VITA
WALTER GAUTSCHI

April 1, 2021

EDUCATION

Ph.D.   University of Basel, Switzerland   1953
        (Thesis advisor: A. M. Ostrowski)

PROFESSIONAL EXPERIENCE

Research Fellow	Istituto Nazionale per le	
	Applicazioni del Calcolo, Rome	1954–55
Research Fellow	Harvard Computation Lab.	1955–56
Research Mathematician	Natl. Bureau of Standards	1956–59
Professor. Lecturer	American U., Washington, D.C.	
Mathematician	Oak Ridge National Lab.	1959–63
Professor of Math.		
& Computer Science	Purdue University	1963–2000
Professor Emeritus	Purdue University	2000–
Visiting Professor	Technical Univ. of Munich, Germany	1970–71
Visiting Professor	Mathematics Res. Center, Univ. of WI	1976–77
Visiting Professor	ETH Zurich	1996–2001
Visiting Professor	University of Padova	1997
Visiting Professor	University of Basel	2000

PROFESSIONAL SOCIETIES AND HONORS

Schweizerische Mathematische Gesellschaft
American Mathematical Society
Mathematical Association of America
Society for Industrial and Applied Mathematics
Corresponding Member, Bavarian Academy of Sciences, Munich, 2001–
Foreign Member, Academy of Sciences, Turin, 2001–
SIAM Fellow, Class 2012
Member, Council of the American Mathematical Society, 1975–80, 1984–95
Fulbright Research Scholar, Munich, 1970–71
Listed in *Who is Who in the World*
Listed in the International Biographical Centre's *Top 100 Educators 2009* and in
 2000 Outstanding Intellectuals of the 21st *Century*
Listed in S. Gottwald, H.-J. Ilgauds, and K.-H. Schlote, *Lexikon bedeutender
 Mathematiker*, 2d ed., Verlag Programm Mathematik, Leipzig, in preparation.

RESEARCH INTERESTS

Numerical Analysis
Constructive Approximation Theory
Special Functions
Orthogonal Polynomials

GENERAL INFORMATION

Birthdate:	December 11, 1927
Birthplace:	Basel, Switzerland
Marital Status:	Married – Erika
Children:	4
Citizenship:	USA

PUBLICATIONS

Books

B1. (with H. Bavinck and G. M. Willems) *Colloquium approximatietheorie*, MC Syllabus
 14, Mathematisch Centrum Amsterdam, 1971.

B2. *Numerical analysis: an introduction*, Birkhäuser, Boston, 1997. [2d edition, 2012.]

B3. *Orthogonal polynomials: computation and approximation*, Oxford University Press, Oxford, 2004.

B4. *Orthogonal polynomials in Matlab: exercises and solutions*, Software, Environments, Tools, SIAM, Philadelphia, PA, 2016.

B5. *A software repository for orthogonal polynomials*, Software, Environments, Tools, SIAM, Philadelphia, PA, 2018.

B6. *A software repository for Gaussian quadratures and Christoffel functons*,Software, Environments, Tools, SIAM, Philadelphia,2021.

Proceedings Edited

P1. (with G. Allasia, L. Gatteschi, and G. Monegato) *International conference on special functions: theory and computation*, Rend. Sem. Mat. Univ. Politec. Torino, Special Issue, Università e Politecnico di Torino, Turin, 1985.

P2. *Mathematics of Computation 1943–1993*: *a half-century of computational mathematics*, Proc. Sympos. Appl. Math., v. 48, American Mathematical Society, Providence, RI, 1994 (xx + 643 pages).

P3. (with G. H. Golub and G. Opfer) *Applications and computation of orthogonal polynomials*, Internat. Ser. Numer. Math., v. 131, Birkhäuser, Basel, 1999 (xiv + 268 pages).

P4. (with F. Marcellán and L. Reichel) *Numerical analysis 2000*, Vol. 5: *Quadrature and orthogonal polynomials*, J. Comput. Appl. Math. 127, nos. 1–2 (2001).

