

# curriculum vitae

Martin H. Gutknecht

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## Personal data, academic degrees

- Oct. 1, 1944    born in Berne, Switzerland
- May 1969    diploma in mathematics at ETH Zurich
- Feb. 1973/Mar. 1974    Dr. sc. math. (Ph.D. in Mathematics) at ETH Zurich
- Apr. 1977    Marriage with Ursula Zimmerli  
(3 children: Stefan 1979, Andreas 1981, Simon 1987)
- Oct. 1980    Privatdozent (Habilitation) at ETH Zurich
- Sep. 19, 1997    Titularprofessor (adjunct professor) at ETH Zurich
- Oct. 31, 2009    retirement

## Education, professional experience

- 1951 – 1955    Primary school in Köniz (Berne)
- 1955 – 1963    Progymnasium and Gymnasium in Berne; maturity (type C, Sep. 1963)  
with two awards
- 1963 – 1964    Studies in mathematics, astronomy, and physics at the University of  
Berne
- 1964 – 1969    Studies in mathematics and physics at ETH Zurich
- 1968 – 1973    Assistent of Prof. A. Huber (1968–1970) and Prof. P. Henrici (1968–  
1973); dissertation in approximation theory with applications to signal  
processing (oral Ph.D. exam, Feb. 1973; thesis in print, Mar. 1974)
- 1973 – 1975    Research associate and lecturer at ETH; Swiss NSF grant for publishing  
the lecture notes of the late Prof. Heinz Rutishauser; lecturer at the  
University of Basel (Nov. 1974 – Feb. 1975)
- 1976    Post-doctoral fellow (on Canadian NSF grant) with Prof. J.M. Varah,  
Computer Science Department, *University of British Columbia, Van-*  
*couver*
- 1977 – 1983    Senior research associate and lecturer at ETH Zurich
- 9/79 – 9/80    Visiting scientist at the Computer Science Department of *Stanford Uni-*  
*versity* (with senior research fellowship of Swiss NSF)

1983 – 6/88	Senior research staff member (wissenschaftlicher Adjunkt) and lecturer at ETH Zurich
8/85 – 3/86	Visiting scientist at the Mathematical Sciences Department of the <i>IBM Thomas J. Watson Research Center, Yorktown Heights, New York</i> (with IBM World Trade Visiting Scientist Fellowship)
7/88 – 12/95	<i>Director of the Interdisciplinary Project Center for Supercomputing (IPS)</i> at ETH Zurich
1/96 – 12/98	<i>Scientific Director of the Swiss Center for Scientific Computing / Centro Svizzero di Calcolo Scientifico</i> affiliated with ETH Zurich
1/99 – 10/09	<i>Section Head / Senior Scientist II</i> with the title of a <i>Professor</i> at the Department of Mathematics, ETH Zurich
3/01 – 4/01	Visiting Scientist at the <i>School of Mathematical Sciences, Australian National University, Canberra, ACT, AUS</i>
6/08	Partial retirement (50%)
11/08 – 12/08	<i>Visiting Scientist</i> at the <i>DFG Research Center MATHEON, Berlin</i>
12/08 – 2/09	<i>DFG Mercator Visiting Professor</i> at <i>TU Berlin</i>
10/09	Retirement
4/10 – 5/10	<i>DFG Mercator Visiting Professor</i> at <i>TU Berlin</i>

## Fellowships and grants

1979/80	Senior research fellowship of Swiss NSF (1 year)
1985/86	IBM World Trade Visiting Scientist Fellowship (8 months)
1987/90	Swiss NSF grant for “Software for numerical conformal mapping” (24 months, CHF 140'662.-)
1989/91	(with E. Anderheggen, H. Melchior, W. Gander, H.U. Schwarzenbach) Swiss KWF grant for “Development of a program system for the three-dimensional simulation of semiconductor sensors” (24 months, CHF 311'150.-)
1990/92	(with Ph. de Forcrand, H.P. Lüthi, D. Würtz) Swiss NSF grant for “Supercomputer Research in Physics and Chemical Physics” (24 months, CHF 330'614.-)
1991/93	(with J.P. Berrut) Swiss NSF grant for “Software for numerical conformal mapping” (18 months, CHF 118'034.-)
1991/92	(with W. Fichtner) Swiss NSF grant for “Numerical algorithms for the solution of nonsymmetric systems of equations on vector and parallel computers” (12 months, CHF 117'306.-)
1992/94	(with Ph. de Forcrand, H.P. Lüthi, D. Würtz) Swiss NSF grant for “Supercomputer Research in Physics and Chemical Physics” (24 months, CHF 412'628.-)

- 1993/94 (with W. Fichtner) Swiss NSF grant for “Numerische Algorithmen zur Lösung (12 months, CHF 127’601.-)
- 1993/95 (with Ph. de Forcrand) Swiss NSF grant for “Fast quark propagator calculations” (24 months, CHF 69’398.-)
- 1994/96 (with Ph. de Forcrand, H.P. Lüthi) Swiss NSF grant for “Supercomputer Research in Physics and Chemical Physics” (24 months, CHF 385’488.-)
- 1995/97 Swiss NSF grant for “Numerical algorithms for solving very large systems of equations” (24 months, CHF 262’960.-)
- 1995/98 (with M. Gross, H. Keck, R. Peikert) Swiss KWF/CTI grant for “Visualisierung von Strukturen in dreidimensionalen Vektorfeldern am Beispiel von CFD-Simulation für Strömungsmaschinen” (36 months, CHF 113’000.-)
- 1998/2000 (with M. Gross, H. Keck, R. Peikert) CTI grant for “Visualisierung von Strukturen in dreidimensionalen Vektorfeldern am Beispiel von CFD-Simulation für Strömungsmaschinen” (24 months, CHF 79’750.-)
- 1998/2000 (with W. Fichtner) KTI-Projekt “Effiziente numerische Methoden zur parallelen direkten Lösung von linearen Gleichungssystemen aus der Prozess- und Halbleiterbauelemente-Simulation” (24 months, CHF 260’100.-)
- 2005/2007 (with W. Fichtner) Swiss NFS grant for “Robust iterative solvers for linear systems in nanoelectronic computational science (ROBUST)” (24 months, CHF 156’744.-)
- 2008-2010 (with J. Liesen, V. Mehrmann, R. Nabben) 3-month DFG Mercator Visiting Professorship

## Professional activities

### Membership in editorial boards

- 1984 – present Associate Editor (1984–1991) and Editor (1991–) of *Numerische Mathematik* (Springer)
- 1987 – present Associate/Honorary Editor of *Journal of Computational and Applied Mathematics* (North-Holland/Elsevier)
- 1987 – 1995, 2008 – 2010 Associate Editor of *SIAM Journal on Matrix Analysis and Applications* (SIAM)
- 1990 – 2016 Editor of *Numerical Algorithms* (J.C. Baltzer [–2000], Kluwer [2001–2004], Springer [2005–])
- 1993 – present Editor of *Electronic Transactions on Numerical Analysis* (Kent State University)
- 1994 – 2002 Associate Editor of *SIAM Journal on Numerical Analysis* (SIAM)
- 1998 – 2000 Managing Editor of *Speedup* (Speedup Society)

Referee for some 35 scientific journals as well as for many universities and funding agencies.

