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CURRICULUM VITÆ

Lothar Reichel

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RESEARCH INTERESTS

Numerical Analysis/Scientific Computing, and in particular:

- Ill-posed problems.
- Orthogonal polynomials and quadrature, applications in linear algebra, signal and image processing.
- Large-scale eigenvalue problems, applications to path following.
- Iterative methods for large linear systems of equations.
- Structured problems in linear algebra and applications.
- Matrix functions, applications to network analysis.

EDUCATION

Ph. D. (fil. dr.), Numerical Analysis/Computer Science, University of Stockholm, Sweden, 1982.

B. Sc. (fil. kand.), University of Lund, Sweden, 1974.

EMPLOYMENT

Professor, Department of Mathematical Sciences, Kent State University, Kent, OH, 2001–present.

Professor, Department of Mathematics and Computer Science, Kent State University, Kent, OH, 1991–2001.

Professor, Department of Mathematics, University of Kentucky, Lexington, KY, 1991–92.

Associate Professor, Department of Mathematics, University of Kentucky, Lexington, KY, 1988–91.

Assistant Professor, Department of Mathematics, University of Kentucky, Lexington, KY, 1983–88.

Lecturer, Department of Numerical Analysis and Computer Science, Royal Institute of Technology, Stockholm, Sweden, 1982.

Assistant, Department of Numerical Analysis and Computer Science, Royal Institute of Technology, Stockholm, Sweden, 1975–81.

AWARDS AND HONORS

Among the 2% most-cited scientists in the world based on a recently updated study published by Stanford University scholars. The report is based on the Oct. 1, 2023, snapshot from Scopus, updated to end of citation year 2022. Scopus is an abstract and indexing database produced by the Elsevier Co. The top 2% includes the top 100,000 most cited scientists as determined by a composite citation score or "c-score" focusing on the impact of the citations rather than the productivity (number of publications).

Among the top 2% most cited scientists in list compiled at Stanford University, 2020.

Chercheur en Mathématique, Centre National de la Recherche Scientifique, France, fall 2012.

Chair of Excellence, University Carlos III of Madrid, Madrid, Spain, 2010-2011.

Senior Research Associateship, National Research Council, 1991.

Scholarship, Swedish Institute and Mathematisches Forschungsinstitut, ETH, Zürich, 1983-84.

Scholarship, Sweden-America Foundation and Mathematics Research Center, University of Wisconsin, Madison, WI, 1982-83.

RESEARCH GRANTS

NSF Grant DMS-1720259, 2017-2021: Collaborative Research: Matrix Functions and Networks, $ 150,000

NSF Grant DMS-1729509, 2017-2020: DMREF: Collaborative Research: Materials Engineering of Columnar and Living Liquid Crystals via Experimental Characterization, Mathematical Modelling and Simulations, $ $5 \cdot 10^5$

NSF Grant DMS-1115385, 2011-15: Matrix Functions, Rational Approximation, and Quadrature with Applications, $ 180,000

OBR Research Challenge Grant, 2011-12: Transmission-through-dye Microscopy as a Tool for Apoptosis Research, $ 35,000

NIH Grant 1R15GM186816-01A1, 2009-2011: Quantitative Imaging of Cell Surface Topography Using Strongly Absorbing Media, $ 273,300

NSF Grant DMS-0821071, 2008: SCREMS: High Performance Scientific Computing Environment, $ 113,522.

NSF Grant DMS-0755318, 2008-2011: REU Site at Kent State University: Applications and Ramifications of Linear Algebra, $ 200,108

OBR Research Challenge Grant, 2005-06: Image Restoration in Biology and Material Sciences, $ 58,000.

NSF Grant DMS-0107858, 2001-04: Collaborative Research on Quadrature and Orthogonal Polynomials in Large-Scale Computation.

OBR Research Challenge Grant, 2001-02: Interactive Tools for the Refinement of 3D Microscopy Images.

NSF Grant DMS-9806413, 1998–01: Collaborative Research on Iterative Methods for Image Restoration.

NSF Grant DMS-9721436, 1998–99: Computational Problems in Biomedical Engineering.

NSF Grant ASC-9720221, 1997–99: A Steering and Visualization Environment.

NSF Grant DMS-9404706, 1995–98: Collaborative Research on Iterative Methods for Image Restoration.

NSF Grant DMS-9205531, 1992–95: Iterative Methods for Large Linear Systems of Equations and Related Questions.

NSF Grant DMS-9002884, 1990-92: Polynomials Orthogonal on the Unit Circle in Numerical Analysis and Signal Processing.

NSF Grant DMS-8704196, 1987–89: Numerical Linear Algebra for Signal Processing and Integral Equations.

EDITORIAL WORK

Editor, Journal of Computational and Applied Mathematics, 1987–present.

Associate Editor, SIGNUM Newsletter, 1987–97.

Editor, Numerische Mathematik, 1991–present.

Editor, Advances in Computational Mathematics, 1992–present.

Editor-in-Chief for Electronic Transactions on Numerical Analysis, 1993–present.

Editor, SIAM Journal on Matrix Analysis and Applications, 1995–2007.

Editor, BIT, 1997–present.

Editor, Mathematics of Computation, 1999–2007.

Editor, Journal of Applied Mathematics, 2000–2004.

Editor, Journal of Scientific Computing, 2006–present.

Editor, Computational Methods and Function Theory, 2001–present.

Editor, Numerical Linear Algebra with Applications, 2002–present.

Editor, Numerical Algorithms, 2006–present.

Editor, Kragujevac Journal of Mathematics, 2006–present.

Editor, Advances in Numerical Analysis, 2008–2018.

Editor, Open Applied Mathematics Journal, 2007–present.

Editor, Publications de l'Institut Mathématique, 2011–present.

Editor, Mathematics, 2013–present.

Editor, Dolomites Res. Notes Approx., 2013–present.

Editor, Applied Numerical Mathematics, 2013–present.

Editor, Applied Numerical Mathematics, 2013–present.

Editor, Journal of Computational Mathematics, 2017–present.

Editor, Numerical Mathematics: Theory, Methods and Applications, 2021–present.

Editor, Computational Mathemtics and Computer Modeling with Applications, 2022–present.

Editor for the book series "Numerical Methods and Algorithms" published by Springer, 2008–present.

Editor for the book series "SpringerBriefs in Mathematics" published by Springer, 2014–present.

ORGANIZATION OF CONFERENCES, WORKSHOPS, AND SPECIAL SESSIONS

Conference ETNA 25: Recent Advances in Scientific Computation, May 27-29, 2019, Santa Margherita di Pula, Sardinia, Italy (with R. Ramlau and G. Rodriguez).

Summer School on Advanced Numerical Techniques for Inverse Problems with Applications in Imaging Science and Applied Geophysics, July 17-21, 2017, Sardegna Ricerche, Santa Margherita di Pula, Sardinia, Italy (with A. Concas, P. Diaz de Alba, L. Dykes, C. Fenu, and G. Rodriguez).

Conference on Numerical Linear Algebra and Applications (about 55 speakers), Oct. 24-28, 2016, Luminy, France (with K. Jbilou and H. Sadok).

Minisymposium on Matrices and Orthogonal Polynomials (16 speakers) at the 18th ILAS Meeting, June 3-7, 2013, Providence, RI (with J. Geronimo and F. Marcellán).

Conference on Structured Matrix Computations in Non Euclidean Geometries: Algorithms and Applications (about 40 speakers), Oct. 8-12, 2012, Luminy, France (with P. Benner, M. Sadkane, and A. Salam).

Special session on Approximation Methods in Numerical Linear Algebra (10 speakers) at the Third Dolomites Workshop on Constructive Approximation and Applications, Sep. 9-14, 2012, Alba di Canazei, Italy (with M. Redivo Zaglia).

Workshop on Numerical Linear Algebra (23 speakers), July 8-11, 2011, Budapest, Hungary, at the conference Foundation of Computational Mathematics (with O. Holtz).

Minisymposium on Structured Matrices (15 speakers) at the meeting of the International Linear Algebra Society, June 21–25, 2010, Pisa, Italy (with Y. Eidelman and M. Van Barel).

Conference on Inverse Problems, Computations, and Applications (about 55 speakers), May 31-June 4, 2010, Luminy, France (with K. Jbilou and H. Sadok).

Special session on Large Scale Matrix Computation (22 speakers) at the AMS Spring Southeastern Sectional Meeting, March 27-28, 2010, Lexington, KY (with Q. Ye).

Special session on Structured Matrix Computations (20 speakers), Oct. 26–29, 2009, Seaside, CA (with M. Van Barel).

Conference on Linear and Numerical Linear Algebra: Theory, Methods, and Applications, Aug. 12–14, Northern Illinois University, De Kalb, IL (with B. N. Datta et al.).

Conference on the occasion of Richard Varga's 80th birthday, Richard Varga Fest, Oct. 17–18, 2008, Kent State University, Kent, OH (with L. Dykes, P. Farrell, J. Li, A. Ruttan, and L. Smithies).

Workshop on Numerical Linear Algebra (27 speakers), June 20–22, 2008, Honk Kong, at the

conference Foundation of Computational Mathematics (with O. Holtz).

Numerical Analysis in Monterey, Graggfest '06, Nov. 3–4, 2006, Naval Postgraduate School, Monterey, CA (with G. Ammar, C. Borges, and M. Van Barel).

Special session on Inverse Problems: Theory and Numerics for Novel Applications, Joint Mathematics Meetings, Jan. 13–14, 2006, San Antonio, TX (with H. Engl).

Workshop on Numerical Linear Algebra, July 7–9, 2005, Santander, Spain, at the conference Foundation of Computational Mathematics (with S. Vavasis).

Workshop on Computational Methods for Inverse Problems and Applications, Nov. 14–19, 2003, Institute for Pure and Applied Mathematics, UCLA, Los Angeles, CA (with H. Engl, D. Colton, P. Deuflhard, D. Donoho, and E. Michielssen).

Special session on Numerical Linear Algebra at the First Joint AMS-RSME International Meeting, June 18–21, 2003, Seville, Spain (with F. Marcellán).

Following the flows of Numerical Analysis: A conference on the occasion of the 10th anniversary of the Electronic Transaction on Numerical Analysis (ETNA), May 29–31, 2003, Kent State University, Kent, OH (with V. Andriyevskyy, D. Calvetti, A. Melton, A. Ruttan, and R. S. Varga).

Applied Inverse Problems: Theoretical and Computational Aspects, June 18–22, 2001, Montecatini Terme, Italy (with M. Bertero, D. Calvetti, T.F. Chan, G.H. Golub, G. Inglese, A. Murli, R.J. Plemmons, S. Seatzu, F. Sgallari, and G. Talenti).

Mathematical Journey through Analysis, Matrix Theory and Scientific Computation: A conference in Honor of Richard Varga's 70th Birthday, Mar. 25–27, 1999, Kent State University, Kent, OH (with D. Calvetti and A. Ruttan).

