Hadamard finite part of hypersingular integrals over $(0, +\infty)$, (submitted).

- **Talks and conferences**

1. Second International Conference in Functional Analysis and Approximation Theory, 14-19 settembre 1992 (Maratea), : *A good interpolation matrix* (D. Occorsio).
2. Conference on Approximation Theory, honoring to 80th Birthday of Paul Erdős, 30/4-2/5 1993 (Budapest) (invited speaker): *Interlacing properties of the zeros of orthogonal polynomials and approximation of the Hilbert transform* (D. Occorsio, G. Mastroianni).
3. VI International Congress in Computational and Applied Mathematics, Leuven (Belgio) july 1994, : *Some Numerical algorithms to evaluate the Hadamard finite part integrals* (N. Mastronardi, D. Occorsio).
4. Recent developments in Approximation Theory, Wavelets and Applications, Scuola NATO-ASI, 16/5-26/5 1994 (Maratea) : *Associated polynomials and related Fourier expansions* (G. Mastroianni, D. Occorsio).
5. International Memorial Conference D.S. Mitrinović, 20-22 /6/1996 Niš (Jugoslavia) : *On the numerical evaluation of Hadamard finite parts on the semi-axis* (D. Occorsio, B.M Della Vecchia).

6. International Memorial Conference D.S. Mitrinović, 20-22 /6/1996 Niš (Jugoslavia), : *Comparison between two possible generalizations of Bézier curves*,(Lj. Kóćic, D.Occorsio, A.C Simoncelli).
7. Third International Conference in Functional Analysis and Approximation Theory, 23-28 September 1996 (Maratea), : *Product rule on the zeros of Laguerre polynomials* (N.Mastronardi, D.Occorsio).
8. Workshop "Approximation Theory and Numerical Analysis" , Vico Equense 9 - 11 settembre 1997 : *Product rule on the semi-axis* (N.Mastronardi, D.Occorsio).
9. VIII Simposium sobre polinomios ortogonales y aplicaciones, Seville 22-26 September 1997, : *Lagrange interpolation at Laguerre zeros in some weighted uniform spaces*(G.Mastroianni, D.Occorsio).
10. International Congress in Computational and Applied Mathematics '98 Leuven (Belgio), 27-31 July 1998, : *Quadrature on the real line and Lagrange interpolation* (N.Mastronardi, D.Occorsio).
11. Meeting on Approximation Theory and Numerical Analysis dedicated to Professor G.Mastroianni for his 60th birthday, Vico Equense (Napoli), 1-2 September 1999 , : *The numerical evaluation of some integrals on the real line* (N. Mastronardi, D.Occorsio).
12. Workshop "Advanced Special Functions and Applications" (Melfi 9–12 May 1999), : *Numerical solution of the generalized airfoil equation*(D. Occorsio, C. Laurita).
13. Workshop on "Advanced Special Functions and Integration Methods" (Melfi 18–23 June 2000), : *Approximation of functions with singularities on the real line* (D. Occorsio, G. Mastroianni).
14. International Congress in Computational and Applied Mathematics '2000 Leuven (Belgio), 17-21 July 2000 , : *Lagrange interpolation on the real line and numerical integration* (D.Occorsio, G. Mastroianni).
15. Workshop on "Quadrature and Numerical Methods for Integral Equations 16–20 September 2000, Rifreddo (Potenza), : *Integration rules on the real line and connected problems* (D. Occorsio).
16. 4–th International Conference in Functional Analysis and Approximation Theory, 22-28 September 2000 (Maratea) ,: *Integration rules of functions with singularities on the real semiaxis* (D.Occorsio, G. Mastroianni).
17. International Congress in Computational and Applied Mathematics '2002 Leuven (Belgio), 21-25 July 2002,: *Markov-Sonin interpolation and connected quadrature rules* (D.Occorsio, G. Mastroianni).