## Committee memberships

1978 – 1989	Member of the Computer Committee of ETH Zurich
1981 – 1987	Member of the Committee for Postdiploma Studies in Mathematics at ETH Zurich
1987	Member of the Project Management and of the Benchmark Team for the Acquisition of a Swiss National Supercomputer
1988 – 1991	Member of the Supercomputer Committee of both ETHs
1989 – 1991	Member of the (second) Project Management for the Acquisition of a Swiss National Supercomputer
1992 – 1996	Guest Member of the Informatics Committee of ETH Zurich
1992 – 1999	Member of the Evaluation Committee for Cray Projects
1992 – 1998	Member of the Evaluation Committee for NEC Projects
1995 – 1997	Member of the Executive Steering Committee of the Cray–ETHZ J90 SuperCluster Cooperation
1996	Member of the Working Group for the Curriculum in Computational Science and Engineering at ETH Zurich
1996 – 1998	Member of the Steering Committee of the SCSC–NEC Joint Program in Software Application Port and Development
2000 – 2008	Member of the Library Committee of the D-Math of ETHZ
2000 – 2009	Member of the Office Space Committee of the D-Math of ETHZ
2001 – 2004	Member of the Committee for Graduate Studies at the D-Math of ETHZ
2002 – 2009	Member of the Computer Committee of the D-Math of ETHZ
2006, 2010	Member of the Prize Committee for the Applied Numerical Algebra Prize (China)

## Ph.D. students

1. André Kaiser, “ $L^\infty$ -Konvergenz verschiedener Verfahren der sukzessiven Konjugation zur Berechnung konformer Abbildungen”, Diss. ETH No. 8160, ETH Zurich, 1986.
2. Alejandro Amrein, “A simplified CF-approximation”, Diss. ETH No. 8183, ETH Zurich, 1986.
3. Heinz Däppen, “Die Schwarz-Christoffel-Abbildung für zweifach zusammenhängende Gebiete, mit Anwendungen”, Diss. ETH No. 8495, ETH Zurich, 1988.
4. Artan Boriçi, “Krylov subspace methods in lattice QCD”, Diss. ETH No. 11689, ETH Zurich, 1996.
5. Helga Labermeier, “Simulation and optimisation of the storage and delivery of goods with stochastic/seasonal depending demand”, Diss. ETH No. 12849, ETH Zurich, 1998.
6. Damian Loher, “Reliable nonsymmetric block Lanczos algorithms”, Diss. ETH No. 16337, ETH Zurich, 2006.

## Other Ph.D. or Habilitation thesis committees

1. Trygve Markus Hegland, “Numerische Lösung von Fredholmschen Integralgleichungen erster Art bei ungenauen Daten”, Diss. ETH No. 8553, ETH Zürich, 1988. (Advisor: Prof. J. Marti)
2. Roland Peter Haas, “Anwendung schneller Algorithmen auf gemischte Potentialprobleme der Mechanik”, Diss. ETH No. 9214, ETH Zürich, 1990. (Advisor: Prof. H. Brauchli)
3. Thomas Huckle, “Krylovraummethoden für normale Matrizen und für Toeplitzmatrizen”, Habil. Universität Würzburg, 1991.
4. Hassane Allouche, “Multivariate Newton-Padé approximants: the singular case”, Diss. Universiteit Antwerpen, 1991. (Advisor: Prof. A. Cuyt)
5. Claude Pommerell, “Solution of Large Unsymmetric Systems of Linear Equations”, Diss. ETH No. 9838, ETH Zürich, 1992. (Advisor: Prof. W. Fichtner)
6. Marie-Paule Istace, “On rational Chebyshev approximation in the complex plane”, Diss. Université Namur, 1994. (Advisor: Prof. J.-P. Thiran)
7. Bernhard Beckermann, “On the numerical condition of polynomial bases: Estimates for the condition number of Vandermonde, Krylov and Hankel matrices”, Habil. Universität Hannover, 1996.
8. Diederik R. Fokkema, “Subspace methods for linear, non-linear, and eigen problems”, Diss. Universiteit Utrecht, 1996. (Advisor: Prof. H. van der Vorst)
9. Marlis Hochbruck, “The Padé table and its relation to certain numerical algorithms”, Habil. Universität Tübingen, 1996.
10. Michèle Reifenberg, “Numerical solution of a boundary integral equation for conformal mapping by means of attenuation factors”, Diss. Université Fribourg, 1997. (Advisor: Prof. J.-P. Berrut)
11. Marc Jonin, “La décomposition polaire — Etude d’un algorithme” Diss. Université Fribourg, 1999. (Advisor: Prof. H. Rummler)
12. Olaf Schenk, “Scalable parallel sparse LU factorization methods on shared memory multiprocessors”, Diss. ETH No. 13515, ETH Zürich, 2000. (Advisor: Prof. W. Fichtner)
13. Markus Ziegler, “A stable cubically convergent GR algorithm and Krylov subspace methods for non-Hermitian eigenvalue problems”, Universität Tübingen, 2001. (Advisor: Prof. Dr. K.P. Haderler)
14. Gregor Schmidlin, “Fast solution algorithms for integral equations in  $\mathbb{R}^3$ ”, Diss. ETH No. 15016, ETH Zürich, 2003. (Advisor: Prof. Chr. Schwab)
15. Leonhard Jaschke, “Preconditioned Arnoldi methods for systems of nonlinear equations”, Diss. ETH No. 15223, ETH Zürich, 2003. (Advisor: Prof. W. Gander)
16. Stefan Karl Röllin, “Parallel iterative solvers in computational electronics”, Diss. ETH No. 15859, ETH Zürich, 2004. (Advisor: Prof. W. Fichtner)