ODE to Linear Algebra and Rational Approximation, a Conference in Honor of William B. Gragg's 60th Birthday, Nov. 1–2, 1996, Naval Postgraduate School, Monterey, CA (with G.S. Ammar, C. Borges and D. Calvetti).

Special sessions (with 22 presentations) on Numerical Linear Algebra and Scientific Computing at AMS Meeting # 904, Nov. 3–4, 1995, Kent State University, Kent, OH (with A. Ruttan and R.S. Varga).

Numerical Linear Algebra and Scientific Computing, Mar. 13–14, 1992, Kent State University, Kent, OH (with A. Ruttan and R.S. Varga).

THESIS DIRECTION

Dan Y. Hu, Ph.D., 1992, University of Kentucky:

"Parallel Krylov subspace methods for solving Sylvester's equation."

Carl F. Jagels, Ph.D., 1992, University of Kentucky:

"Applications of Szegő polynomials in numerical analysis."

James Baglama, Ph.D., 1997, Kent State University:

"Krylov subspace methods with application to liquid crystal modeling."

Qin Zhang, Ph.D., 1998, Kent State University:

"Iterative methods for linear ill-posed problems."

James E. Blevins, M.S., 1998, Kent State University:
"Reducible linear operators that contract angles."
Bryan Lewis, Ph.D., 2000, Kent State University:
"Krylov methods for signals, systems and control."
Naman Al-Niemi, M.S., 2000, Kent State University:
"On the ordering of tridiagonal matrices in the cyclic reduction method for Poisson's equation."
Abdallah Shuibi, Ph.D., 2003, Kent State University:
"Numerical methods for large-scale ill-posed problems."
Sun-Mi Kim, Ph.D., 2004, Kent State University:
"Orthogonal polynomials, quadrature rules, and linear algebra."
Renat Islamov, M.S., 2005, Kent State University:
"Tikhonov regularization of large-scale problems."
Andriy Shyshkov, Ph.D., 2010, Kent State University:
"Numerical solution of ill-posed problems."
Arthur Neuman, M.S., 2010, Kent State University:
"Regularization methods for ill-posed problems."
Martin Fuhry, Honors thesis, 2011, Kent State University:
"A new Tikhonov regularization method."
Tristan A. Hearn, Ph.D., 2012, Kent State University:
"Numerical methods for ill-posed problems with applications."
David R. Martin, Ph.D., 2012, Kent State University:
"Quadrature approximation of matrix functions with applications."
Xuebo Yu, Ph.D., 2014, Kent State University:
"Generalized Krylov subspace methods with applications."
Maged A. Alkilayh, M.S., 2016, Kent State University:
"Cubically convergent zero-finders for the trust region problem."
Tunan Tang, Ph.D., 2016, Kent State University:
"Extensions of Gauss, block Gauss, and Szegő quadrature rules with applications."
Laura R. Dykes, Ph.D., 2016, Kent State University:
"New methods for solution of discrete ill-posed problem."
Hessah Alqahtani, Ph.D., 2017, Kent State University:
"Gauss-type quadrature rules, with applications in linear algebra."
Enyinda Onunwor, Ph.D., 2017, Kent State University:
"Lanczos and Golub-Kahan reduction methods applied to ill-posed problems."
Mykhailo Kuian, Ph.D., 2019, Kent State University:
"Optimal conditioning of Vandermonde-like matrices and of a measurement problem."
Aparnnaa, M.S., 2019, Kent State University:
"Image denoising and noise estimation by wavelet transformation."

Mona Matar, Ph.D., 2019, Kent State University:

"Node and edge importance in networks via the matrix exponential."

Yonggi Park, Ph.D., 2019, Kent State University:

"Parameter selection rules for ill-posed problems."

Mirjeta Pasha, Ph.D., 2020, Kent State University:

"Krylov subspace type methods for the computation of nonnegative or sparse solutions of ill-posed problems."

Mohammed Al Mugahwi, Ph.D., 2020, Kent State University:

"Methods for solving node centrality measure problems for large networks."

Nasim Eshghi, Ph.D., 2020, Kent State University:

"Approximation of matrix functions by quadrature rules based on the Lanczos and Arnoldi processes."

Xianglan Bai, Ph.D., 2021, Kent State University:

"Non-Krylov non-iterative subspace methods for linear discrete ill-posed problems."

Jihan Alahmadi, Ph.D., 2021, Kent State University:

"Standard and rational Gauss quadrature rules for the approximation of matrix functionals."

Ugochukwu Ugwu, Ph.D., 2021, Kent State University:

"Iterative tensor factorization based on Krylov subspace-type methods with applications to image processing."

Yunzi Zhang, Ph.D., 2021, Kent State University:

"Chained graphs and iterative methods for computing the Perron vector of adjacency matrices."

Abdulaziz Alqahtani, Ph.D., 2022, Kent State University:

"Numerical methods for the solution of linear illposed problems."

Lucas W. Onisk, Ph.D., 2022, Kent State University:

"Arnoldi-type methods for the solution of linear discrete ill-posed problems."

Maged Alkilayh, Ph.D., 2022, Kent State University:

"Iterative methods for optimization, eigenvalue and ill-posed problems."

Fei (Jerry) Chen, Ph.D., 2023, Kent State University:

"Sparse approximation, curve fitting, and mathematical methods for exploring living liquid crystals transitions."

Jiafeng Jin, Ph.D., 2023, Kent State University:

"Modeling and approximation of complex networks."

Hanan Almutairi, work for Ph.D. in progress.

Josh Kane, work for Ph.D. in progress.

LECTURE SERIES FOR GRADUATE STUDENTS AND NEW PH.D.s DELIVERED AT SUMMER SCHOOLS OR MATHEMATICS DEPARTMENTS

Lectures on "Numerical methods for ill-posed problems" at the Summer School on Applied Analysis, Chemnitz University of Technology, Faculty of Mathematics, Chemnitz, Germany, Oct.

2010.

Lectures on "Linear algebra for ill-posed problems" at the University of Insubria, Como, Italy, Nov. 2011.

Lectures on "Error bounds and estimates for matrix functions" at the International Spring School on Matrix Functions and Their Applications, Lille, France, May 2013.

Lectures on "Network analysis, orthogonal polynomials, and Gauss quadrature" at the University of Insubria, Como, Italy, Nov. 2016.

Lectures on "Numerical linear algebra for discrete ill-posed problems" at the Summer School on Advanced Numerical Techniques for Inverse Problems with Applications in Imaging Science and Applied Geophysics, Sardegna Ricerche, Santa Margherita di Pula, Italy, July 2017.

Lectures on "Numerical methods for linear discrete ill-posed problems" at the University of Uppsala, Sweden, May 2018.

Lectures on "Iterative methods for image processing" at the Summer School on Computational Methods for Inverse Problems in Imaging, Lake Como School of Advanced Studies, Como, Italy, May 2018.

Lectures on "Numerical linear algebra for ill-posed problems" at the University of Padova, Italy, June 2018.

Lectures on "Numerical linear algebra for ill-posed problems" at the University of Cagliari, Italy, June 2019.

Lectures on "Introduction to network analysis" at the University of Insubria, Como, Italy, July 2021.

Lectures at Summer School on Recent Advancements in Computational and Learning Methods for Inverse problems on "Solution methods for ill-posed problems," University of Cagliari, Italy, July 2022.

PRINCIPAL ACADEMIC VISITS

Visiting Professor, Department of Mathematics, University of Padova, Padova, Italy, June 2017, June 2018.

Visiting Professor, Department of Science, University of Insubria, Como, Italy, June-July 2016, May 2018, July 2021.

Visiting Professor, Department of Computer Science, Catholic University of Leuven, Leuven, Belgium, June 2012, July 2014, June 2015.

Visiting Professor, Department of Mathematics, University of Valenciennes, Valenciennes, France, May 2012, May 2014.

Visiting Professor, Department of Mathematics and Computer Science, Technical University of Eindhoven, Eindhoven, The Netherlands, July-Aug. 2009, June-July 2010, May-June 2013.

Visiting Professor, IRISA, University of Rennes, France, Aug. 2008, June 2009.

Visiting Professor, Department of Mathematics, University of Cagliari, Cagliari, Italy, June-July 2008, July 2011, Feb.-Apr. 2015, July 2017, June 2019.

Visiting Scientist, Radon Institute of Computational and Applied Mathematics, Linz, Austria, May-June 2007, July 2012.

Visiting Professor, Department of Mathematics, Technical University of Berlin, Berlin, Germany, Feb.-Mar. 2007.

Visiting Professor, Department of Mathematics, University Carlos III, Leganés, Spain, November 2006.

Visiting Professor, Department of Mathematics, University of Bologna, Bologna, Italy, June 1993, September 2006, July 2007, July 2015.

Visiting Professor, Department of Mathematics, University of Lille, Villeneuve d'Asq, France, June 2005.

Visiting Professor, Department of Mathematics, University of Littoral, Calais, France, June 2004, May 2005, June 2006, May 2008, May 2009, May 2010, June 2011, July 2013, June 2014, May 2015, May 2016, July 2017, July 2018, July 2019.

Visiting Professor, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, Aug. 1998-July 1999.

Visiting Professor, Department of Mathematics, University of Bologna, Italy, and Department of Applied Mathematics, University of Naples, Italy, July 1994.

Visiting Scientist, CERFACS, Toulouse, France, July 1992.

Research Associate, Department of Mathematics, Naval Postgraduate School, Monterey, CA, Jan.-June 1991.

Visiting Scholar, Computer & Information Technology Institute, Rice University, Houston, TX, Sep.-Dec. 1990.

Visiting Professor, Department of Computational and Applied Mathematics, University of the Witwatersrand, Johannesburg, South Africa, July 1990.

Visiting Scientist, Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA, Mar.-Apr. 1989.

Visiting Scientist, Applied Mathematics Division, Argonne National Laboratory, Argonne, IL, June-Aug. 1986.

Visiting Assistant Professor, Department of Mathematics, University of South Florida, Tampa, FL, spring semester 1986.

Visiting Researcher, Computer Science Department, Stanford University, Stanford, CA, Aug. 1985, Aug. 1993, Jan.-July 1995.

Visiting Professor, Department of Applied Mathematics, University of Hamburg, Hamburg, Germany, Nov. 1983, Apr.–July 1986.

Research Associate, Mathematics Research Institute, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland, academic year 83/84.

Research Associate, Mathematics Research Center, University of Wisconsin, Madison, WI, Aug.

1982-July 1983.

INDUSTRIAL EXPERIENCE

Senior Scientist, IBM Bergen Scientific Centre, Bergen, Norway, Aug. 1987–Aug. 1989, June 1990, July-Aug. 1991.

Worked for the Swedish Institute of Applied Mathematics, spring semester 1982.