18. Conference on Orthogonal Functions and Related Topics, in honor of Professor Olav Njåstad, Róros (Norway) August 12-16, 2003, *Fourier sums in Markov-Sonin polynomials* (D. Occorsio, G. Mastroianni,)
19. 5–th International Conference in Functional Analysis and Approximation Theory, 16-23 June 2004 (Maratea),: *An extension of Bernstein polynomials on the real semiaxis* (D. Occorsio, G. Mastroianni).
20. Conference on Approximation Theory Dedicated to the 70th Birthday of Jozsef Szabados, Budapest, Hungary, July 6-12, 2008, :*Extended Lagrange interpolation in some weighted uniform spaces* (D. Occorsio);
21. 6–th International Conference in Functional Analysis and Approximation Theory, 24-30 settembre 2009 (Maratea) , *A method to evaluate the Hilbert transform on $(0, \infty)$* (D. Occorsio).
22. SC11 International Conference in Functional Analysis and Approximation Theory, 10-5 October 2011 (S. Margherita di Pula, Sardinia), *Interlacing properties of generalized Laguerre zeros and some applications* (D. Occorsio).
23. International Conference in Computational and Applied Mathematics, Gent (Belgium) 9-13 July 2012 *Extended interpolation on the real line* (D. Occorsio)
24. 25-th Biennial Numerical Analysis Conference 25-28 June 2013 Glasgow (UK), *Approximation of Hadamard finite-parts integrals on the positive semi-axis*, (D. Occorsio, M.C. De Bonis).
25. 25-th Biennial Numerical Analysis Conference 25-28 June 2013 Glasgow (UK), *Numerical methods for two variables Fredholm integral equations defined on the square*, (M.G. Russo, D. Occorsio).
26. Dolomites Research Week on Approximation (DRWA 2014), Alba di Canazei 8-12 settembre 2014, sessione poster: Numerical Methods for bivariate Fredholm integral equations on bounded domains (D. Occorsio, M. G. Russo).
27. Dolomites Research Week on Approximation (DRWA 2014), Alba di Canazei 8-12 settembre 2014, sessione poster: Numerical Methods for bivariate Fredholm integral equations part II (D. Occorsio, M. G. Russo).
28. Numerical Analysis and Approximation Theory , Third edition, Cluj-Napoca 17-20 settembre 2014, Lagrange Interpolation on unbounded intervals and some applications (D. Occorsio)
29. 6-th International Conference on Numerical Analysis NumAn 2014 Recent Approaches to Numerical Analysis: Theory, methods and applications

September 2-5, 2014: Numerical evaluation of hypersingular integrals on the semiaxis (M.C. DE Bonis, D. Occorsio)

30. 6-th International Conference on Numerical Analysis NumAn 2014 Recent Approaches to Numerical Analysis: Theory, methods and applications September 2-5, 2014: Nyström methods for two-dimensional Fredholm integral equations on unbounded domains, (D. Occorsio, M.G. Russo).
31. New Trends in Numerical Analysis Theory, Methods, Algorithms and Applications, Falerna 18–21 giugno 2015: A Bivariate Generalized Bernstein Operator and its application to Fredholm Integral Equations, (D. Occorsio, M.G. Russo).
32. New Trends in Numerical Analysis Theory, Methods, Algorithms and Applications, Falerna 18–21 giugno 2015: A method to approximate Hadamard finite part transforms on the positive semiaxis, (M.C. De Bonis, D. Occorsio).

• **Grants**

1. National Research Project : Numerical Analysis and Computational Mathematics(head: prof. Ferruccio Fontanella) from 1991 to 1996.
2. National Research Project : Numerical Analysis : Methods and Mathematical Software (head prof. Valeria Ruggiero)from 1997 al 1999.
3. National Research Project : ” Extended Interpolation, numerical quadrature and integral equations”, University of Basilicata (local project) from 1990 al 1993.
4. National Research Project : ” Approximation Theory in Numerical Analysis”, University of Basilicata (local project) on 1994.
5. National Research Project: ” Orthogonal Polynomials and their applications”, University of Basilicata (local project)from 1995 to 1998.
6. National Research Project : ”Numerical treatment of Integral Equations and related problems of Quadrature and Linear Algebra”University of Basilicata (local project) on 1999.
7. International Project ”Approximation Theory and Its Applications” Scientific cooperation Italy-Hungary from 1996 to 1998.
8. Project Vigoni ”Orthogonal Polynomials, interpolation processes and their applications to the numerical solution of different classes of Singular Integral Equations” Scientific cooperation Italy-Germany from 1997 al 1998.

9. Project Vigoni "Suitable Interpolation Operator for numerical methods in signal theory" Scientific cooperation Italy- Germany from 1999 to 2000.
10. National project leader M. Bozzini (1999-2000), leader G. Mastroianni (2000-01), leader G. Rodriguez (2001-02), and leader G. Mastroianni from 2003 to 2005.

- **PHD Board component**

1. Mathematical Methods and Models for Dynamical Systems, University of Basilicata (2007).
2. Applied Mathematics and Computer Science, University of Basilicata (2008-2010).
3. International Doctoral Seminar Pythagoras of Samos, Department of Mathematics and Computer Science of the University of Basilicata, from 2011

- **Institutional duties**

1. Evaluation activity for the Computer Science Degree in the Ministerial Project "Campus One" for the application of the University reform over the national territory, from 2002 up to 2004.
2. Component of the Technical and Scientific Committee of the Interfaculty Centre for Telematic and Informatic Services (CISIT), from 2003-2006.
3. Chairperson of the Computer Science degree from 2006 up to 2010.
4. From 2010 is the Delegate of the Rector for the coordination of the initiatives in support of the disabled students