## Organization of Conferences

1. “Symposium on Numerical Analysis and Computational Complex Analysis”, Zurich, August 15–17, 1983 (with J. Marti, H.R. Schwarz, W. Gander, and J. Waldvogel)
2. “ETH-NEC Joint Workshop on Supercomputing”, Zurich, April 25, 1991 (with R. Hütter)
3. Minisymposium on “Nonsymmetric Lanczos algorithms”, Fourth SIAM Conference on “Applied Linear Algebra”, Minneapolis, MN, USA, September 11–14, 1991
4. “Second ETH-NEC Joint Workshop on Supercomputing”, Zurich, April 24, 1992 (with R. Hütter)
5. Workshop on “Supercomputing in Science and Industry”, Monte Verità, Ascona, Switzerland, May 31 – June 6, 1992 (with R. Jeltsch)
6. “Third ETH-NEC Joint Workshop on Parallel Computing”, Zurich, April 29, 1993 (with R. Hütter)
7. Workshop on “Massively Parallel Scientific Computing”, Monte Verità, Ascona, Switzerland, March 07–11, 1994 (with R. Jeltsch and W. Gander)
8. “Householder Symposium XIII on Numerical Algebra”, Pontresina, Switzerland, June 17–21, 1996 (with W. Gander)
9. “Sixth ETH-NEC Joint Workshop on Supercomputing”, Zurich, September 12-14, 1996 (with R. Hütter)
10. Minisymposium on “Lanczos-type methods”, Sixth SIAM Conference on “Applied Linear Algebra”, Snowbird, UT, USA, October 29 – November 1, 1997
11. 25th SPEEDUP Workshop: “Trends in High-Performance Computing: Systems, Services, and User Requirements”, Cadro-Lugano, Switzerland, March 25–26, 1999
12. Workshop on “Computational Science and Engineering”, Monte Verità, Ascona, Switzerland, May 02–07, 1999 (with R. Jeltsch and W. van Gunsteren)
13. Session on “Developments and Trends in Iterative Methods for Large Systems of Equations”, 16th IMACS World Congress 2000, Lausanne, Switzerland, August 21–25, 2000 (with W. Schönauer)
14. GAMM Annual Meeting 2001, Zurich, Switzerland, February 12–15, 2001 (with R. Jeltsch and L. Kleiser)
15. Latsis–Symposium 2002 on “Iterative Solvers for Large Linear Systems”, Zurich, Switzerland, February 18–21, 2002 (with W. Gander)
16. Minisymposium on “New Approaches to Preconditioning”, ICIAM03, Sydney, Australia, July 7, 2003 (with Michele Benzi)
17. Minisymposium on “Accuracy and Effectiveness of Krylov Space Methods”, ICIAM03, Sydney, Australia, July 9, 2003
18. “6th International Congress on Industrial and Applied Mathematics (ICIAM07)”, Zurich, Switzerland, July 16–20, 2007 (with R. Jeltsch and others)
19. GAMM Workshop on “Applied and Numerical Linear Algebra with special emphasis on Preconditioning”, Zurich, Switzerland, September 10–11, 2009 (with D. Kressner)
20. Minisymposium on “Induced Dimension Reduction (IDR): a family of efficient Krylov solvers”, SIAM Conference on Applied Linear Algebra, Seaside, California, October 26–29, 2009 (with Martin van Gijzen)
21. The Third International Conference on Numerical Algebra and Scientific Computing (NASC10), Beijing (Chairs: M.H. Gutknecht and Zhong-Ci Shi; Org.: Zhong-Zhi Bai et al.)

# List of Publications

## Scientific articles

1. A priori Fehlerschranken für sukzessiv abgepaltene Polynomnullstellen. *ZAMP* **22**, 630–634 (1971).
2. A posteriori error bounds for the zeros of a polynomial. *Numer. Math.* **20**, 139–148 (1972).
3. Ein Abstiegsverfahren für gleichmässige Approximation, mit Anwendungen. Dissertation Nr. 5006, ETH Zürich, 1973.
4. Existence of a solution to the discrete Theodorsen equation for conformal mappings. *Math. Comp.* **31**, 478–480 (1977).
5. Non-strong uniqueness in real and complex Chebyshev approximation. *J. Approx. Theory* **23**, 204–213 (1978).
6. Ein Abstiegsverfahren für nicht-diskrete Tschebyscheff-Approximationsprobleme. In: *Numerische Methoden der Approximationstheorie, Band 4* (Hrsg. L. Collatz, G. Meinardus, H. Werner), 154–171. ISNM Vol. 42, Birkhäuser, Basel, 1978.
7. Fast algorithms for the conjugate periodic function. *Computing* **22**, 79–91 (1979).
8. Solving Theodorsen's integral equation for conformal maps with the fast Fourier transform. Habilitationsschrift, ETH Zürich, 1979.
9. Solving Theodorsen's integral equation for conformal maps with the fast Fourier transform and various nonlinear iterative methods. *Numer. Math.* **36**, 405–429 (1981).
10. Numerical experiments on solving Theodorsen's integral equation for conformal maps with the fast Fourier transform and various nonlinear iterative methods. *SIAM J. Scient. Stat. Comp.* **4**, 1–30 (1983).
11. Two applications of periodic splines. In: *Approximation Theory III* (E.W. Cheney, ed.), 467–472. Academic Press, New York, 1980.
12. (with Lloyd N. Trefethen) Recursive digital filter design by the Carathéodory-Fejér method. *Numer. Anal. Proj. Ms. NA-80-01*, Computer Science Dept., Stanford University, 1980.
13. (with Lloyd N. Trefethen) Real polynomial Chebyshev approximation by the Carathéodory-Fejér method. *SIAM J. Numer. Anal.* **19**, 358–371 (1982).
14. (with Lloyd N. Trefethen) The Carathéodory-Fejér method for real rational approximation. *SIAM J. Numer. Anal.* **20**, 420–436 (1983).
15. Listen der Publikationen und Doktoranden von Heinz Rutishauser. Research Report 82-01, Seminar f. Angew. Math., ETH Zürich, 1982.
16. (with Stephen W. Ellacott) The polynomial Carathéodory-Fejér approximation method for Jordan regions. *IMA J. Numer. Anal.* **3**, 207–220 (1983).
17. (with Stephen W. Ellacott) The Carathéodory-Fejér extension of a finite geometric series. *IMA J. Numer. Anal.* **3**, 221–227 (1983).