Worked for Husqvarna AB (a Swedish company) with problems of microwave heating, 1973-75.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Mathematical Society

Society for Industrial and Applied Mathematics

PUBLICATIONS

Books and Special Journal Volumes Edited

1. Numerical Linear Algebra, Proceedings of the SIAM Western Pennsylvania/Eastern Ohio Sectional Meeting, March 13–14, 1992 (with A. Ruttan and R.S. Varga), de Gruyter, Berlin, 1993.
2. Special issue of J. Comput. Appl. Math. dedicated to W.B. Gragg on the occasion of his 60th birthday (with G.S. Ammar and D. Calvetti), issue 1, vol. 86, 1997.
3. Mathematical Journey through Analysis, Matrix Theory and Scientific Computation, special volume of Numerical Algorithms dedicated to R.S. Varga (with D. Calvetti), vol. 25, 2000.
4. Quadrature and Orthogonal Polynomials, special volume of J. Comput. Appl. Math. (with W. Gautschi and F. Marcellán), vol. 127, 2001. Also published as the book "Numerical Analysis 2000, vol. 5, Quadrature and Orthogonal Polynomials, Elsevier, Amsterdam, 2001.
5. Applied Computational Inverse Problems, special issue of J. Comput. Appl. Math. (with F. Sgallari), issue 2, vol. 198, 2007.
6. Special volume of Electron. Trans. Numer. Anal. dedicated to G.H. Golub (with M. Gutknecht, M. Overton, D.B. Szyld, L.N. Trefethen, P. Van Dooren, and A. Wathen), vol. 28, 2007-2008.
7. Numerical Algebra and Scientific Computing, special issue of J. Comput. Appl. Math. (with Z.-Z. Bai and Z.-C. Shi), issue 1, vol. 226, 2009.
8. Matrix Analysis and Applications (M2A), special volume of Electron. Trans. Numer. Anal. (with B. Beckermann, K. Jbilou, Y. Saad, M. Sadkane, and A. Salam), vol. 33, 2008–2009.
9. Special issue of J. Comput. Appl. Math. dedicated to W.B. Gragg on the occasion of his 70th birthday (with G.S. Ammar and M. Van Barel), issue 5, vol. 233, 2010.
10. Special volume of Electron. Trans. Numer. Anal. dedicated to Richard S. Varga on the occasion of his 80th birthday (with V. Andriyevskyy, M. Eiermann, R. Freund, J. Li, V. Mehrmann, R. Nabben, and D. Szyld), vol. 36, 2009–2010.

11. Special issue of Linear Algebra and Its Applications with selected papers presented at the Northern Illinois University LA'09 Conference on Linear and Numerical Linear Algebra: Theory, Methods, and Applications, August 12-14, 2009 (with B.N. Datta, R.J. Plemmons, and Q. Ye), issue 7, vol. 434, 2011.
12. Inverse Problems: Computation and Applications, special issue of J. Comput. Appl. Math. (with A. Bouhamidi, K. Jbilou, R. Ramlau, H. Sadok, and F. Sgallari), issue 8, vol. 236, 2012.
13. Special issue of Linear Algebra and Its Applications dedicated to Heinrich Voss on the occasion of his 65th birthday (with T. Betcke, C. Mehl, V. Mehrmann, and S. M. Rump), issue 10, vol. 436, 2012.
14. Innovative Methods and Theories in Numerical Algebra, special issue of Numer. Linear Algebra Appl. (with Z.-Z. Bai, I. S. Duff, and Z.-C. Shi), issue 6, vol. 19, 2012.
15. Inverse Problems in Science and Industry, special issue of Numerical Linear Algebra and Applications dedicated to Biswa N. Datta (with E. K.-W. Chu and W.-W. Lin), issue 2, vol. 20, 2013.
16. Special issue of Applied Numerical Methods with selected papers presented at the 10th IMACS meetingi, held in Marrakech, Morocco, May 18-21, 2011 (with K. Jbilou and H. Sadok), vol. 75, 2014.
17. Special volume of Electron. Trans. Numer. Anal. with selected papers presented at the Conference on Numerical Analysis and Scientific Computing with Applications (NASCA 13), held in Calais, France, June 24-26, 2013 (with K. Jbilou and H. Sadok), vol. 43, 2014-2015.
18. Numerical Algebra and Scientific Computing, special issue of BIT (with Z.-Z. Bai), issue 2, vol. 56, 2016.
19. Recent Progress on Iterative Methods for Large Systems of Equations, special issue of Numerical Algorithms (with K. Hayami, K. Morikuni, Y. Nakatsukasa, and J.-F. Yin), issue 2, vol. 75, 2017.
20. Special volume of Electron. Trans. Numer. Anal. with selected papers presented at the Conference on Numerical Linear Algebra and Applications, held at Luminy, October 24-28, 2016 (with K. Jbilou and G. Meurant), vol. 47, 2017.
21. Novel Methods and Theories in Numerical Algebra with Interdisciplinary Applications, special issue of Numer. Linear Algebra Appl. (with Z.-Z. Bai and M. G. Neytcheva), issue 4, vol. 25, 2018.
22. Special volume of Electron. Trans. Numer. Anal. dedicated to Walter Gautschi with selected papers presented at the Conference "Approximation and Computation - Theory and Applications" held in Belgrade, November 30 - December 2, 2017 (with G. Milovanović), vol. 50, 2018.
23. Special issue of J. Comput. Appl. Math. with selected papers presented at the Conference on Numerical Analysis and Scientific Computing with Applications (NASCA 18), held in Kalamata, Greece, July 2-6, 2018 (with D. A. Bini, K. Jbilou, M. Mitrouli), vol. 373, 2020.
24. Special volume of Electron. Trans. Numer. Anal. with selected papers presented at the conference ETNA25 (with M. Donatelli, R. Ramlau, and G. Rodriguez), vol. 53, 2020.

25. Special issue for the Seventh International Conference on Numerical Algebra and Scientific Computing, Appl. Numer. Math. (with Z.-Z. Bai and Z.-Q. Wang), vol. 164, 2021.
26. Special issue on "Recent Advances in the Iterative Solution of Matrix Problems" of J. Comput. Appl. Math. (with K. Hayami, Keiichi Morikuni, and N. Zheng), vol. 430, 2023.
27. Special issue on "Advances in Quadrature, Cubature, and the Solution of Integral Equations with Applications" of J. Comput. Appl. Math. (with L. Fermo, G. V. Milovanović, and M. M. Spalević), vol. 445, 2024, Art 115813. https://www.sciencedirect.com/journal/journal-of-computational-and-applied-mathematics/special-issue/10893QG2PSV

Numerical Methods for Ill-Posed Problems

1. An iterative method for image reconstruction from projections (with D. Calvetti, F. Sgallari and G. Spaletta), in Proceedings of the Fifth SIAM Conference on Applied Linear Algebra, ed. J.G. Lewis, SIAM, Philadelphia, 1994, pp. 92–96.
2. Iterative solution methods for ill-posed problems (with D. Calvetti and Q. Zhang), in Advanced Signal Processing Algorithms, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 2563, The International Society for Optical Engineering, Bellingham, WA, 1995, pp. 338–347.
3. Application of ADI iterative methods to the restoration of noisy images (with D. Calvetti), SIAM J. Matrix Anal., 17 (1996), pp. 165–186.
4. Iterative solution methods for ill-posed problems (with D. Calvetti and Q. Zhang), in 12th Annual Review on Computational and Applied Electromagnetism, ACES, 1996, pp. 638–644.
5. Iterative methods for $X - AXB = C$ (with D. Calvetti and N. Levenberg), J. Comput. Appl. Math., 86 (1997), pp. 73–101.
6. Smooth or abrupt: a comparison of regularization methods (with D. Calvetti and B. Lewis), in Advanced Signal Processing Algorithms, Architectures and Implementations VIII, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 3461, The International Society for Optical Engineering, Bellingham, WA, 1998, pp. 286–295.
7. Iterative solution methods for large linear discrete ill-posed problems (with D. Calvetti and Q. Zhang), Applied and Computational Control, Signals and Circuits, 1 (1999), pp. 313–367.
8. Iterative exponential filtering for large discrete ill-posed problems (with D. Calvetti and Q. Zhang), Numer. Math., 83 (1999), pp. 535–556.
9. Estimation of the L-curve via Lanczos bidiagonalization (with D. Calvetti and G.H. Golub), BIT, 39 (1999), pp. 603–619.
10. A regularizing Lanczos iteration method for underdetermined linear systems (with D. Calvetti, F. Sgallari and G. Spaletta), J. Comput. Appl. Math., 115 (2000), pp. 101–120.
11. Tikhonov regularization and the L-curve for large, discrete ill-posed problems (with D. Calvetti, S. Morigi and F. Sgallari), J. Comput. Appl. Math., 123 (2000), pp. 423–446.
12. An L-ribbon for large underdetermined linear discrete ill-posed problems (with D. Calvetti, S. Morigi and F. Sgallari), Numer. Algorithms, 25 (2000), pp. 89–107.
13. Restoration of images with spatially variant blur by the GMRES method (with D. Calvetti and

B. Lewis), in Advanced Signal Processing Algorithms, Architectures, and Implementations X, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 4116, The International Society for Optical Engineering, Bellingham, WA, 2000, pp. 364–374.

14. An L-curve for the MINRES method (with D. Calvetti and B. Lewis), in Advanced Signal Processing Algorithms, Architectures, and Implementations X, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 4116, The International Society for Optical Engineering, Bellingham, WA, 2000, pp. 385–395.
15. On the choice of subspace for iterative methods for linear discrete ill-posed problems (with D. Calvetti and B. Lewis), Int. J. Appl. Math. Comput. Sci., 11 (2001), pp. 1069–1092.
16. Krylov subspace iterative methods for nonsymmetric discrete ill-posed problems in image restoration (with D. Calvetti and B. Lewis), in Advanced Signal Processing Algorithms, Architectures, and Implementations XI, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 4474, The International Society for Optical Engineering, Bellingham, WA, 2001, pp. 224–233.
17. GMRES, L-curves, and discrete ill-posed problems (with D. Calvetti and B. Lewis), BIT, 42 (2002), pp. 44–65.
18. On the regularizing properties of the GMRES method (with D. Calvetti and B. Lewis), Numer. Math., 91 (2002), pp. 605–625.
19. L-curve curvature bounds via Lanczos bidiagonalization (with D. Calvetti and P.C. Hansen), Electron. Trans. Numer. Anal., 14 (2002), pp. 20–35.
20. Lanczos-based exponential filtering for discrete ill-posed problems (with D. Calvetti), Numer. Algorithms, 29 (2002), pp. 45–65.
21. A hybrid GMRES and TV-norm based method for image restoration (with D. Calvetti and B. Lewis), in Advanced Signal Processing Algorithms, Architectures, and Implementations XII, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 4791, The International Society for Optical Engineering, Bellingham, WA, 2002, pp. 192–200.
22. Enriched Krylov subspace methods for ill-posed problems (with D. Calvetti and A. Shuibi), Linear Algebra Appl., 362 (2003), pp. 257–273.
23. Tikhonov regularization of large linear problems (with D. Calvetti), BIT, 43 (2003), pp. 263–283.
24. Parallel deconvolution methods for three dimensional image restoration (with B. Lewis), in Advanced Signal Processing Algorithms, Architectures, and Implementations XIII, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 5205, The International Society for Optical Engineering, Bellingham, WA, 2003, pp. 291–296.
25. L-curve and curvature bounds for Tikhonov regularization (with D. Calvetti and A. Shuibi), Numer. Algorithms, 35 (2004), pp. 301–314.
26. Tikhonov regularization with a solution constraint (with D. Calvetti), SIAM J. Sci. Comput., 26 (2004), pp. 224–239.