P5. (with G. Mastroianni and Th. M. Rassias) *Approximation and computation: in honor of Gradimir V. Milovanović*, Springer Optim. Appl., v. 42, Springer, Dordrecht, 2011.

Translations

T1. (with R. Bartels and C. Witzgall) *Introduction to numerical analysis* by J. Stoer and R. Bulirsch, translated from German, Springer, New York, 1980. [2d ed., Texts in Appl. Math., v. 12, Springer, New York, 1993.]

T2. *Lectures on numerical mathematics* by H. Rutishauser, annotated translation from German, Birkhäuser, Boston, 1990.

T3. (with Martin Mattmüller) *Consideration of some series which are distinguished by special properties*, Memoir E190 by Leonhard Euler, translated from Latin, `http://math.dartmouth.edu/~euler`

T4. (with Erika Gautschi) *Leonhard Euler* by E .A. Fellmann, translated from German, Birkhäuser, Basel, 2007.

Refereed Papers

1951

1. *Ein Analogon zu Grammels Methode der graphischen Integration gewöhnlicher Differentialgleichungen*, Z. Angew. Math. Mech. 31, 242–243.

1953

2. *Fehlerabschätzungen für die graphischen Integrationsverfahren von Grammel und Meissner–Ludwig*, Verh. Naturforsch. Ges. Basel 64, 401–435.

1954

3. *Über die zeichnerischen Ungenauigkeiten und die zweckmässige Bemessung der Schrittlänge beim graphischen Integrationsverfahren von Meissner–Ludwig*, Verh. Naturforsch. Ges. Basel 65, 49–66.
4. *Über eine Klasse von linearen Systemen mit konstanten Koeffizienten*, Comment. Math. Helv. 28, 186–196.

1955

5. *Über den Fehler des Runge–Kutta-Verfahrens für die numerische Integration gewöhnlicher Differentialgleichungen n-ter Ordnung*, Z. Angew. Math. Phys. 6, 456–461.

1956

6. *Una estensione agli integrali doppi di una condizione di Picone necessaria per un estremo*, Atti Accad. Naz. Lincei. Rend. Cl. Sci. Fis. Mat. Nat. (8) 20, 283–289.
7. *Bemerkung zu einer notwendigen Bedingung von Picone in der Variationsrechnung*, Comment. Math. Helv. 31, 1–4.
8. (with F. Malmborg) *Calculations related to the improved free-volume-theory of liquids (AF Problem 116)*, Harvard Computation Laboratory, Problem Report 100, VI-1–VI-41.

1959

9. *Some elementary inequalities relating to the gamma and incomplete gamma function*, J. Math. and Phys. 38, 77–81.
10. *Exponential integral $\int_1^\infty e^{-xt} t^{-n} dt$ for large values of n*, J. Res. Nat. Bur. Standards 62, 123–125.
11. *Note on bivariate linear interpolation for analytic functions*, Math. Tables Aids Comput. 13, 91–96.

1961

12. *Recursive computation of certain integrals*, J. Assoc. Comput. Mach. 8, 21–40.
13. *Recursive computation of the repeated integrals of the error function*, Math. Comp. 15, 227–232.
14. *Numerical integration of ordinary differential equations based on trigonometric polynomials*, Numer. Math. 3, 381–397.

1962

15. (with H. A. Antosiewicz) *Numerical methods in ordinary differential equations*, Ch. 9 in *Survey of numerical analysis* (J. Todd, ed.), 314–346, McGraw-Hill, New York.
16. *On inverses of Vandermonde and confluent Vandermonde matrices*, Numer. Math. 4, 117–123.
17. *Diffusion functions for small argument*, SIAM Rev. 4, 227–229.

1963

18. *Instability of linear second-order difference equations*, in *Proc. IFIP Congress 62* (C. M. Popplewell, ed.), 207, North-Holland, Amsterdam.
19. *On inverses of Vandermonde and confluent Vandermonde matrices II*, Numer. Math. 5, 425–430.