18. Rational Carathéodory-Fejér approximation on a disk, a circle, and an interval. *J. Approx. Theory* **41**, 257–278 (1984).
19. On the computation of the conjugate trigonometric rational function and on a related splitting problem. *SIAM J. Numer. Anal.* **20**, 1198–1205 (1983).
20. (with Julius O. Smith and Lloyd N. Trefethen) The Carathéodory-Fejér method for recursive digital filter design. *IEEE Trans. Acoust., Speech, Signal Processing ASSP-31*, 1417–1426 (1983).
21. On complex rational approximation. In: *Computational Aspects of Complex Analysis* (H. Werner, L. Wuytack, E. Ng, H.J. Bünger, eds.), 79–101 (Part I), 103–132 (Part II). D. Reidel Publ. Co., Dordrecht, Netherlands, 1983.
22. (with Lloyd N. Trefethen) Nonuniqueness of best rational Chebyshev approximations on the unit disk. *J. Approx. Theory* **39**, 275–288 (1983).
23. (with Lloyd N. Trefethen) Real vs. complex rational Chebyshev approximation on an interval. *Trans. Amer. Math. Soc.* **280**, 555–561 (1983).
24. (with Lloyd N. Trefethen) Real and complex Chebyshev approximation on the unit disk and interval. *Bull. Amer. Math. Soc.* **8**, 455–458 (1983).
25. Algebraically solvable Chebyshev approximation problems. In: *Approximation Theory IV* (C.K. Chui, L.L. Schumaker, J.D. Ward, eds.), 491–498. Academic Press, New York, 1983.
26. (with Lloyd N. Trefethen) On convergence and degeneracy in rational Padé and Chebyshev approximation. *SIAM J. Math. Anal.* **16**, 198–210 (1985).
27. (with Lloyd N. Trefethen) Real vs. complex rational Chebyshev approximation on complex domains. In: *Numerische Methoden der Approximationstheorie, Band 7* (Hrsg. L. Collatz, G. Meinardus, H. Werner), 87–97. ISNM Vol. 67, Birkhäuser, Basel, 1984.
28. Numerical conformal mapping methods based on function conjugation. *J. Comput. Appl. Math.* **14**, 31–77 (1986).
29. Hankel norm approximation of power spectra. In: *Computational and Combinatorial Methods in Systems Theory* (C.I. Byrnes and A. Lindquist, eds.), 315–326. North-Holland/Elsevier Science Publ., Amsterdam/New York, 1986.
30. (with André Kaiser) Iterative k-step methods for computing possibly repulsive fixed points in Banach spaces. *J. Math. Anal. Applics.* **125**, 104–122 (1987).
31. (with Wilhelm Niethammer and Richard S. Varga) k-step iterative methods for solving nonlinear systems of equations. *Numer. Math.* **48**, 699–712 (1986).
32. The evaluation of the conjugate function of a periodic spline on a uniform mesh. *J. Comput. Appl. Math.* **16**, 181–201 (1986).
33. (with Edward B. Saff) A de Montessus type theorem for CF approximation. *J. Comput. Appl. Math.* **16**, 251–254 (1986).
34. (with Lloyd N. Trefethen) Padé, stable Padé, and Chebyshev-Padé approximation. In: *Algorithms for Approximation* (J.C. Mason and M.G. Cox, eds.), 227–264. IMA Conf. Series, new series, Vol. 10, Clarendon Press, Oxford, 1987.



35. An iterative method for solving linear equations based on minimum norm Pick-Nevalinna interpolation. In: Approximation Theory V (C.K. Chui, L.L. Schumaker, J.D. Ward, eds.), 371–374. Academic Press, New York, 1986.
36. Attenuation factors in multivariate Fourier analysis. *Numer. Math.* **51**, 615–629 (1987).
37. The pioneer days of scientific computing in Switzerland. In: A History of Scientific Computing (S.G. Nash, ed.), 301–313. ACM Press, New York, and Addison-Wesley, Reading, Mass., 1990.
38. (with Eric Hayashi and Lloyd N. Trefethen) The CF table. *Constr. Approx.* **6**, 195–223 (1990).
39. The rational interpolation problem revisited. *Rocky Mountain J. Math.* **21**, 263–280 (1991).
40. Stationary and almost stationary iterative  $(k, l)$ -step methods for linear and nonlinear systems of equations. *Numer. Math.* **56**, 179–213 (1989).
41. Continued fractions associated with the Newton-Padé table. *Numer. Math.* **56**, 547–589 (1989).
42. Iterative methods for linear systems of equations designed via complex rational approximation. In: Approximation Theory VI, Vol. I, (C.K. Chui, L.L. Schumaker, J.D. Ward, eds.), 315–318. Academic Press, New York, 1989.
43. In what sense is the rational interpolation problem well posed? *Constr. Approx.* **6**, 437–450 (1990).
44. (with Gene H. Golub) Modified moments for indefinite weight functions. *Numer. Math.* **57**, 607–624 (1990).
45. A completed theory of the unsymmetric Lanczos process and related algorithms, Part I. *SIAM J. Matrix Anal. Appl.* **13**, 594–639 (1992).
46. A completed theory of the unsymmetric Lanczos process and related algorithms, Part II. *SIAM J. Matrix Anal. Appl.* **15**, 15–58 (1994).
47. The unsymmetric Lanczos algorithms and their relations to Padé approximation, continued fractions, and the qd algorithm. Preliminary Proc. Copper Mountain Conference on Iterative Methods, 1990.
48. (with Daniel L. Boley, Sylvan Elhay, and Gene H. Golub) Nonsymmetric Lanczos and finding orthogonal polynomials associated with indefinite weights. *Numerical Algorithms* **1**, 21–43 (1991).
49. On certain types of  $(k, l)$ -step methods for solving linear systems of equations. In: Iterative Methods in Linear Algebra (R. Beauwens and P. de Groen, eds.), 373–380, Elsevier (North-Holland), Amsterdam, 1992.
50. (with Roland W. Freund and Noël M. Nachtigal) An implementation of the look-ahead Lanczos algorithm for non-Hermitian matrices. *SIAM J. Sci. Comput.* **14**, 137–158 (1993). [Extended version: RIACS Tech. Rep. 90.45, Nov. 1990.]
51. Variants of BiCGStab for matrices with complex spectrum. *SIAM J. Scient. Comput.* **14**, 1020–1033 (1993).

52. Changing the norm in conjugate gradient type algorithms. *SIAM J. Numer. Anal.* **30**, 40–56 (1993).
53. Block structure and recursiveness in rational interpolation. In: *Approximation Theory VII* (E.W. Cheney, C.K. Chui, L.L. Schumaker, eds.), 93–130, Academic Press, Boston, 1993.
54. Stable row recurrences for the Padé table and a generically superfast lookahead solver for non-Hermitian Toeplitz systems. *Linear Algebra Appl.* **188/189**, 351–421 (1993).
55. (with Steven F. Ashby) A matrix analysis of conjugate gradient algorithms. In: *Advances in Numerical Methods for Large Sparse Sets of Linear Systems, Parallel Processing for Scientific Computing* (M. Natori and T. Nodera, eds.), No. 9, 32–47, Keio University, 1993.
56. (with Marlis Hochbruck) Look-ahead Levinson and Schur algorithms for non-Hermitian Toeplitz systems. *Numer. Math.* **70**, 181–227 (1995).
57. (with Stan Cabay and Ron Meleshko) Stable rational interpolation? In: *Systems and Networks: Mathematical Theory and Applications* (U. Helmke, R. Menniken, J. Saurer, eds.), *Proceedings of the International Symposium MTNS '93, Regensburg, Germany, Vol. 2*, pp. 631–634, Akademie-Verlag, Berlin, 1994.
58. (with Marlis Hochbruck) The stability of inversion formulas for Toeplitz matrices. *Linear Algebra Appl.* **223/224**, 307–324 (1995).
59. The multipoint Padé table and general recurrences for rational interpolation. *Acta Appl. Math.* **33**, 165–194 (1993). Reprinted in: *Nonlinear Numerical Methods and Rational Approximation II* (A. Cuyt, ed.), 109–136, Kluwer, Dordrecht, The Netherlands, 1994.
60. (with William B. Gragg) Weakly stable look-ahead versions of the Euclidean and Chebyshev algorithms. In: *Approximation and Computation* (R.V.M. Zahar, ed.), 231–260, ISNM 119, Birkhäuser Verlag, Basel-Boston-Berlin, 1994.
61. The Lanczos process and Padé approximation. In: *Proceedings Cornelius Lanczos International Centenary Conference*, (J.D. Brown et al., eds.), 61–75, SIAM, Philadelphia, 1994.
62. (with Marlis Hochbruck) Look-ahead Levinson- and Schur-type recurrences in the Padé table. *Electronic Trans. Numer. Anal.* **2**, 104–129 (1994).
63. (with Marlis Hochbruck) Optimized look-ahead recurrences for adjacent rows in the Padé table. *BIT* **36**, 264–286, 1996.
64. (with Klaus J. Ressel) Look-ahead procedures for Lanczos-type product methods based on three-term Lanczos recurrences. *SIAM J. Matrix Anal. Appl.* **21**, 1051–1078 (2000).
65. (with Klaus J. Ressel) QMR-smoothing for Lanczos-type product methods based on three-term recurrences. *SIAM J. Sci. Comp.* **19**, 55–73 (1998).
66. Lanczos-type solvers for nonsymmetric linear systems of equations. *Acta Numerica* **6**, 271–397 (1997).