27. Nonnegativity and iterative methods for ill-posed problems (with D. Calvetti, G. Landi and F. Sgallari), Inverse Problems, 20 (2004), pp. 1747–1758.
28. Tikhonov regularization with nonnegativity constraint (with D. Calvetti, B. Lewis and F. Sgallari), Electron. Trans. Numer. Anal., 18 (2004), pp. 153–173.
29. Tikhonov regularization of large symmetric problems (with D. Calvetti and A. Shuibi), Numer. Linear Algebra Appl., 12 (2005), pp. 127–139.
30. Invertible smoothing preconditioners for linear discrete ill-posed problems (with D. Calvetti and A. Shuibi), Appl. Numer. Math., 54 (2005), pp. 135–149.
31. Iterative methods for ill-posed problems and semiconvergent sequences (with S. Morigi, F. Sgallari, and F. Zama), J. Comput. Appl. Math., 193 (2006), pp. 157–167.
32. An iterative Lavrentiev regularization method (with S. Morigi and F. Sgallari), BIT, 46 (2006), pp. 589–606.
33. A truncated projected SVD method for linear discrete ill-posed problems (with S. Morigi and F. Sgallari), Numer. Algorithms, 43 (2006), pp. 197–213.
34. Decomposition methods for large linear discrete ill-posed problems (with J. Baglama), J. Comput. Appl. Math., 198 (2007), pp. 332–343.
35. An iterative method for linear discrete ill-posed problems with box constraints (with S. Morigi, F. Sgallari, and F. Zama), J. Comput. Appl. Math., 198 (2007), pp. 505–520.
36. Orthogonal projection regularization operators (with S. Morigi and F. Sgallari), Numer. Algorithms, 44 (2007), pp. 99–114.
37. Greedy Tikhonov regularization for large linear ill-posed problems (with H. Sadok and A. Shyshkov), Int. J. Comput. Math., 84 (2007), pp. 1151–1166.
38. A new L-Curve for ill-posed problems (with H. Sadok), J. Comput. Appl. Math., 219 (2008), pp. 493–508.
39. A new zero-finder for Tikhonov regularization (with A. Shyshkov), BIT, 48 (2008), pp. 627–643.
40. Cascadic multiresolution methods for image deblurring (with S. Morigi, F. Sgallari, and A. Shyshkov), SIAM J. Imaging Sci., 1 (2008), pp. 51–74.
41. Arnoldi-Tikhonov regularization methods (with B. Lewis), J. Comput. Appl. Math., 226 (2009), pp. 92–102.
42. Vector extrapolation enhanced TSVD for linear discrete ill-posed problems (with K. Jbilou and H. Sadok), Numer. Algorithms, 51 (2009), pp. 195–208.
43. Error estimates for large-scale ill-posed problems (with G. Rodriguez and S. Seatzu), Numer. Algorithms, 51 (2009), pp. 341–361.
44. Simple square smoothing regularization operators (with Q. Ye), Electron. Trans. Numer. Anal., 33 (2009), pp. 63–83.
45. An edge-preserving multilevel method for deblurring, denoising, and segmentation (with S. Morigi and F. Sgallari), in Scale Space and Variational Methods in Computer Vision, eds. X.-C. Tai, K. Morken, M. Lysaker, and K.-A. Lie, Lecture Notes in Computer Science, vol. 5567, Springer, Berlin, 2009, pp. 427–438.

46. An interior-point method for large constrained discrete ill-posed problems (with S. Morigi and F. Sgallari), J. Comput. Appl. Math., 233 (2010), pp. 1288–1297.
47. Cascadic multilevel methods for ill-posed problems (with A. Shyshkov), J. Comput. Appl. Math., 233 (2010), pp. 1314–1325.
48. Noise-reducing cascadic multilevel methods for linear discrete ill-posed problems (with S. Morigi and F. Sgallari), Numer. Algorithms, 53 (2010), pp. 1–22.
49. Cascadic multilevel methods for fast nonsymmetric blur- and noise-removal (with S. Morigi and F. Sgallari), Appl. Numer. Math., 60 (2010), pp. 378–396.
50. An iterative method for Tikhonov regularization with a general linear regularization operator (with M. E. Hochstenbach), J. Integral Equations Appl., 22 (2010), pp. 463–480.
51. Subspace-restricted singular value decompositions for linear discrete ill-posed problems (with M. E. Hochstenbach), J. Comput. Appl. Math., 235 (2010), pp. 1053–1064.
52. An extrapolated TSVD method for linear discrete ill-posed problems with Kronecker structure (with A. Bouhamidi, K. Jbilou, and H. Sadok), Linear Algebra Appl., 434 (2011), pp. 1677–1688.
53. A hybrid multilevel-active set method for large box-constrained linear discrete ill-posed problems (with S. Morigi, R. Plemmons, and F. Sgallari), Calcolo, 48 (2011), pp. 89–105.
54. Fractional Tikhonov regularization for linear discrete ill-posed problems (with M. E. Hochstenbach), BIT, 51 (2011), pp. 197–215.
55. Wavelet-based multilevel methods for linear ill-posed problems (with E. Klann and R. Ramlau), BIT, 51 (2011), pp. 669–694.
56. Alternating Krylov subspace image restoration methods (with J. O. Abad, S. Morigi, and F. Sgallari), J. Comput. Appl. Math., 236 (2012), pp. 2049–2062.
57. A generalized global Arnoldi method for ill-posed matrix equations (with A. Bouhamidi, K. Jbilou, and H. Sadok), J. Comput. Appl. Math., 236 (2012), pp. 2078–2089.
58. Combining approximate solutions for linear discrete ill-posed problems (with M. E. Hochstenbach), J. Comput. Appl. Math., 236 (2012), pp. 2179–2185.
59. A new Tikhonov regularization method (with M. Fuhry), Numer. Algorithms, 59 (2012), pp. 433–445.
60. Large-scale Tikhonov regularization via reduction by orthogonal projection (with J. Lampe and H. Voss), Linear Algebra Appl., 436 (2012), pp. 2845–2865.
61. Discrete ill-posed least-squares problems with a solution norm constraint (with M. E. Hochstenbach and N. McNinch), Linear Algebra Appl., 436 (2012), pp. 3801–3818.
62. Implementations of range restricted iterative methods for linear discrete ill-posed problems (with A. Neuman and H. Sadok), Linear Algebra Appl., 436 (2012), pp. 3974–3990.
63. Tikhonov regularization based on generalized Krylov subspace methods (with F. Sgallari and Q. Ye), Appl. Numer. Math., 62 (2012). pp. 1215–1228.
64. Inverse problems for regularization matrices (with S. Noschese), Numer. Algorithms, 60 (2012), pp. 531–544.
65. On the reduction of Tikhonov minimization problems and the construction of regularization

matrices (with L. Dykes), Numer. Algorithms, 60 (2012), pp. 683–696.

66. Square regularization matrices for large linear discrete ill-posed problems (with M. Donatelli and A. Neuman), Numer. Linear Algebra Appl., 19 (2012), pp. 896–913.
67. Iterative methods of Richardson-Lucy-type for image deblurring (with M. K. Khan, S. Morigi, and F. Sgallari), Numer. Math. Theor. Meth. Appl., 6 (2013), pp. 262–275.
68. Minimization of functionals on the solution of a large-scale discrete ill-posed problem (with D. R. Martin), BIT, 53 (2013), pp. 153–173.
69. A cascadic alternating Krylov subspace image restoration method (with S. Morigi and F. Sgallari), Scale Space and Variational Methods in Computer Vision 2013, ed. A. Kuijper et al., Lecture Notes in Computer Science, vol. 7893, Springer, Berlin, 2013, pp. 98–108.
70. Old and new parameter choice rules for discrete ill-posed problems (with G. Rodriguez), Numer. Algorithms, 63 (2013), pp. 65–87.
71. Simplified GSVD computations for the solution of linear discrete ill-posed problems (with L. Dykes), J. Comput. Appl. Math., 255 (2013), pp. 15–27.
72. A family of range restricted iterative methods for linear discrete ill-posed problems (with L. Dykes), Dolomites Res. Notes Approx., 6 (2013), pp. 27–36.
73. Projected Tikhonov regularization of large-scale discrete ill-posed problems (with D. R. Martin), J. Sci. Comput., 56 (2013), pp. 471–493.
74. Extensions of the Justen-Ramlau blind deconvolution method (with T. A. Hearn), Adv. Comput. Math., 39 (2013), pp. 465–491.
75. FGMRES for linear discrete ill-posed problems (with K. Morikuni and K. Hayami), Appl. Numer. Math., 75 (2014), pp. 175–187.
76. Fast computation of convolution operations via low-rank approximation (with T. A. Hearn), Appl. Numer. Math., 75 (2014), pp. 136–153.
77. The structure of iterative methods for symmetric linear discrete ill-posed problems (with L. Dykes and F. Marcellán), BIT, 54 (2014), pp. 129–145.
78. Square smoothing regularization matrices with accurate boundary conditions (with M. Donatelli), J. Comput. Appl. Math., 272 (2014), pp. 334–349.
79. A general framework for nonlinear regularized Krylov-based image restoration (with S. Morigi and F. Sgallari), in CompIMAGE 2014, eds. Y. Zhang and J. M. R. S. Tavares, Lecture Notes in Computer Science, vol. 8641, Springer, Berlin, 2014, pp. 273–279.
80. Application of denoising methods to regularization of ill-posed problems (with T. A. Hearn), Numer. Algorithms, 66 (2014), pp. 761–777.
81. Inverse subspace problems with applications (with S. Noschese), Numer. Linear Algebra Appl., 21 (2014), pp. 589–603.
82. A modified TSVD method for discrete ill-posed problems (with S. Noschese), Numer. Linear Algebra Appl., 21 (2014), pp. 813–822.
83. Regularization parameter determination for discrete ill-posed problems (with M. E. Hochstenbach and G. Rodriguez), J. Comput. Appl. Math., 273 (2015), pp. 132–149.
84. Rescaling the GSVD with application to ill-posed problems (with L. Dykes and S. Noschese),

Numer. Algorithms, 68 (2015), pp. 531–545.