1964

20. (with W. F. Cahill) *Exponential integral and related functions*, Ch. 5 in *Handbook of mathematical functions* (M. Abramowitz and I. A. Stegun, eds.), 227–251, Nat. Bur. Standards Appl. Math. Ser. 55. [Russian translation by V. A. Ditkin and L. N. Karmazina, in *Spravočnik po special'nym funkciyam*, 55–79, Nauka, Moscow, 1979.]
21. *Error function and Fresnel integrals*, Ch. 7 in *Handbook of mathematical functions* (M. Abramowitz and I. A. Stegun, eds.), 295–329, Nat. Bur. Standards Appl. Math. Ser. 55.[Russian translation by V. A. Ditkin and L. N. Karmazina, in *Spravočnik po special'nym funkciyam*, 119–152, Nauka, Moscow, 1979.]
22. *Algorithm 221 — Gamma function*, and *Algorithm 222 — Incomplete beta function ratios*, Comm. ACM 7, 143–144; Certification of Algorithm 222, *ibid.*, 244.

1965

23. *Algorithm 236 — Bessel functions of the first kind*, Comm. ACM 7, 479–480; Certification of Algorithm 236, *ibid.* 8, 105–106.

24. *Algorithm 259 — Legendre functions for arguments larger than one*, Comm. ACM 8, 488–492.

1966

25. *Computation of transcendental functions by recurrence relations*, in *Proc. IFIP Congress 65*, v. 2 (W. A. Kalenich, ed.), 485–486, Spartan Books, Washington, D. C.

26. *Computation of successive derivatives of $f(z)/z$*, Math. Comp. 20, 209–214.

27. *Algorithm 282 — Derivatives of e^x/x, $\cos(x)/x$, and $\sin(x)/x$*, Comm. ACM 9, 272.

28. *Algorithm 292 — Regular Coulomb wave functions*, Comm. ACM 9, 793–795.

1967

29. *Computational aspects of three-term recurrence relations*, SIAM Rev. 9, 24–82.

30. *Numerical quadrature in the presence of a singularity*, SIAM J. Numer. Anal. 4, 357–362.

1968

31. *Construction of Gauss–Christoffel quadrature formulas*, Math. Comp. 22, 251–270.

32. *Algorithm 331 — Gaussian quadrature formulas*, Comm. ACM 11, 432–436.

1969

33. *Remark on Algorithm 292*, Comm. ACM 12, 280.

34. *On the condition of a matrix arising in the numerical inversion of the Laplace transform*, Math. Comp. 23, 109–118.

35. *An application of minimal solutions of three-term recurrences to Coulomb wave functions*, Aequationes Math. 2, 171–176; abstract, *ibid.* 1 (1968), 208.

36. *Algorithm 363 — Complex error function*, Comm. ACM 12, 635.

<div align="center">1970</div>

37. (with B. J. Klein) *Recursive computation of certain derivatives — a study of error propagation*, Comm. ACM 13, 7–9.
38. (with B. J. Klein) *Remark on Algorithm 282*, Comm. ACM 13, 53–54.
39. *Efficient computation of the complex error function*, SIAM J. Numer. Anal. 7, 187–198.
40. *On the construction of Gaussian quadrature rules from modified moments*, Math. Comp. 24, 245–260.

<div align="center">1971</div>

41. *Attenuation factors in practical Fourier analysis*, Numer. Math. 18, 373–400.

<div align="center">1972</div>

42. *Zur Numerik rekurrenter Relationen*, Computing 9, 107–126. [English translation in: Aerospace Research Laboratories, Report ARL 73-0005, February 1973.]
43. *The condition of orthogonal polynomials*, Math. Comp. 26, 923–924.

<div align="center">1973</div>

44. *Algorithm 471 — Exponential integrals*, Comm. ACM 16, 761–763.
45. *On the condition of algebraic equations*, Numer. Math. 21, 405–424.