67. (with Zdenek Strakoš) Accuracy of two three-term and three two-term recurrences for Krylov space solvers. *SIAM J. Matrix Anal. Appl.* **22**, 213–229 (2000).
68. Theodorsen’s integral equation. In: *Encyclopaedia of Mathematics, Supplement III* (M. Hazewinkel, ed.) 401–402, Kluwer Academic Publishers, 2002, Dordrecht, The Netherlands.
69. (with Miroslav Rozložník) Residual smoothing techniques: do they improve the limiting accuracy of iterative solvers? *BIT* **41**, 86–114 (2001).
70. On Lanczos-type methods for Wilson fermions. In: *Numerical Challenges in Lattice Quantum Chromodynamics. Proceedings of the Interdisciplinary Workshop on Numerical Challenges in Lattice QCD, Wuppertal, August 22–24, 1999* (A. Frommer, Th. Lippert, B. Medeke, K. Schilling, eds.) 48–65; *Lecture Notes in Computational Science and Engineering (LNCSE)*, Vol. 15, Springer, Berlin, 2000.
71. A matrix interpretation of the extended Euclidean algorithm. In: *Structured Matrices in Mathematics, Computer Science, and Engineering, Vol. 1* (V. Olshevsky, ed.) 53–70, *Contemporary Mathematics*, Vol. 280, American Mathematical Society, 2001.
72. (with Miroslav Rozložník) By how much can residual minimization accelerate the convergence of orthogonal residual methods? *Numerical Algorithms* **27**, 189–213 (2001).
73. (with Stefan Röllin) The Chebyshev iteration revisited. *Parallel Comput.* **28**, 263–283 (2002).
74. (with Stefan Röllin) Variations of Zhang’s Lanczos-Type Product Method. *Appl. Numer. Math.* **41**, 119–133 (2002).
75. (with Miroslav Rozložník) A framework for generalized conjugate gradient methods — with special emphasis on contributions by Rüdiger Weiss. *Appl. Numer. Math.* **41**, 7–22 (2002).
76. (with Thomas Schmelzer) A QR-decomposition of block tridiagonal matrices generated by the block Lanczos process. In: *Proceedings of the 17th IMACS World Congress, Paris, 2005* (P. Borne, M. Benrejeb, N. Dangoumau, and L. Lorimier, eds.) 1–8 Ecole Central de Lille, Villeneuve d’Ascq, France (ISBN 2-915913-02-1; CD only), July 2005.
77. Block Krylov space methods for linear systems with multiple right-hand sides: an introduction. In: *Modern Mathematical Models, Methods and Algorithms for Real World Systems* (A.H. Siddiqi, I.S. Duff, and O. Christensen, eds.), 420–447, Anamaya Publishers, New Delhi, India, 2007.
78. (with Thomas Schmelzer) Updating the QR decomposition of block tridiagonal and block Hessenberg matrices. *Appl. Numer. Math.* **58**, 871–883 (2008), avail. online 29 Apr. 2007.
79. A brief introduction to Krylov space methods for solving linear systems. In: *Frontiers of Computational Science — Proceedings of the International Symposium on Frontiers of Computational Science 2005* (Y. Kaneda, H. Kawamura, and M. Sasai, eds.), 53–62, Springer-Verlag, Berlin Heidelberg, Mar. 2007.

80. (with Thomas Schmelzer) The block grade of a block Krylov space. *Linear Algebra Appl.* **430**, 174–185 (2009), avail. online 30 Aug. 2008.
81. (with Pavel Jiránek and Miroslav Rozložník) How to make Simpler GMRES and GCR more stable. *SIAM J. Matrix Anal. Appl.* **30**, 1483–1499 (2008).
82. IDR explained. *Electronic Trans. Numer. Anal.* **36**, 126–148 (2010).
83. (with Beresford N. Parlett) From qd to LR, or, how were the qd and LR algorithms discovered? *IMA J. Numer. Anal.* **31**, 741–754 (2011); published online May 27, 2010.
84. (with Jens-Peter M. Zemke) Eigenvalue computations based on IDR. *SIAM J. Matrix Anal. Appl.* **34**, 283–311 (2013).  
(*Extended version*: Research Report No. 2010-13, SAM, ETH Zurich & Bericht Nr. 145, INS, TU Hamburg-Harburg; published online May 4, 2010.)
85. Spectral deflation in Krylov solvers: A theory of coordinate space based methods. *Electronic Trans. Numer. Anal.* **39**, 156–185 (2012).
86. (with André Gaul, Jörg Liesen and Reinhard Nabben) A framework for deflated and augmented Krylov subspace methods. *SIAM J. Matrix Anal. Appl.* **34**, 495–518 (2013).  
(*Revision of*: Deflated and augmented Krylov subspace methods: Basic facts and a breakdown-free deflated MINRES. Preprint 759, DFG Research Center MATHEON, TU Berlin, Jan 2011.)
87. Deflated and augmented Krylov subspace methods: A framework for deflated BiCG and related solvers. *SIAM J. Matrix Anal. Appl.* **35**, 1444–1466 (2014).  
*DOI:10.1137/130923087*
88. Revisiting  $(k, \ell)$ -step methods. *Numerical Algorithms* **69**, 455–469 (electr. 2014, paper 2015).  
*DOI: 10.1007/s11075-014-9906-0.*

## Extended Abstracts

1. A completed theory of the unsymmetric Lanczos process and related algorithms. Extended abstract, Householder Symposium XI on Numerical Algebra, Tylösand, Sweden, 1990.
2. A weakly stable, generically superfast algorithm for non-Hermitian Toeplitz systems. Householder Symposium XII on Numerical Algebra, Lake Arrowhead, CA, USA, 1993.
3. (with Klaus J. Ressel) Look-ahead procedures for Lanczos-type product methods based on three-term recurrences. Extended abstract, Copper Mountain Conference on Iterative Methods, Copper Mtn., CO, USA, 1996.
4. (with Klaus J. Ressel) Look-ahead procedures for Lanczos-type product methods based on three-term recurrences. Extended abstract, Householder Symposium XII on Numerical Algebra, Pontresina, Switzerland, 1996.
5. (with Klaus J. Ressel) Attempts to improve the accuracy of the Lanczos and Lanczos-type methods for solving linear systems. Extended abstract, Householder Symposium XII on Numerical Algebra, Pontresina, Switzerland, 1996.