85. Arnoldi methods for image deblurring with anti-reflective boundary conditions (with M. Donatelli and D. Martin), Appl. Math. Comput., 253 (2015), pp. 135–150.
86. Lavrentiev-type regularization methods for Hermitian problems (with S. Noschese), Calcolo, 52 (2015), pp. 187–205.
87. Some properties of range restricted GMRES methods (with M. Bellalij and H. Sadok), J. Comput. Appl. Math., 290 (2015), pp. 310–318.
88. Image denoising via residual kurtosis minimization (with T. A. Hearn), Numer. Math. Theor. Meth. Appl., 8 (2015), pp. 403–422.
89. Fractional regularization matrices for linear discrete ill-posed problems (with M. E. Hochstenbach and S. Noschese), J. Eng. Math., 93 (2015), pp. 113–129.
90. Vector extrapolation applied to truncated singular value decomposition and truncated iteration (with A. Bouhamidi, K. Jbilou, H. Sadok, and Z. Wang), J. Eng. Math., 93 (2015), pp. 99–112.
91. Matrix decompositions for Tikhonov regularization (with X. Yu), Electron. Trans. Numer. Anal., 43 (2015), pp. 223–243.
92. A Golub–Kahan-type reduction method for matrix pairs (with M. Hochstenbach and X. Yu), J. Sci. Comput., 65 (2015), pp. 767–789.
93. A generalized Krylov subspace method for l_p-l_q minimization (with A. Lanza, S. Morigi, and F. Sgallari), SIAM J. Sci. Comput., 37 (2015), pp. S30–S50.
94. Tikhonov regularization via flexible Arnoldi reduction (with X. Yu), BIT, 55 (2015), pp. 1145–1168.
95. On fractional Tikhonov regularization (with D. Gerth, E. Klann, and R. Ramlau), J. Inverse Ill-Posed Probl., 23 (2015), pp. 611–625.
96. On the Lanczos and Golub–Kahan reduction methods applied to discrete ill-posed problems (with S. Gazzola, E. Onunwor, and G. Rodriguez), Numer. Linear Algebra Appl., 23 (2016), pp. 187–204.
97. A global Lanczos method for image restoration (with A. H. Bentbib, M. El Guide, and K. Jbilou), J. Comput. Appl. Math., 300 (2016), pp. 233–244.
98. Adaptive cross approximation for ill-posed problems (with T. Mach, M. Van Barel, and R. Vandebril, J. Comput. Appl. Math., 303 (2016), pp. 206–217.
99. Some matrix nearness problems suggested by Tikhonov regularization (with S. Noschese), Linear Algebra Appl., 502 (2016), pp. 366–386.
100. Regularization matrices via matrix nearness problems (with G. Huang and S. Noschese), Linear Algebra Appl., 502 (2016), pp. 41–57.
101. Projected nonstationary iterated Tikhonov regularization (with G. Huang and F. Yin), BIT, 56 (2016), pp. 467–487.
102. On the choice of solution subspace for nonstationary iterated Tikhonov regularization (with G. Huang and F. Yin), Numer. Algorithms, 72 (2016), pp. 1043–1063.
103. A new framework for multi-parameter regularization (with S. Gazzola), BIT, 56 (2016), pp.

919–949.

104. GCV for Tikhonov regularization via global Golub-Kahan decomposition (with C. Fenu and G. Rodriguez), Numer. Linear Algebra Appl., 23 (2016), pp. 467–484.
105. Modulus-based iterative methods for constrained Tikhonov regularization (with Z.-Z. Bai, A. Buccini, K. Hayami, J.-F. Yin, and N. Zheng), J. Comput. Appl. Math., 319 (2017), pp. 1–13.
106. Majorization-minimization generalized Krylov subspace methods for ℓ_p-ℓ_q optimization applied to image restoration (with G. Huang, A. Lanza, S. Morigi, and F. Sgallari), BIT, 57 (2017), pp. 351–378.
107. The global Golub–Kahan bidiagonalization process applied to large discrete ill-posed problems (with A. H. Bentbib, M. El Guide, and K. Jbilou), J. Comput. Appl. Math., 322 (2017), pp. 46–56.
108. Fractional Tikhonov regularization with a nonlinear penalty term (with S. Morigi and F. Sgallari), J. Comput. Appl. Math., 324 (2017), pp. 142–154.
109. On the computation of a truncated SVD of a large linear discrete ill-posed problem (with E. Onunwor), Numer. Algorithms, 75 (2017), pp. 359–380.
110. Circulant preconditioners for discrete ill-posed Toeplitz systems (with L. Dykes and S. Noschese), Numer. Algorithms, 75 (2017), pp. 477–490.
111. Iterated Tikhonov regularization with a general penalty term (with A. Buccini and M. Donatelli), Numer. Linear Algebra Appl., 24 (2017), e2089 (12 pages).
112. GCV for Tikhonov regularization by partial SVD (with C. Fenu, G. Rodriguez, and H. Sadok), BIT, 57 (2017), pp. 1019–1039.
113. Parameter determination for Tikhonov regularization problems in general form (with Y. Park, G. Rodriguez, and X. Yu), J. Comput. Appl. Math., 343 (2018), pp. 12–25.
114. Numerical aspects of the nonstationary modified linearized Bregman algorithm (with A. Buccini and Y. Park), Appl. Math. Comput., 337 (2018), pp. 386–398.
115. Regularization matrices for discrete ill-posed problems in several space-dimensions (with L. Dykes, G. Huang, and S. Noschese), Numer. Linear Algebra Appl., 25 (2018), e2163.
116. Solution methods for linear discrete ill-posed problems for color image restoration (with A. H. Bentbib, M. El Guide, K. Jbilou, and E. Onunwor), BIT, 58 (2018), pp. 555–578.
117. Arnoldi decomposition, GMRES, and preconditioning for linear discrete ill-posed problems (with S. Gazzola, S. Noschese, and P. Novati), Appl. Numer. Math., 142 (2019), pp. 102–121.
118. Error estimates for Arnoldi–Tikhonov regularization for ill-posed operator equations (with R. Ramlau), Inverse Problems, 35 (2019), Art. 055002.
119. On the choice of subspace for large-scale Tikhonov regularization problems in general form (with G. Huang and F. Yin), Numer. Algorithms, 81 (2019), pp. 33–55.
120. An ℓ^2-ℓ^q regularization method for large discrete ill-posed problems (with A. Buccini), J. Sci. Comput., 78 (2019), pp. 1526–1549.
121. Non-stationary structure-preserving preconditioning for image restoration (with P. Dell'Acqua and M. Donatelli), in Computational Methods for Inverse Problems in Imaging, eds. M. Donatelli and S. Serra-Capizzano, Springer, Cham, 2019, pp. 51–75.

122. Iterative Tikhonov regularization of tensor equations based on the Arnoldi process and some of its generalizations (with F.P.A. Beik and M. Najafi-Kalyani), Appl. Numer. Math., 151 (2020), pp. 425–447.
123. Comparison of a-posteriori parameter choice rules for linear discrete ill-posed problems (with A. Buccini and Y. Park), J. Comput. Appl. Math., 373 (2020), Art. 112138.
124. Generalized singular value decomposition with iterated Tikhonov regularization (with A. Buccini and M. Pasha), J. Comput. Appl. Math., 373 (2020), Art. 112276.
125. An ℓ^p-ℓ^q minimization method with cross-validation for the restoration of impulse noise contaminated images (with A. Buccini), J. Comput. Appl. Math., 375 (2020), Art. 112824.
126. Simple stopping criteria for the LSQR method applied to discrete ill-posed problems (with H. Sadok and W. Zhang), Numer. Algorithms, 84 (2020), pp. 1381–1395.
127. Golub-Kahan bidiagonalization for ill-conditioned tensor equations with applications (with F.P.A. Beik, K. Jbilou, and M. Najafi-Kalyani), Numer. Algorithms, 84 (2020), pp. 1535–1563.
128. Large-scale regression with non-convex loss and penalty (with A. Buccini, O. De la Cruz Cabrera, M. Donatelli, and A. Martinelli), Appl. Numer. Math., 157 (2020), pp. 590–601.
129. Modulus-based iterative methods for constrained ℓ_p-ℓ_q minimization (with A. Buccini and M. Pasha), Inverse Problems, 36 (2020), Art. 084001.
130. Lanczos-based fast blind deconvolution methods (with L. Dykes, R. Ramlau, K. Soodhalter, and R. Wagner), J. Comput. Appl. Math., 382 (2021), Art. 113067.
131. A novel modified TRSVD method for large-scale linear discrete ill-posed problems (with X. Bai, G. Huang, X.-J. Lei, and F. Yin), Appl. Numer. Math., 164 (2021), pp. 72–88.
132. On the choice of regularization matrix for an ℓ_2-ℓ_q minimization method for image restoration (with A. Buccini, G. Huang, and F. Yin), Appl. Numer. Math., 164 (2021), pp. 211–221.
133. A new non-stationary preconditioned iterative method for linear discrete ill-posed problems with application to image deblurring (with A. Buccini, M. Donatelli, and W. Zhang), Numer. Linear Algebra Appl., 28 (2021), e2353.
134. Tensor Krylov subspace methods with an invertible linear transform product applied to image processing (with U. O. Ugwu), Appl. Numer. Math., 166 (2021), pp. 186–207.
135. Linearized Krylov subspace Bregman iteration with nonnegativity constraint (with A. Buccini and M. Pasha), Numer. Algorithms, 87 (2021), pp. 1177–1200.
136. On the block Lanczos and block Golub-Kahan reduction methods applied to discrete ill-posed problems (with A. Alqahtani, S. Gazzola, and G. Rodriguez), Numer. Linear Algebra Appl., 28 (2021), e2376.
137. Golub–Kahan vs. Monte Carlo: A comparison of bidiagonlization and a randomized SVD method for the solution of linear discrete ill-posed problems (with X. Bai and A. Buccini), BIT, 61 (2021), pp. 1093–1114.
138. Generalized cross validation for ℓ^p-ℓ^q minimization (with A. Buccini), Numer. Algorithms, 88 (2021), pp. 1595–1616.
139. Solution of linear discrete ill-posed problems by discretized Chebyshev expansion (with X. Bai and Z. Buccini), Proceedings of the 21st International Conference on Computational Science

and Its Applications (ICCSA), Cagliari, Italy, 2021, pp. 101–111. Publisher: IEEE, doi: 10.1109/ICCSA54496.2021.00024