<div align="center">1974</div>

46. (with H. Yanagiwara) *On Chebyshev-type quadratures*, Math. Comp. 28, 125–134.
47. *A harmonic mean inequality for the gamma function*, SIAM J. Math. Anal. 5, 278–281.
48. *Some mean value inequalities for the gamma function*, SIAM J. Math. Anal. 5, 282–292.

<div align="center">1975</div>

49. *Computational methods in special functions — a survey*, in *Theory and applications of special functions* (R. A. Askey, ed.), 1–98, Math. Res. Center, Univ. Wisconsin Publ., no. 35, Academic Press, New York.
50. *Nonexistence of Chebyshev-type quadratures on infinite intervals*, Math. Comp. 29, 93–99.
51. *Norm estimates for inverses of Vandermonde matrices*, Numer. Math. 23, 337–347.

52. *Optimally conditioned Vandermonde matrices*, Numer. Math. 24, 1–12.

53. (with L. A. Anderson) *Optimal weighted Chebyshev-type quadrature formulas*, Calcolo 12, 211–248.

54. *Stime dell'errore globale nei metodi "one-step" per equazioni differenziali ordinarie*, Rend. Mat. (2) 8, 601–617.

1976

55. *Advances in Chebyshev quadrature*, in *Numerical analysis* (G. A. Watson, ed.), 100–121, Lecture Notes Math., v. 506, Springer, Berlin.

56. *Comportement asymptotique des coefficients dans les formules d'intégration d'Adams, de Störmer et de Cowell*, C. R. Acad. Sci. Paris Ser. A–B 283, A787–A788.

57. *Qualche contributo recente sul problema di Chebyshev nella teoria dell'integrazione numerica*, Rend. Sem. Mat. Univ. e Politec. Torino 35, 39–44.

1977

58. (with G. Monegato) *On optimal Chebyshev-type quadratures*, Numer. Math. 28, 59–67.

59. *Evaluation of the repeated integrals of the coerror function*, ACM Trans. Math. Software 3, 240–252.

60. *Algorithm 521 — Repeated integrals of the coerror function*, ACM Trans. Math. Software 3, 301–302.

61. *Anomalous convergence of a continued fraction for ratios of Kummer functions*, Math. Comp. 31, 994–999.

1978

62. *On inverses of Vandermonde and confluent Vandermonde matrices III*, Numer. Math. 29, 445–450.

63. (with J. Slavik) *On the computation of modified Bessel function ratios*, Math. Comp. 32, 865–875.

64. *Questions of numerical condition related to polynomials*, in *Symposium on recent advances in numerical analysis* (C. de Boor and G. H. Golub, eds.), 45–72, Academic Press, New York. [Revised and reprinted in MAA Studies in Mathematics, v. 24: *Studies in numerical analysis* (G. H. Golub, ed.), 140–177, Math. Assoc. America, Washington, DC, 1984.]

1979

65. *On generating Gaussian quadrature rules*, in *Numerische Integration* (G. Hämmerlin, ed.), 147–154, Internat. Ser. Numer. Math., v. 45, Birkhäuser, Basel.

66. *The condition of polynomials in power form*, Math. Comp. 33, 343–352.

67. *On the preceding paper "A Legendre polynomial integral" by James L. Blue*, Math. Comp. 33, 742–743.

68. *A computational procedure for incomplete gamma functions*, ACM Trans. Math. Software 5, 466–481.

69. *Algorithm 542 — Incomplete gamma functions*, ACM Trans. Math. Software 5, 482–489.

70. *Un procedimento di calcolo per le funzioni gamma incomplete*, Rend. Sem. Mat. Univ. e Politec. Torino 37, 1–9.

71. *Families of algebraic test equations*, Calcolo 16, 383–398.

1980

72. (with F. Costabile) *Stime per difetto per gli zeri più grandi dei polinomi ortogonali*, Boll. Un. Mat. Ital. (5) 17A, 516–522.

73. (with M. Montrone) *Metodi multistep con minimo coefficiente dell'errore globale*, Calcolo 17, 67–75.