6. Improving accuracy and efficiency of Lanczos-type solvers for nonsymmetric linear systems of equations. Project description, CSCS Annual Report 1998, pp. 24–27, Centro Svizzero di Calcolo Scientifico, Manno, 1999.
7. Conquering roundoff effects in the biconjugate gradient and related methods. Extended abstract, International RIKEN Symposium on Linear Algebra and its Applications, Tokyo, Japan, 1999.
8. (with Damian Loher) Preconditioning by similarity transformations: another valid option? Extended abstract, International RIKEN Symposium on Linear Algebra and its Applications, Tokyo, Japan, 1999.
9. Trends in Iterative Methods and Preconditioning—a Brief Overview. Proceedings of the 16th IMACS World Congress, 2000.
10. (with Stefan Röllin) Variations of Zhang’s Lanczos-Type Product Method. Proceedings of the 16th IMACS World Congress, 2000.
11. Revisiting  $(k, \ell)$ -step methods. Proceedings of the 2nd International Kyoto Forum on Krylov Subspace Methods, 2010.

### Popular science articles, historical notes, obituaries

- (1) (with U. Kirchgraber, J. Marti) In memoriam Prof. Dr. P. Henrici. ZAMP **38**, No. 3, i–ii (1987).
- (2) Als wären’s 10’000 Personalcomputer. Finanz und Wirtschaft, Magazin “Informatik 88”, 28. Sept. 1988.
- (3) The pioneer days of scientific computing in Switzerland. IPS Windows, No. 2, 23–27 (1991), and Crosscuts, **2**, No. 3, 14–17 (1993).
- (4) Henrici, Peter (1923–1987). Historisches Lexikon der Schweiz, Band 6, Verlag Schwabe, Basel, 2007.  
<http://www.hls-dhs-dss.ch/textes/d/D43121.php>
- (5) Preface (with a short biography and a bibliography of Rüdiger Weiss), Appl. Numer. Math. **41**, 1–6 (2002).
- (6) Numerical Analysis in Zurich — 50 years ago. Zurich Intelligencer, 10–15, Springer-Verlag, July 2007.
- (7) (with Rolf Jeltsch and Thomas Rösigen) Bericht über die Jahrestagung der GAMM 2007. GAMM Rundbrief 2/2007
- (8) Numerical Analysis in Zurich — 50 years ago. In: [math.ch/100](http://math.ch/100) — Schweizerische Mathematische Gesellschaft, Société Mathématique Suisse, Swiss Mathematical Society 1910–2010 (eds. Bruno Colbois, Christine Riedtmann, Viktor Schroeder), European Mathematical Society, Zurich, 2010, pp. 279–290. (*Slightly revised version of the 2007 article [out of print] with the same title.*)

## Lecture Notes

- (1) Lineare Algebra — Studiengang Informatik, personal web site, 2001–2007.
- (2) Iterative Methods, personal web site, 2004–2006.
- (3) (with P. Arbenz, O. Chinellato and M. Sala) Software for Numerical Linear Algebra, ETH Lecture Notes, Jul. 2006

## Books edited

- (1) H. Rutishauser: Vorlesungen über numerische Mathematik (2 Vols.), posthumous edition by M. Gutknecht, in cooperation with P. Henrici, P. Läuchli, and H.R. Schwarz. Birkhäuser, Basel, 1976. (English translation by W. Gautschi: Birkhäuser, Basel, 1990.)
- (2) Developments and Trends in Iterative Methods for Large Systems of Equations — in memoriam Rüdiger Weiss (W. Schönauer and M.H. Gutknecht, eds.), Special Issue, Appl. Numer. Math. **41**, No. 1 (April 2002), 245 pages.
- (3) Numerical Algorithms, Parallelism and Applications (M.H. Gutknecht, E.J. Kontoghiorghes, and V. Simoncini, eds.), Special Issue, Appl. Numer. Math. **49**, No. 1 (April 2004), 133 pages.

## Talks at Universities and Research Centers

- U Kentucky at Lexington (22.3.76)
- FU Berlin (8.12.77)
- U Fribourg (13.2.79)
- Stanford U (12.5.80)
- EPF Lausanne (17.12.82)
- U Bonn (17.5.83)
- TH Aachen (18.5.83)
- U Bielefeld (8.6.83)
- U Mannheim (29.11.83)
- U Eichstätt (30.11.83)
- Kent State U (17.10.85)
- IBM Yorktown (29.10.85)
- U North Carolina at Chapel Hill (22.11.85)
- Courant Institute, New York U (14.2.86)
- U South Florida at Tampa (5.3.86)
- U Zürich (18.12.86)
- U Göttingen (7.7.87)
- U Hamburg (9.7.87)
- Kent State U (29.6.88)
- U Zürich (8.11.88)
- U Basel (7.12.88)
- U Pretoria (20.7.89)
- U Cape Town (28.7.89)
- U Fribourg (16.1.90)
- CSRD, U Illinois Urbana-Champaign (27.3.90)
- U Antwerp (4.7.91)
- Lawrence Livermore National Laboratory (9.9.91)
- Northern Illinois U (16.9.91)
- IMA, U Minnesota (12.3.92)
- TU Dresden (12.5.92)
- U Rostock (13.5.92)
- AT&T Bell Laboratories (20.10.92)
- Courant Institute, New York U (10.12.93)
- U Namur (22.4.94)
- U Colorado at Boulder (15.4.96)
- Academy of Sciences, Prague (24.6.97)
- Keio U, Yokohama (12.12.97)
- U Pavia (4.3.98)
- Chinese Acad. of Sciences Beijing (31.7.98)
- Emory U, Atlanta (23.10.98)
- Chalmers U of Technology, Göteborg (27./28.10.98)
- Linköping U (29.10.98)
- Keio U, Yokohama (25.11.99)
- Australian National U, Canberra (29.11.99)
- Australian National U, Canberra (26.3.01)
- U Queensland, Brisbane (12.4.01)
- U Adelaide (23.4.2001)
- Massey U, Auckland (26./27.4.01)
- Oxford U (23.8.05)
- Keio U, Yokohama (7.12.05)
- Nagoya U (8.12.05)
- LSEC, ICMSEC, Chinese Academy of Sciences, Beijing (21.9.06)
- Tsinghua U, Beijing (22.9.06)
- Jiao Tong U, Shanghai (17.10.06)
- Fudan U, Shanghai (19.10.06)
- Purdue U, West Lafayette, IN (14.10.08)
- TU Berlin (16.12.08)
- Weierstrass Institute, Berlin (12.01.09)
- TU Bergakademie Freiberg (16.01.09)
- TU Chemnitz (20.01.09)
- TU Hamburg-Harburg (28.01.09)
- Hong Kong Baptist U (15.01.10)
- Gifu Shotoku U, Gifu (16.03.10)
- TU Berlin (04.05.10)
- TU Berlin (06.05.10)
- U Mainz (20.05.10)
- Shanghai Jiao Tong U (14.10.10)
- U Fribourg (10.5.11)
- TU Hamburg-Harburg (14.3.12)
- Karlsruhe Institute of Technology (KIT) (31.05.12)
- Hong Kong Baptist U (18.04.19)
- Lanzhou U (23.04.19)
- Nanjing U (25.04.19)