140. Restoration of blurred images corrupted by impulse noise via median filters and ℓ_p-ℓ_q minimization (with M. Alotaibi and A. Buccini), Proceedings of the 21st International Conference on Computational Science and Its Applications (ICCSA), Cagliari, Italy, 2021, pp. 112–122. Publisher: IEEE, doi: 10.1109/ICCSA54496.2021.00025
141. Tensor Arnoldi-Tikhonov and GMRES-type methods for ill-posed problems with a t-product structure (with U. O. Ugwu), J. Sci. Comput., 90 (2022), Art. 59.
142. The tensor Golub-Kahan-Tikhonov method applied to the solution of ill-posed problems with a t-product structure (with U. O. Ugwu), Numer. Linear Algebra Appl., 29 (2022), e2412.
143. Weighted tensor Golub-Kahan-Tikhonov-type methods applied to image processing using a t-product (with U. O. Ugwu), J. Comput. Appl. Math., 415 (2022), Art. 114488.
144. Krylov subspace split Bregman methods (with M. Alotaibi and A. Buccini), Appl. Numer. Math., 184 (2023), pp. 371–390.
145. A comparison of parameter choice rules for ℓ^p-ℓ^q minimization (with A. Buccini, M. Pragliola, and F. Sgallari), Annali dell'Università di Ferrara, 68 (2022), pp. 441–463.
146. Tikhonov regularization in general form with Chebfun (with A. Alqahtani and T. Mach), Proc. Appl. Math. Mech., 22 (2022), Art. e202200041.
147. Theoretical and numerical aspects of a non-stationary preconditioned iterative method for linear discrete ill-posed problems (with A. Buccini and M. Donatelli), J. Comput. Appl. Math., 423 (2023), Art. 114940.
148. Error estimates for GolubKahan bidiagonalization with Tikhonov regularization for Illposed operator equations (with A. Alqahtani and R. Ramlau), Inverse Problems, 39 (2023), Art. 025002.
149. Some numerical aspects of Arnoldi-Tikhonov regularization (with M. Alkilayh), Appl. Numer. Math., 185 (2023), pp. 503–515.
150. An Arnoldi-based preconditioner for iterated Tikhonov regularization (with A. Buccini and L. Onisk), Numer. Algorithms, 92 (2023), pp. 223–245.
151. Adaptive cross approximation for Tikhonov regularizatioN in general form (with T. Mach and M. Van Barel), Numer. Algorithms, 92 (2023), pp. 815–830.
152. Limited memory restarted ℓ^p-ℓ^q minimization methods using generalized Krylov subspaces (with A. Buccini), Adv. Comput. Math., 49 (2023), Art. 26.
153. Numerical considerations of block GMRES methods when applied to linear discrete ill-posed problems (with L. Onisk and H. Sadok), J. Comput. Appl. Math., 430 (2023), Art, 115262.
154. Variable selection in saturated and supersaturated designs via ℓ_p-ℓ_q minimization (with A. Buccini, O. De la Cruz Cabrera, C. Koukouvinos, and M. Mitrouli), Commun. Statist. Simulation Comput., 52 (2023), pp. 4326–4347.
155. Fast alternating fitting methods for trigonometric curves for large data sets (with A. Buccini, F. Chen, and O. De la Cruz Cabrera), Appl. Numer. Math., in press.

Large Eigenvalue and SVD Problems, Path Following, and Liquid Crystal Modeling

1. An implicitly restarted Lanczos method for large symmetric eigenvalue problems (with D. Calvetti and D.C. Sorensen), Electron. Trans. Numer. Anal., 2 (1994), pp. 1–21.
2. Iterative methods for computing a few eigenvalues of a large symmetric matrix (with J. Baglama and D. Calvetti), BIT, 36 (1996), pp. 400–421.
3. Computation of a few close eigenvalues of a large matrix with application to liquid crystal modeling (with J. Baglama, D. Calvetti, and A. Ruttan), J. Comput. Phys., 146 (1998), pp. 203–226.
4. Fast Leja points (with J. Baglama and D. Calvetti), Electron. Trans. Numer. Anal., 7 (1998), pp. 126–140.
5. A block Lanczos method for large continuation problems (with D. Calvetti), Numer. Algorithms, 21 (1999), pp. 109–118.
6. Iterative methods for large continuation problems (with D. Calvetti), J. Comput. Appl. Math., 123 (2000), pp. 217–240.
7. IRBL: An implicitly restarted block Lanczos method for large-scale Hermitian eigenproblems (with J. Baglama and D. Calvetti), SIAM J. Sci. Comput., 24 (2003), pp. 1650–1677.
8. Augmented implicitly restarted Lanczos bidiagonalization methods (with J. Baglama), SIAM J. Sci. Comput., 27 (2005), pp. 19–42.
9. An implicitly restarted block Lanczos bidiagonalization method using Leja shifts (with J. Baglama), BIT, 53 (2013), pp. 285–310.
10. A method for computing a few eigenpairs of large generalized eigenvalue problems (with M. Alkilayh and Q. Ye), Appl. Numer. Math., 183 (2023), pp. 108–117.
11. Spectral computation with third-order tensors using the t-product (with A. El Hachimi, K. Jbilou, and A. Rantnani), Appl. Numer. Math., 193 (2023), pp. 1–23.
12. A tensor bidiagonalization method for higher-order singular value decomposition with applications (with A. El Hachimi, K. Jbilou, and A. Rantnani), Numer. Linear Algebra Appl., 31 (2024), Art. e2530.

Iterative Methods for Linear and Non-Linear Systems of Equations and Optimization

1. On the application of orthogonal polynomials to the iterative solution of linear systems of equations with indefinite or non-Hermitian matrices (with W.B. Gragg), Linear Algebra Appl., 88–89 (1987), pp. 349–371.
2. Polynomials by conformal mapping for the Richardson iteration method for complex linear systems, SIAM J. Numer. Anal., 25 (1988), pp. 1359–1368.
3. A stable Richardson iteration method for complex linear systems (with B. Fischer), Numer. Math., 54 (1988), pp. 225–242.
4. On the application of orthogonal polynomials to the iterative solution of singular linear systems of equations (with M. Eiermann), in Vector and Parallel Computing Issues in Applied Research and Development, eds. J. Dongarra, I. Duff, P. Gaffney and S. McKee, Ellis Horwood, Chichester, 1989, pp. 285–297.
5. The application of Leja points to Richardson iteration and polynomial preconditioning, Linear Algebra Appl., 154–156 (1991), pp. 389–414.

6. A hybrid GMRES algorithm for nonsymmetric linear systems (with N.M. Nachtigal and L.N. Trefethen), SIAM J. Matrix Anal. Appl., 13 (1992), pp. 796–825.
7. Implementation of GMRES method using QR factorization (with Z. Bai and D. Hu), in Proceedings of the Fifth SIAM Conference on Parallel Processing for Scientific Computing, eds. J. Dongarra, K. Kennedy, P. Messina, D.C. Sorensen and R.G. Voigt, SIAM, Philadelphia, 1992, pp. 84–91.
8. The isometric Arnoldi process and an application to iterative solution of large linear systems (with C.F. Jagels), in Iterative Methods in Linear Algebra, eds. R. Beauwens and P. de Groen, Elsevier, Amsterdam, 1992, pp. 361–369.
9. Krylov subspace methods for the Sylvester equation (with D.Y. Hu), Linear Algebra Appl., 172 (1992), pp. 283–313.
10. A parallel implementation of the GMRES algorithm (with D. Calvetti and J. Petersen), in Numerical Linear Algebra, eds. L. Reichel, A. Ruttan and R.S. Varga, de Gruyter, Berlin, 1993, pp. 31–46.
11. A Newton basis GMRES implementation (with Z. Bai and D. Hu), IMA J. Numer. Anal., 14 (1994), pp. 563–581.
12. Gaussian quadrature applied to adaptive Chebyshev iteration (with D. Calvetti and G.H. Golub), in Recent Advances in Iterative Methods, eds. G. Golub, A. Greenbaum and M. Luskin, Springer, New York, 1994, pp. 31–44.
13. A fast minimal residual algorithm for shifted unitary matrices (with C.F. Jagels), Numer. Linear Algebra Appl., 1 (1994), pp. 555–570.
14. A generalized ADI iterative method (with N. Levenberg), Numer. Math., 66 (1993), pp. 215–233.
15. An adaptive Chebyshev iterative method for nonsymmetric linear systems based on modified moments (with D. Calvetti and G.H. Golub), Numer. Math., 67 (1994), pp. 21–40.
16. Application of a block modified Chebyshev algorithm to the iterative solution of symmetric linear systems with multiple right hand side vectors (with D. Calvetti), Numer. Math., 68 (1994), pp. 3–16.
17. An adaptive semiiterative method for symmetric semidefinite linear systems (with D. Calvetti and Q. Zhang), in Approximation and Computation, ed. R.V.M. Zahar, Int'l Series of Numer. Math. # 119, Birkhäuser, Basel, 1994, pp. 77–96.
18. Conjugate gradient algorithms for symmetric inconsistent linear systems (with D. Calvetti and Q. Zhang), in Proceedings of the Cornelius Lanczos International Centenary Conference, eds. J.D. Brown, M.T. Chu, D.C. Ellison and R.J. Plemmons, SIAM, Philadelphia, 1994, pp. 267–272.
19. Adaptive Richardson iteration based on Leja points (with D. Calvetti), J. Comput. Appl. Math., 71 (1996), pp. 267–286.
20. A hybrid method for symmetric positive definite linear systems (with D. Calvetti), Numer. Algorithms, 11 (1996), pp. 79–98.
21. An adaptive Richardson iteration method for indefinite linear systems (with D. Calvetti), Numer. Algorithms, 12 (1996), pp. 125–149.

22. A hybrid iterative method for symmetric indefinite linear systems (with D. Calvetti), J. Comput. Appl. Math., 92 (1998), pp. 109–133.
23. Adaptively preconditioned GMRES algorithms (with J. Baglama, D. Calvetti and G.H. Golub), SIAM J. Sci. Comput., 20 (1999), pp. 243–269.
24. GMRES-type methods for inconsistent systems (with D. Calvetti and B. Lewis), Linear Algebra Appl., 316 (2000), pp. 157–169.
25. Computable error bounds and estimates for the conjugate gradient method (with D. Calvetti, S. Morigi and F. Sgallari), Numer. Algorithms, 25 (2000), pp. 79–88.
26. An iterative method with error estimators (with D. Calvetti, S. Morigi and F. Sgallari), J. Comput. Appl. Math., 127 (2001), pp. 93–119.
27. Pole placement preconditioning (with D. Calvetti), Linear Algebra Appl., 366 (2003), pp. 99–120.
28. Gauss quadrature applied to trust region computations (with D. Calvetti), Numer. Algorithms, 34 (2003), pp. 85–102.
29. Breakdown-free GMRES for singular systems (with Q. Ye), SIAM J. Matrix Anal. Appl., 26 (2005), pp. 1001–1021.
30. Augmented GMRES-type methods (with J. Baglama), Numer. Linear Algebra Appl., 14 (2007), pp. 337–350.
31. The Arnoldi process and GMRES for nearly symmetric matrices (with B. Beckermann), SIAM J. Matrix Anal. Appl., 30 (2008), pp. 102–120.
32. A generalized LSQR algorithm (with Q. Ye), Numer. Linear Algebra Appl., 15 (2008), pp. 643–660.
33. On the generation of Krylov subspace bases (with B. Philippe), Appl. Numer. Math., 62 (2012), pp. 1171–1186.
34. An augmented LSQR method (with J. Baglama and D. Richmond), Numer. Algorithms, 64 (2013), pp. 263–293.
35. Simple efficient solvers for certain ill-conditioned systems of linear equations, including $H(\mathrm{div})$ problems (with J. Ku), J. Comput. Appl. Math., 343 (2018), pp. 240–249.
36. A novel iterative method for discrete Helmholtz decomposition (with J. Ku), Appl. Numer. Math., 151 (2020), pp. 161–171.
37. An efficient implementation of the Gauss-Newton method via generalized Krylov subspaces (with A. Buccini, P. Diaz de Alba, and F. Pes), J. Sci. Comput., 97 (2023), Art. 44. in press.