1981

74. *A survey of Gauss–Christoffel quadrature formulae*, in *E. B. Christoffel — the influence of his work in mathematics and the physical sciences* (P. L. Butzer and F. Fehér, eds.), 72–147, Birkhäuser, Basel.

75. *Minimal solutions of three-term recurrence relations and orthogonal polynomials*, Math. Comp. 36, 547–554.

76. *Recognition of Christoffel's work on quadrature during and after his lifetime*, in *E. B. Christoffel — the influence of his work in mathematics and the physical sciences* (P. L. Butzer and F. Fehér, eds.), 724–727, Birkhäuser, Basel.

1982

77. *An algorithmic implementation of the generalized Christoffel theorem*, in *Numerical integration* (G. Hämmerlin, ed.), 89–106, Internat. Ser. Numer. Math., v. 57, Birkhäuser, Basel.

78. (with R. E. Lynch) *Error behavior in optimal relaxation methods*, Z. Angew. Math. Phys. 33, 24–35.

79. *A note on the successive remainders of the exponential series*, Elem. Math. 37, 46–49.

80. *Polynomials orthogonal with respect to the reciprocal gamma function*, BIT 22, 387–389.

81. *On generating orthogonal polynomials*, SIAM J. Sci. Statist. Comput. 3, 289–317.

1983

82. *To Alexander M. Ostrowski on his ninetieth birthday*, Linear Algebra Appl. 52/53, xi–xiv.

83. *The condition of Vandermonde-like matrices involving orthogonal polynomials*, Linear Algebra Appl. 52/53, 293–300.

84. *How and how not to check Gaussian quadrature formulae*, BIT 23, 209–216.

85. (with R. S. Varga) *Error bounds for Gaussian quadrature of analytic functions*, SIAM J. Numer. Anal. 20, 1170–1186.

86. *On Padé approximants associated with Hamburger series*, Calcolo 20, 111–127.

87. *On the convergence behavior of continued fractions with real elements*, Math. Comp. 40, 337–342.

1984

88. (with G. V. Milovanović) *On a class of complex polynomials having all zeros in a half circle*, in *Numerical methods and approximation theory* (G. V. Milovanović, ed.), 49–53, Faculty of Electronic Engineering, Univ. Niš, Niš.

89. *Discrete approximations to spherically symmetric distributions*, Numer. Math. 44, 53–60.

90. *On some orthogonal polynomials of interest in theoretical chemistry*, BIT 24, 473–483.

91. (with Jet Wimp) *In memoriam YUDELL L. LUKE June 26, 1918 – May 6, 1983*, Math. Comp. 43, 349–352.

1985

92. *Some new applications of orthogonal polynomials*, in *Polynômes orthogonaux et applications* (C. Brezinski, A. Draux, A. P. Magnus, P. Maroni and A. Ronveaux, eds.), 63–73, Lecture Notes Math., v. 1171, Springer, Berlin.

93. (with G. V. Milovanović) *Gaussian quadrature involving Einstein and Fermi functions with an application to summation of series*, Math. Comp. 44, 177–190. Supplement, *ibid.*, S1–S11.

94. *Orthogonal polynomials — constructive theory and applications*, J. Comput. Appl. Math. 12/13, 61–76.

95. (with G. V. Milovanović) *Polynomials orthogonal on the semicircle*, Rend. Sem. Mat. Univ. e Politec. Torino, Special Issue, 179–185.

1986

96. (with B. Flury) *An algorithm for simultaneous orthogonal transformation of several positive definite matrices to nearly diagonal form*, SIAM J. Sci. Statist. Comput. 7, 169–184.

97. (with G. V. Milovanović) *Polynomials orthogonal on the semicircle*, J. Approx. Theory 46, 230–250.

98. *On the sensitivity of orthogonal polynomials to perturbations in the moments*, Numer. Math. 48, 369–382.

99. (with F. Caliò and E. Marchetti) *On computing Gauss–Kronrod quadrature formulae*, Math. Comp. 47, 639–650.