## Invited/Plenary Talks at Conferences

- Conferences on Numerical Methods in Approximation Theory, Oberwolfach, Germany (June 1973, Nov. 1977, Jan. 1981, Mar. 1983, Oct. 1986)
- Conferences on Constructive Methods in Complex Analysis, Oberwolfach, Germany (Aug. 1978, July 1980, Aug. 1983, Aug. 1987, Feb. 1991, Mar. 1995)
- NATO Advanced Study Institute on Computational Aspects of Complex Analysis, Braunlage, Germany (July/Aug. 1982)
- Conference on Rational Approximation and Interpolation, Tampa, Florida (Dec. 1983)
- International Conference on Numerical Analysis, Munich, Germany (Mar. 1984)
- International Conference on Computational and Applied Mathematics, Leuven, Belgium (July 1984)
- Symposium on Delay Equations, Approximation and Application, Mannheim, Germany (Oct. 1984)
- 7th International Symposium on the Mathematical Theory of Networks and Systems, Stockholm, Sweden (June 1985)
- SIAM Eastern Ohio/Western Pennsylvania Section Meeting, Pittsburgh, Pennsylvania (Oct. 1985)
- Felix-Klein-Kolloquium, Düsseldorf, Germany (May 1986)
- Conference on Nonlinear Numerical Methods and Rational Approximation, Antwerp, Belgium (Apr. 1987)
- ACM Conference on the History of Scientific and Numeric Computation, Princeton, New Jersey (May 1987)
- Conference on Numerical Linear Algebra and Parallel Computation, Oberwolfach, Germany (Feb./March 1988)
- US/Norway Joint Seminar on Padé Approximants and Related Topics, Boulder, Colorado (June 1988)
- Parallel Computing in Optimization, Murten, Switzerland (Sep. 1988)
- Symposium on Computational Aspects of Complex Analysis, Phoenix Joint Mathematics Meeting, Phoenix, Arizona (Jan. 1989)
- Conference on Approximation Theory and Linear Algebra, Kent, Ohio (Mar.-Apr. 1989)
- Fifteenth South African Symposium on Numerical Mathematics, Umhlanga Rocks (July 1989)
- Copper Mountain Conference on Iterative Methods, Copper Mountain, CO (April 1990)
- Householder Symposium XI, Tylösand, Sweden (June 1990)
- Conference on Numerical Linear Algebra, Oberwolfach, Germany (April 1991, April 1994, April 1997)
- Seventh International Symposium on Approximation Theory, Austin, TX (Jan. 1992)
- Workshop on Iterative Methods for Nonsymmetric Problems, Austin, TX (Jan. 1992)



- International Congress on Extrapolation and Rational Approximation, Tenerife, Canary Islands (Jan. 1992)
- Workshop on Iterative Methods for Sparse and Structured Problems, Minneapolis (Feb. 1992)
- Conference on Numerical Analysis and Scientific Computing, Kent, Ohio (Mar. 1992)
- Householder Symposium XII, Lake Arrowhead, CA (June 1993)
- Conference on Nonlinear Numerical Methods and Rational Approximation, Antwerp, Belgium (Sep. 1993)
- International Symposium on Special Functions, Approximation, Numerical Quadrature and Orthogonal Polynomials, West Lafayette, IN (Dec. 1993)
- Lanczos Centenary Conference, Raleigh, NC (Dec. 1993)
- Conference on Numerical Linear Algebra with Applications, Oberwolfach, Germany (April 1994)
- Conference on Orthogonal Polynomials and Numerical Analysis, Luminy, France (Sep. 1994)
- Conference on Iterative Methods for Solving Systems of Linear Equations, Namur, Belgium (May 1995)
- Swiss Numerical Analysis Day '97, Geneva (Mar. 1997)
- Czech-U.S. Workshop on Iterative Methods and Parallel Computing (IMPC '97), Milovy, Czech Republic (June 1997)
- Conference on Applications and Computation of Orthogonal Polynomials, Oberwolfach, Germany (Mar. 1998)
- International Symposium on Theory and Algorithms for Large Scale Matrix Problems, Dalian, China (Aug. 1998)
- Interdisciplinary Workshop on Numerical Challenges in Lattice QCD, Wuppertal, Germany (Aug. 1999)
- EMS/WiR Summer School Numerical Simulation of Flows, Heidelberg (1999)
- International RIKEN Symposium on Linear Algebra and its Applications, RIKEN, Tokyo, Japan (Nov. 1999)
- Session on “Developments and Trends in Iterative Methods for Large Systems of Equations” at 16th IMACS World Congress 2000, Lausanne, Switzerland (Aug. 2000)
- Minisymposium on “Recent Advances in Krylov Subspace Methods” at First SIAM-EMS Conference, Berlin, Germany (Sep. 2001)
- GAMM Workshop on “Numerical Linear Algebra with Special Emphasis on Numerical Methods for Structured and Random Matrices”, Berlin, Germany (Sep. 2001)
- Conference on Computational Linear Algebra with Applications, Milovy, Czech Republic (Aug. 2002)
- Workshop on Contemporary Computational Mathematics, Canberra, Australia (Jul. 2003)
- International Summer School on Numerical Linear Algebra and Its Applications, Monopoli, Italy (Sep. 2003)
- International Workshop on Numerical Linear Algebra and Its Applications, Monopoli, Italy (Sep. 2003)