Iterative Solution of Integral Equations and Conformal Mapping

1. A fast method for solving certain integral equations of the first kind with application to conformal mapping, J. Comput. Appl. Math., 14 (1986), pp. 125–142. Also in Numerical Conformal Mapping, ed. L.N. Trefethen, Elsevier, Amsterdam 1986.
2. A method for preconditioning matrices arising from linear integral equations for elliptic boundary value problems, Computing, 37 (1986), pp. 125–136.
3. Parallel iterative methods for the solution of Fredholm integral equations of the second kind,

in Hypercube Multiprocessors 1987, ed. M.T. Heath, SIAM, Philadelphia 1987, pp. 520–529.

4. Fast solution methods for Fredholm integral equations of the second kind, Numer. Math., 57 (1989), pp. 719–736.
5. A matrix problem with application to rapid solution of integral equations, SIAM J. Sci. Stat. Comput., 11 (1990), pp. 263–280.
6. Fast solution of a class of periodic pseudodifferential equations (with Y. Yan), J. Integral Equations Appl., 6 (1994), pp. 401–426.
7. Averaged Nyström interpolants for the solution of Fredholm integral equations of the second kind (with L. Fermo, G. Rodriguez, and M. M. Spalević), Appl. Math. Comput., 467 (2024), Art. 128482.

Orthogonal Polynomials and Quadrature with Applications

1. Discrete least squares approximation by trigonometric polynomials (with G.S. Ammar and W.B. Gragg), Math. Comp., 57 (1991), pp. 273–289.
2. Downdating of Szegő polynomials and data fitting applications (with G.S. Ammar and W.B. Gragg), Linear Algebra Appl., 172 (1992), pp. 315–336.
3. An analogue for Szegő polynomials of the Clenshaw algorithm (with G.S. Ammar and W.B. Gragg), J. Comput. Appl. Math., 46 (1993), pp. 211–216.
4. On the construction of Szegő polynomials (with C.F. Jagels), J. Comput. Appl. Math., 46 (1993), pp. 241–254.
5. Construction of polynomials that are orthogonal with respect to a discrete bilinear form, Adv. Comput. Math., 1 (1993), pp. 241–258.
6. Continuation methods for the computation of zeros of Szegő polynomials (with G.S. Ammar and D. Calvetti), Linear Algebra Appl., 249 (1996), pp. 125–155.
7. Application of anti-Gauss quadrature rules in linear algebra (with D. Calvetti and F. Sgallari), in Applications and Computation of Orthogonal Polynomials, eds. W. Gautschi, G.H. Golub and G. Opfer, Birkhäuser, Basel, 1999, pp. 41–56.
8. A computable error bound for matrix functionals (with D. Calvetti and G.H. Golub), J. Comput. Appl. Math., 103 (1999), pp. 301–306.
9. Computation of Gauss-Kronrod quadrature rules with non-positive weights (with G.S. Ammar and D. Calvetti), Electron. Trans. Numer. Anal., 9 (1999), pp. 26–38.
10. Computation of Gauss-Kronrod quadrature rules (with D. Calvetti, G.H. Golub, and W.B. Gragg), Math. Comp., 69 (2000), pp. 1035–1052. Republished in Milestones in Matrix Computations, eds. R. Chan, C. Greif, and D. O'Leary, Oxford University Press, Oxford, England, 2007.
11. Symmetric Gauss-Lobatto and modified anti-Gauss rules (with D. Calvetti), BIT, 43 (2003), pp. 541–554.
12. Quadrature rules based on the Arnoldi process (with D. Calvetti and S.-M. Kim), SIAM J. Matrix Anal. Appl., 26 (2005), pp. 765–781.
13. Szegő-Lobatto quadrature rules (with C. Jagels), J. Comput. Appl. Math, 200 (2007), pp. 116–126.

14. Anti-Szegő quadrature rules (with S.-M. Kim), Math. Comp., 76 (2007), pp. 795–810.
15. Matrices, moments, and rational quadrature (with G. López Lagomasino and L. Wunderlich), Linear Algebra Appl., 429 (2008), pp. 2540–2554.
16. Stieltjes-type polynomials on the unit circle (with B. de la Calle Ysern and G. López Lagomasino), Math. Comp., 78 (2009), pp. 969–997.
17. Sensitivity analysis for Szegő polynomials (with S.-M. Kim), Numer. Math., 113 (2009), pp. 265–279.
18. Block Gauss and anti-Gauss quadrature with application to networks (with C. Fenu, D. Martin, and G. Rodriguez), SIAM J. Matrix Anal., 34 (2013), pp. 1655–1684.
19. Polynomials orthogonal on the semicircle, in Walter Gautschi: Selected Works with Commentaries, vol. 2, eds. C. Brezinski and A. Sameh, Springer, New York, 2014, pp. 17–22.
20. Rational Gauss quadrature (with M. Pranić), SIAM J. Numer. Math., 52 (2014), pp. 832–851.
21. Generalized anti-Gauss quadrature rules (with M. Pranić), J. Comput. Appl. Math., 284 (2015), pp. 235–243.
22. Bounding matrix functionals via partial global block Lanczos decomposition (with M. Bellalij, G. Rodriguez, and H. Sadok), Appl. Numer. Math., 94 (2015), pp. 127–139.
23. On the computation of Gauss quadrature rules for measures with a monomial denominator (with C. Jagels), J. Comput. Appl. Math., 286 (2015), pp. 102–113.
24. New block quadrature rules for the approximation of matrix functions (with G. Rodriguez and T. Tang), Linear Algebra Appl., 502 (2016), pp. 299–326.
25. Truncated generalized averaged Gauss quadrature rules (with D. Lj. Djukić and M. M. Spalević), J. Comput. Appl. Math., 308 (2016), pp. 408–418.
26. Generalized averaged Gauss quadrature rules for the approximation of matrix functionals (with M. M. Spalević and T. Tang), BIT, 56 (2016), pp. 1045–1067.
27. Internality of generalized averaged Gauss rules and their truncations for Bernstein-Szegő weights (with D. Lj. Djukić, M. M. Spalević, and J. D. Tomanović), Electron. Trans. Numer. Anal., 45 (2016), pp. 405–419.
28. Generalized averaged Szegő quadrature rules (with C. Jagels and T. Tang), J. Comput. Appl. Math., 311 (2017), pp. 645–654.
29. Enhanced matrix function approximation (with N. Eshghi and M. M. Spalević), Electron. Trans. Numer. Anal., 47 (2017), pp. 197–205.
30. Simplified anti-Gauss quadrature rules with applications in linear algebra (with H. Alqahtani), Numer. Algorithms, 77 (2018), pp. 577–602.
31. Multiple orthogonal polynomials applied to matrix function evaluation (with H. Alqahtani), BIT, 58 (2018), pp. 835–859.
32. The extended global Lanczos method for matrix function approximation (with A. H. Bentbib, M. El Ghomari, C. Jagels, and K. Jbilou), Electron. Trans. Numer., Anal., 50 (2018), pp. 144–163.
33. Internality of generalized averaged Gaussian quadrature rules and truncated variants for mod-

ified Chebyshev measures of the second kind (with D. Lj. Djukić, M. M. Spalević, and J. D. Tomanović), J. Comput. Appl. Math., 345 (2019), pp. 70–85.

34. Internality of generalized averaged Gaussian quadrature rules and truncated variants for measures induced by Chebyshev polynomials (with D. Lj. Djukić and M. M. Spalević), Appl. Numer. Math., 142 (2019), pp. 190–205.
35. Generalized block anti-Gauss quadrature rules (with H. Alqahtani), Numer. Math., 143 (2019), pp. 605–648.
36. Rational averaged Gauss quadrature rules (with M. M. Spalević and J. D. Tomanović), FILOMAT, 34:2 (2020), pp. 379–389.
37. The extended global Lanczos method, Gauss-Radau quadrature, and matrix function approximation (with C. Jagels and K. Jbilou), J. Comput. Appl. Math., 381 (2021), Art. 113027.
38. Shifted extended global Lanczos processes for trace estimation with application to network analysis (with A. Bentbib, M. El Ghomari, and K. Jbilou), Calcolo, 58 (2021), Art. 4.
39. New matrix function approximations and quadrature rules based on the Arnoldi process (with N. Eshghi and T. Mach), J. Comput. Appl. Math., 391 (2021), Art. 113442.
40. A new representation of generalized averaged Gauss quadrature rules (with M. M. Spalević), Appl. Numer. Math., 165 (2021), pp. 614–619.
41. Computation of error bounds via generalized Gauss-Radau and Gauss-Lobatto rules (with J. Alahmadi and M. S. Pranić), J. Comput. Appl. Math., 396 (2021), Art. 113604.
42. Internality of generalized averaged Gauss quadrature rules and truncated variants for modified Chebyshev measures of the first kind (with D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), J. Comput. Appl. Math., 398 (2021), Art. 113696.
43. Estimating the error in matrix function approximations (with N. Eshghi), Adv. Comput. Math., 47 (2021), Art. 57.
44. Gauss–Laurent-type quadrature rules for the approximation of functionals of a nonsymmetric matrix (with J. Alahmadi, H. Alqahtani, and M. S. Pranić), Numer. Algorithms, 88 (2021), pp. 1937–1964.
45. The extended symmetric block Lanczos method for matrix-valued Gauss-type quadrature rules (with A. Bentbib, M. El Ghomari, and K. Jbilou), J. Comput. Appl. Math., 407 (2022), Art. 113965.
46. Averaged Gauss quadrature formulas: Properties and applications (with M. M. Spalević), J. Comput. Appl. Math., 410 (2022), Art. 114232.
47. Rational Gauss quadrature rules for the approximation of matrix functionals involving Stieltjes functions (with J. Alahmadi and M. Pranić), Numer. Math., 151 (2022), pp. 443–473.
48. Pole allocation for rational Gauss quadrature rules for matrix functionals defined by a Stieltjes function (with J. Alahmadi and M. Pranić), Axioms, 12 (2023), Art 105.
49. The global Golub-Kahan method and Gauss quadrature for tensor function approximation (with A. Benbib, M. El Ghomari, and K. Jbilou), Numer. Algorithms, 92 (2023), pp. 5–34.
50. Internality of generalized averaged Gauss quadrature rules and truncated variants for modified Chebyshev measures of the third and fourth kinds (with D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), Numer. Algorithms, 92 (2023), pp. 523–544.