100. (with G. V. Milovanović) *Spline approximations to spherically symmetric distributions*, Numer. Math. 49, 111–121.

101. *Reminiscences of my involvement in de Branges's proof of the Bieberbach conjecture*, in *The Bieberbach conjecture* (Albert Baernstein II, David Drasin, Peter Duren, and Albert Marden, eds.), 205–211, Proc. Symp. on the Occasion of the Proof, Math. Surveys Monographs, no. 21, American Mathematical Society, Providence, RI.

1987

102. (with M. Frontini and G. V. Milovanović) *Moment-preserving spline approximation on finite intervals*, Numer. Math. 50, 503–518.

103. (with J. Wimp) *Computing the Hilbert transform of a Jacobi weight function*, BIT 27, 203–215.

104. (with H. J. Landau and G. V. Milovanović) *Polynomials orthogonal on the semicircle II*, Constructive Approx. 3, 389–404.

105. (with M. A. Kovačević and G. V. Milovanović) *The numerical evaluation of singular integrals with coth-kernel*, BIT 27, 389–402.

106. *A conjectured inequality for Hermite interpolation at the zeros of Jacobi polynomials*, Problem 87-7, SIAM Rev. 29, 297–298.

1988

107. *Gauss–Kronrod quadrature — a survey*, in *Numerical methods and approximation theory III* (G. V. Milovanović, ed.), 39–66, Faculty of Electronic Engineering, Univ. Niš, Niš.
108. (with S. E. Notaris) *Newton's method and Gauss–Kronrod quadrature*, in *Numerical integration III* (H. Brass and G. Hämmerlin, eds.), 60–71, Internat. Ser. Numer. Math., v. 85, Birkhäuser, Basel.
109. (with S. E. Notaris) *An algebraic study of Gauss–Kronrod quadrature formulae for Jacobi weight functions*, Math. Comp. 51, 231–248.
110. (with G. Inglese) *Lower bounds for the condition number of Vandermonde matrices*, Numer. Math. 52, 241–250.
111. (with T. J. Rivlin) *A family of Gauss–Kronrod quadrature formulae*, Math. Comp. 51, 749–754.

1989

112. *Orthogonality — conventional and unconventional — in numerical analysis*, in *Computation and control* (K. Bowers and J. Lund, eds.), 63–95, Progress in Systems and Control Theory, v. 1, Birkhäuser, Boston.
113. *On the zeros of polynomials orthogonal on the semicircle*, SIAM J. Math. Anal. 20, 738–743.
114. (with S. E. Notaris) *Gauss–Kronrod quadrature formulae for weight functions of Bernstein–Szegö type*, J. Comput. Appl. Math. 25, 199–224. [Erratum, *ibid.* 27 (1989), 429.]

1990

115. *Some applications and numerical methods for orthogonal polynomials*, in *Numerical analysis and mathematical modelling* (A. Wakulicz, ed.), 7–19, Banach Center Publications, v. 24, PWN Polish Scientific Publishers, Warsaw.
116. *Orthogonal polynomials on the semicircle*, in *Numerical analysis and mathematical modelling* (A. Wakulicz, ed.), 21–27, Banach Center Publications, v 24, PWN Polish Scientific Publishers, Warsaw.

117. *Computational aspects of orthogonal polynomials*, in *Orthogonal polynomials* (Paul Nevai, ed.), 181–216, NATO ASI Series, Series C: Mathematical and Physical Sciences, v. 294, Kluwer, Dordrecht.

118. *How (un)stable are Vandermonde systems?*, in *Asymptotic and computational analysis* (R. Wong, ed.), 193–210, Lecture Notes Pure Appl. Math., v. 124, Dekker, New York.

119. (with E. Tychopoulos and R.S. Varga) *A note on the contour integral representation of the remainder term for a Gauss–Chebyshev quadrature rule*, SIAM J. Numer. Anal. 27, 219–224.

120. (with A. Córdova and S. Ruscheweyh) *Vandermonde matrices on the circle: spectral properties and conditioning*, Numer. Math. 57, 577–591.