- Dagstuhl Seminar on Theoretical and Computational Aspects of Matrix Algorithms, Dagstuhl, Germany (Oct. 2003)
- International Conference on Industrial and Applied Mathematics (Biannual Indian SIAM Meeting), New Delhi, India (Dec. 2004)
- Joint Workshop on Computational Chemistry and Numerical Analysis (CCNA2005), Akihabara, Tokyo, Japan (Dec. 2005)
- International Symposium on Frontiers of Computational Science (FCS 2005), Nagoya, Japan (Dec. 2005)
- First International Conference on Numerical Algebra and Scientific Computing (NASC06), Beijing (Oct. 2006)
- Gene Golub Around the World Commemoration, Leuven, Belgium (Feb. 2008)
- RSV80: Conference on the Occasion of Richard Varga’s 80th Birthday, Kent, OH, USA (Oct. 2008)
- Workshop “IDR and block Lanczos solvers for large nonsymmetric systems”, TU Delft, The Netherlands (June 2009)
- Minisymposium “The QR Algorithm: 50 Years later, its Genesis by John Francis, and Subsequent Developments”, 23rd Biennial Conference on Numerical Analysis, Glasgow, Scotland (June 2009)
- Autumn School “Future Developments in Model Order Reduction”, Terschelling, The Netherlands (Sep. 2009)
- 3rd International Conference on Structured Matrices and Tensors, Hong Kong, China (Jan. 2010)
- 2nd Kyoto Forum 2010 on Krylov Subspace Methods, Kyoto University, Kyoto, Japan (Mar. 2010)
- Workshop on “Sparse Matrix Solvers and Preconditioning”, Keio University, Hiyoshi, Yokohama, Japan (Mar. 2010)
- The Third International Conference on Numerical Algebra and Scientific Computing (NASC10), Beijing (Oct. 2010)
- SAMHYP2011: Numerical Methods for Hyperbolic Equations — Recent Trends and Future Directions, Zurich, Switzerland (Feb. 2011)
- Advances in Model Order Reduction (AMR11), Manchester, UK (Jul. 2011)
- Gene Golub Memorial Day 2019 — International Workshop on Matrix Computations, Lanzhou, P.R. China (Apr. 2019)

## Courses Taught

- Numerische Mathematik I (ETHZ; SS 1973–75)
- Numerisches Praktikum (ETHZ; WS 1974/75)
- Numerische Mathematik (U Basel; WS 1974/75)
- ALGOL-Kurs (U Basel; WS 1974/75)
- Numerische Praktikum (U Basel; WS 1974/75)
- Numerik und Programmieren I+II (ETHZ; 1977/78, 1978/79, 1980/81 – 1984/85)
- Numerik-Software an der ETHZ (ETHZ; SS 1981)
- Theorie und Numerik der Approximation (ETHZ; WS 1981/82)
- Symmetrische Eigenwertprobleme (ETHZ; WS 1982/83)
- Padé-Approximation (ETHZ; WS 1983/84)
- Lineare Algebra (ETHZ; WS 1984/85)
- Numerische Mathematik für Ingenieure (ETHZ; SS 1985, 1987)
- Numerische Methoden (für Math./Phys.) (ETHZ; SS 1986, 1988)
- Rationale Interpolation (ETHZ; SS 1986)
- Numerik (für Naturwissenschaftler) (ETHZ; WS 1986/87, 1987/88)
- Vektorrechner-Algorithmen für lineare Gleichungssysteme (ETHZ; WS 86/87)
- Vektorrechner-Algorithmen (ETHZ; WS 1987/88)
- Analysis III+IV (für Elektroing. und Informatiker) (ETHZ; 1988/89)
- Analysis I+II (für Elektroing.) (ETHZ; 1989/90)
- Lanczos-Algorithmen für nicht-symmetrische Matrizen (ETHZ; SS 1991)
- Schnelle Hankel- und Toeplitz-Löser (ETHZ; SS 1992)
- Padé-Approximation und rationale Interpolation (ETHZ; WS 1992/93)
- Lanczos-Algorithmen für nicht-symmetrische Matrizen (ETHZ; SS 1993)
- Theorie und Numerik partieller Differentialgleichungen (Rand- und Eigenwertprobleme) (ETHZ; WS 1993/94)
- Theorie und Numerik partieller Differentialgleichungen Anfangswertaufgaben) (ETHZ; SS 1994)
- Iterative Methoden (ETHZ; WS 1995/96)
- Ausgewählte Kapitel der Numerischen Mathematik (U Fribourg; WS+SS 1995/6)
- Numerische Methoden der linearen Algebra (U Fribourg; WS+SS 1996/7)
- Iterative Methoden (ETHZ; SS 1998)

- Vorkonditionierung (ETHZ; WS 1998/99)
- Lanczos-Algorithmen für nicht-symmetrische Matrizen (ETHZ; SS 1999)
- Introduction à l'analyse numérique (U Fribourg; SS 1999)
- Algebra I (für Informatiker) (ETHZ; WS 1999/2000)
- Algebraisches Multigrid (ETHZ; SS 2000)
- Algebra I (für Informatiker) (ETHZ; WS 2000/2001)
- Iterative Methoden (ETHZ; SS 2001)
- Algebra I (für Informatiker) (ETHZ; WS 2001/2002)
- Preconditioning (ETHZ; SS 2002)
- Algebra I (für Informatiker) (ETHZ; WS 2002/2003)
- Software for Numerical Linear Algebra [with W. Gander, B.N. Parlett] (ETHZ; SS 2003)
- Lineare Algebra (für Informatiker) [mit W. Gander] (ETHZ; WS 2003/2004)
- Numerische Mathematik II (für Mathematiker) (ETHZ; WS 2003/2004)
- Software for Numerical Linear Algebra [with W. Gander, B.N. Parlett] (ETHZ; SS 2004)
- Lineare Algebra (für Informatiker) [mit W. Gander] (ETHZ; WS 2004/2005)
- Numerische Mathematik (für Mathematiker) (ETHZ; SS 2005)
- Software for Numerical Linear Algebra [with W. Gander] (ETHZ; SS 2005)
- Lineare Algebra (für Informatiker) [mit W. Gander] (ETHZ; WS 2005/2006)
- Numerische Mathematik (für Mathematiker) (ETHZ; SS 2006)
- Software for Numerical Linear Algebra [with P. Arbenz, O. Chinellato] (ETH Z; SS 2006)
- Lineare Algebra (für Informatiker) [mit W. Gander] (ETHZ; WS 2006/2007)
- Numerische Methoden (für Elektroingenieure und Materialwissenschaftler) (ETHZ; SS07)
- Lineare Algebra (für Informatiker) [mit W. Gander] (ETHZ; HS 2007)
- Software for Numerical Linear Algebra [with W. Gander] (ETHZ; FS 2008)
- Theory and Numerics of Model Reduction [with D. Kressner] (ETHZ; FS 2009)
- Numerische Mathematik (für Maschineningenieure) [mit K. Nipp] (ETHZ; FS 2011)

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