121. (with Shikang Li) *The remainder term for analytic functions of Gauss–Radau and Gauss–Lobatto quadrature rules with multiple end points*, J. Comput. Appl. Math. 33, 315–329.

1991

122. *Computational problems and applications of orthogonal polynomials*, in *Orthogonal polynomials and their applications* (C. Brezinski, L. Gori and A. Ronveaux, eds.), 61–71, IMACS Annals Comput. Appl. Math., v. 9, Baltzer, Basel.

123. *On the remainder term for analytic functions of Gauss–Lobatto and Gauss–Radau quadratures*, Rocky Mountain J. Math. 21, 209–226.

124. *A class of slowly convergent series and their summation by Gaussian quadrature*, Math. Comp. 57, 309–324.

125. *On certain slowly convergent series occurring in plate contact problems*, Math. Comp. 57, 325–338.

126. (with Shikang Li) *Gauss–Radau and Gauss–Lobatto quadratures with double end points*, J. Comput. Appl. Math. 34, 343–360.

127. *On the paper "A continued fraction approximation of the modified Bessel function $I_1(t)$" by P .R. Parthasarathy and N. Balakrishnan*, Appl. Math. Letters 4, 47–51.

128. *Quadrature formulae on half-infinite intervals*, BIT 31, 438–446.

1992

129. *Remainder estimates for analytic functions*, in *Numerical integration* (T. O. Espelid and A. Ganz, eds.), 133–145, NATO ASI Series, Series C: Mathematical and Physical Sciences, v. 357, Kluwer, Dordrecht.

130. *Applications and computation of orthogonal polynomials*, Proc. Eighteenth South African Sympos. Numer. Math. (S. Abelman, ed.), 47–71, Department of Computer Science, University of Natal, Durban.

131. *Spline approximation and quadrature formulae*, Atti Sem. Mat. Fis. Univ. Modena 40, 169–182.

132. *On mean convergence of extended Lagrange interpolation*, J. Comput. Appl. Math. 43, 19–35.

1993

133. *The spiral of Theodorus, special functions, and numerical analysis*, Supplement A in *Spirals: from Theodorus to chaos* by P. J. Davis, 67–87, A K Peters, Boston.

134. (with Shikang Li) *A set of orthogonal polynomials induced by a given orthogonal polynomial*, Aequationes Math. 46, 174–198.

135. *Is the recurrence relation for orthogonal polynomials always stable?*, BIT 33, 277–284.

136. *On the computation of generalized Fermi–Dirac and Bose–Einstein integrals*, Comput. Phys. Comm. 74, 233–238.

137. *Gauss-type quadrature rules for rational functions*, in *Numerical integration IV* (H. Brass and G. Hämmerlin, eds.), 111–130, Internat. Ser. Numer. Math., v.112, Birkhäuser, Basel.

138. (with S. E. Notaris) *Problem 6*, in *Numerical integration IV* (H. Brass and G. Hämmerlin, eds.), 379–380, Internat. Ser. Numer. Math., v. 112, Birkhäuser, Basel.

1994

139. *Summation of slowly convergent series*, in *Numerical analysis and mathematical modelling* (A. Wakulicz, ed.), 7–18, Banach Center Publications, v. 29, PWN Polish Scientific Publishers, Warsaw.

140. *Applications and computation of orthogonal polynomials*, in *Advances in computational mathematics: New Delhi, India* (H. P. Dikshit and C. A. Micchelli, eds.), Series in Approximations and Decompositions, v. 4, World Scientific, Singapore.

141. *Algorithm 726: ORTHPOL — a package of routines for generating orthogonal polynomials and Gauss-type quadrature rules*, ACM Trans. Math. Software 20, 21–62; Remark on Algorithm 726, *ibid.* 24 (1998), 355.

142. *Reflections and recollections*, in *Approximation and computation: a festschrift in honor of Walter Gautschi* (R. V. M. Zahar, ed.), xvii–xxxv, Internat. Ser. Numer. Math., v. 119, Birkhäuser, Basel.

1995

143. *The work of Philip Rabinowitz on numerical integration*, Numer. Algorithms 9, 199–222.

144. *Luigi Gatteschi's work on special functions and numerical analysis*, Annals Numer. Math. 2, 3–19.

145. (with M. Zhang) *Computing orthogonal polynomials in Sobolev spaces*, Numer. Math. 71, 159–183.

1996

146. *Orthogonal polynomials: applications and computation*, Acta Numerica 1996 (A. Iserles, ed.), 45–119, Cambridge University Press, Cambridge.

147. (with Shikang Li) *On quadrature convergence of extended Lagrange interpolation*, Math. Comp. 65, 1249–1256.

148. (with S. E. Notaris) *Stieltjes polynomials and related quadrature formulae for a class of weight functions*, Math. Comp. 65, 1257–1268.

1997

149. (with J. Waldvogel) *Contour plots of analytic functions*, Ch. 25 in *Solving problems in scientific computing using Maple and Matlab* (W. Gander and J. Hřebíček, eds.), 3d ed., 359–372, Springer, Berlin. [Chinese translation by China Higher Education Press and Springer, 1999; Portuguese translation of 3d ed. by Editora Edgard Blücher Ltda, Sao Paolo, 2001; Russian translation of 4th ed. by Vassamedia, Minsk, Bjelarus, 2005.]

150. *The computation of special functions by linear difference equations*, in *Advances in difference equations* (S. Elaydi, I. Győri, and G. Ladas, eds.), 213–243, Gordon and Breach, Amsterdam.

151. *On the computation of special Sobolev-type orthogonal polynomials*, The heritage of P. L. Chebyshev: a festschrift in honor of the 70th birthday of T. J. Rivlin, Ann. Numer. Math. 4, 329–342.

152. *Moments in quadrature problems*, Approximation theory and approximation, Comput. Math. Appl. 33, 105–118.

153. (with A. B. J. Kuijlaars) *Zeros and critical points of Sobolev orthogonal polynomials*, J. Approx. Theory 91, 117–137.

154. (with G. V. Milovanović) *s-orthogonality and construction of Gauss–Turán-type quadrature formulae*, J. Comput. Appl. Math. 86, 205–218.

1998

155. *The incomplete gamma functions since Tricomi*, in *Tricomi's ideas and contemporary applied mathematics*, 203–237, Atti dei Convegni Lincei, n. 147, Accademia Nazionale dei Lincei, Roma.

156. *Ostrowski and the Ostrowski prize*, Math. Intelligencer 20, 32–34. [Revised and translated into German, Uni Nova 87 (2000), 60–62, Universität Basel.]

1999

157. *Orthogonal polynomials and quadrature*, Electron. Trans. Numer. Anal. 9, 65–76.

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2015

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2016

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2017

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<div align="center">2018</div>

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1. National Science Foundation, *Research in numerical analysis*,
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3. National Science Foundation, *Applied orthogonal polynomials*,

   6/1/82 – 7/31/90, $303,607.

4. National Science Foundation, *Mathematical sciences: applied orthogonal polynomials*,

   6/1/91 – 11/30/93, $107,500.

5. National Science Foundation, *Mathematical sciences: orthogonal polynomials – applications and computation*,

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C.I.M.E. Lecturer, Perugia, Italy	1965
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SIAM Visiting Lecturer	1971–72, 1975–76
Invited Lecturer, Summer Courses in Mathematics, Perugia	1972, 1973
and Cortona, Italy	1974, 1975
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Member, Stiftungsrat of the A.M. Ostrowski Foundation	
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EDITORSHIPS

Editorial Committee, Mathematics of Computation	1966–1999
Managing Editor	1984–1995
Editorial Board, SIAM Journal on Mathematical Analysis	1970–73
Editorial Board, Numerische Mathematik	1971–
Honorary Editor	1991–
Editorial Board, Calcolo	1975–1987
Special Editor, Linear Algebra and its Applications	1981–83

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