51. Radau- and Lobatto-type averaged Gauss rules (with M. M. Spalević), J. Comput. Appl. Math., 437 (2024), Art. 115475.
52. Decompositions of optimal averaged Gauss quadrature rules (with D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), J. Comput. Appl. Math., 438 (2024), Art. 115586.
53. Internality of averaged Gauss quadrature rules for certain modifications of Jacobi measures (with D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), Appl. Comput. Math. (Baku), 22 (2023), pp. 426–442.
54. Error estimates for quadrature rules based on the Arnoldi process (with H. Almutairi and M. Pranić), J. Comput. Appl. Math., 442 (2024), Art. 1115726.
55. Weighted averaged Gaussian quadrature rules for modified Chebyshev measures (with D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), Appl. Numer. Math., 200 (2024), pp. 195–208.
56. Enhanced Averaged Quadrature Rules with Application to Error Estimation (with H. Almutairi, D. Lj. Djukić, R. M. Mutavdžić Djukić, M. S. Pranić, and M. M. Spalević), in Analysis, Approximation, Optimization: Computation and Applications, eds. M. Stanić, M. Albijanić, D. Djurčić, and M. M. Spalević, Springer, in press.
57. Computation of pairs of related Gauss-type quadrature rules (with H. Alqahtani, C. F. Borges, D. Lj. Djukić, R. M. Mutavdžić Djukić, and M. M. Spalević), Appl. Numer. Math., in press.

Network Analysis

1. Network analysis via partial spectral factorization and Gauss quadrature (with C. Fenu, D. Martin, and G. Rodriguez), SIAM J. Sci. Comput., 35 (2013), pp. A2046–A2068.
2. Analysis of directed networks via partial singular value decomposition and Gauss quadrature (with J. Baglama, C. Fenu, and G. Rodriguez), Linear Algebra Appl., 456 (2014), pp. 93–121.
3. Analysis of directed networks via the matrix exponential (with O. De la Cruz Cabrera and M. Matar), J. Comput. Appl. Math., 355 (2019), pp. 182–192.
4. Edge importance in a network via line graphs and the matrix exponential (with O. De la Cruz Cabrera and M. Matar), Numer. Algorithms, 83 (2020), pp. 807–832.
5. A spectral method for bipartizing a network and detecting a large anti-community (with A. Concas, S. Noschese, and G. Rodriguez), J. Comput. Appl. Math., 373 (2020), Art. 112306.
6. Orthogonal expansion of network functions (with M. Al Mugahwi and O. De la Cruz Cabrera), Vietnam J. Math., 48 (2020), pp. 941–962.
7. Functions and eigenvectors of partially known matrices with applications tonetwork analysis (with M. Al Mugahwi, O. De la Cruz Cabrera, and S. Noschese), Appl. Numer. Math., 159 (2021), pp. 93–105.
8. Block matrix models for dynamic networks (with M. Al Mugahwi, O. De la Cruz Cabrera, C. Fenu, and G. Rodriguez), Appl. Math. Comput., 402 (2021), Art. 126121.
9. New models for multi-class networks (with O. De la Cruz Cabrera and J. Jin), J. Comput. Appl. Math., 394 (2021), Art. 113567.
10. Chained graphs and some applications (with A. Concas, G. Rodriguez, and Y. Zhang), Appl. Netw. Sci., 6 (2021), Art. 39.

11. Iterative methods for the computation of the Perron vector of adjacency matrices (with A. Concas, G. Rodriguez, and Y. Zhang), Mathematics, 9 (2021), Art. 1522.
12. Centrality measures for node-weighted networks via line graphs and the matrix exponential (with O. De la Cruz Cabrera and M. Matar), Numer. Algorithms, 88 (2021), pp. 583–614.
13. Communication in complex networks (with O. De la Cruz Cabrera, J. Jin, and S. Noschese), Appl. Numer. Math., 172 (2022), pp. 186–205.
14. Estimating and increasing the structural robustness of a network (with S. Noschese). Numer. Linear Algebra Appl., 29 (2022), e2418.
15. Chained structure of directed graphs with applications to social and transportation networks (with A. Concas, C. Fenu, G. Rodriguez, and Y. Zhang), Appl. Netw. Sci., 7 (2022), Art. 64.
16. Perron communicability and sensitivity of multilayer networks (with S. El-Halouy and S. Noschese), Numer. Algorithms, 92 (2023), pp. 597–617.
17. Network analysis with the aid of the path length matrix (with S. Noschese), Numer. Algorithms, 95 (2024), pp. 451–470.
18. A tensor formalism for multilayer network centrality measures using the Einstein product (with S. El-Halouy and S. Noschese), Appl. Numer. Math., 200 (2024), pp. 236–253.
19. Enhancing multiplex global efficiency (with S. Noschese), Numer. Algorithms, 96 (2024), pp. 397–416.
20. Weighted chained graphs and some applications (with C. Fenu, G. Rodriguez, and Y. Zhang), Appl. Numer. Math., in press.
21. Sparse approximation of complex networks (with J. Jin and O. De la Cruz Cabreara) Appl. Numer. Math., in press.

Structured Problems in Linear Algebra, Applications to Signal Processing, Control Theory, and Optimization

1. On the eigenproblem for orthogonal matrices (with G.S. Ammar and W.B. Gragg), in Proceedings of the 25th IEEE Conference on Decision and Control, IEEE, Piscataway, 1986, pp. 1963–1966.
2. A divide and conquer method for the unitary eigenproblem (with W.B. Gragg), in Hypercube Multiprocessors 1987, ed. M.T. Heath, SIAM, Philadelphia 1987, pp. 639–647.
3. Determination of Pisarenko frequency estimates as eigenvalues of an orthogonal matrix (with G.S. Ammar and W.B. Gragg), in Advanced Algorithms and Architectures for Signal Processing II, ed. F.T. Luk, Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE), vol. 826, The International Society for Optical Engineering, Bellingham, WA, 1987, pp. 143–145.
4. On singular values of Hankel operators of finite rank (with W.B. Gragg), Linear Algebra Appl., 121 (1989), pp. 53–70.
5. Fast approximation of dominant harmonics by solving an orthogonal eigenvalue problem (with G.S. Ammar), in Mathematics in Signal Processing II, ed. J.G. McWhirter, Oxford University Press, Oxford, 1990, pp. 575–591.

6. A divide and conquer method for the unitary and orthogonal eigenproblems (with W.B. Gragg), Numer. Math., 57 (1990), pp. 695–718.
7. Constructing a unitary Hessenberg matrix from spectral data (with G.S. Ammar and W.B. Gragg), in Numerical Linear Algebra, Digital Signal Processing and Parallel Algorithms, eds. G.H. Golub and P. Van Dooren, Springer, New York, 1991, pp. 385–396.
8. Chebyshev-Vandermonde systems (with G. Opfer), Math. Comp., 57 (1991), pp. 703–721.
9. Fast QR decomposition of Vandermonde-like matrices and polynomial least squares approximation, SIAM J. Matrix Anal. Appl., 12 (1991), pp. 552–564.
10. Eigenvalues and pseudo-eigenvalues of Toeplitz matrices (with L.N. Trefethen), Linear Algebra Appl., 162–164 (1992), pp. 153–185.
11. A Chebyshev-Vandermonde solver (with D. Calvetti), Linear Algebra Appl., 172 (1992), pp. 219–229.
12. Direct and inverse unitary eigenproblems in signal processing: an overview (with G.S. Ammar and W.B. Gragg), in Linear Algebra for Large Scale and Real Time Applications, eds. M.S. Moonen, G.H. Golub and B.L.R. de Moor, Kluwer Academic Publishers, Dordrecht, 1993, pp. 341–343.
13. Fast inversion of Vandermonde-like matrices involving orthogonal polynomials (with D. Calvetti), BIT, 33 (1993), pp. 473–484.
14. Computing the poles of autoregressive models from the reflection coefficients (with G.S. Ammar and D. Calvetti), in Proceedings of the Thirty-First Annual Allerton Conference on Communication, Control and Computing, University of Illinois at Urbana-Champaign Press, Urbana-Champaign, 1994, pp. 247–254.
15. On the solution of Cauchy systems of equations (with D. Calvetti), Electron. Trans. Numer. Anal., 4 (1996), pp. 125–136.
16. Factorizations of Cauchy matrices (with D. Calvetti), J. Comput. Appl. Math., 86 (1997), pp. 103–123.
17. Numerical aspects of some solution methods for large Sylvester-observer equations (with D. Calvetti), in Proceedings of the 36th IEEE Conference on Decision and Control, IEEE, Piscataway, 1997, pp. 4389–4393.
18. On the solution of the single input pole placement problem (with D. Calvetti and B. Lewis), in Mathematical Theory of Networks and Systems, eds. A. Beghi, L. Finesso and G. Picci, Il Poliografo, Padova, 1998, pp. 585–588.
19. On an inverse eigenvalue problem for Jacobi matrices (with D. Calvetti), Adv. Comput. Math., 11 (1999), pp. 11–20.
20. On the selection of poles in the single input pole placement problem (with D. Calvetti and B. Lewis), Linear Algebra Appl., 302-303 (1999), pp. 331–345.
21. Partial eigenvalue assignment for large observer problems (with D. Calvetti and B. Lewis), in Proceedings CD of the Fourteenth International Symposium of Mathematical Theory of Networks and Systems, Perpignan, France, 2000, 5 pages.
22. Polynomial zerofinders based on Szegő polynomials (with G.S. Ammar, D. Calvetti and W.B. Gragg), J. Comput. Appl. Math., 127 (2001), pp. 1–16.

23. Partial eigenvalue assignment for large linear control systems (with D. Calvetti and B. Lewis), in Structured Matrices in Mathematics, Computer Science and Engineering I, ed. V. Olshevsky, Contemporary Mathematics, vol. 280, Amer. Math. Soc., Providence, RI, 2001, pp. 241–254.
24. On the solution of large Sylvester-observer equations (with D. Calvetti and B. Lewis), Numer. Linear Algebra Appl., 8 (2001), pp. 435–451.
25. The restarted QR-algorithm for eigenvalue computation of structured matrices (with D. Calvetti and S.-M. Kim), J. Comput. Appl. Math., 149 (2002), pp. 415–422.
26. A modified companion matrix method based on Newton polynomials (with D. Calvetti and F. Sgallari), in Fast Algorithms for Structured Matrices: Theory and Applications, ed. V. Olshevsky, Contemporary Mathematics, vol. 323, Amer. Math. Soc., Providence, RI, 2003, pp. 179–186.
27. The structured distance to normality of an irreducible real tridiagonal matrix (with S. Noschese and L. Pasquini), Electron. Trans. Numer. Anal., 28 (2007), pp. 65–77.
28. The extended Krylov subspace method and orthogonal Laurent polynomials (with C. Jagels), Linear Algebra Appl., 431 (2009), pp. 441–458.
29. The structured distance to normality of banded Toeplitz matrices (with S. Noschese), BIT, 49 (2009), pp. 629–640.
30. Recursion relations for the extended Krylov subspace method (with C. Jagels), Linear Algebra Appl., 434 (2011), pp. 1716–1732.
31. The structured distance to normality of Toeplitz matrices with application to preconditioning (with S. Noschese), Numer. Linear Algebra Appl., 18 (2011), pp. 429–447.
32. Generalized circulant Strang-type preconditioners (with S. Noschese), Numer. Linear Algebra Appl., 19 (2012), pp. 3–17.
33. Tridiagonal Toeplitz matrices: properties and novel applications (with S. Noschese and L. Pasquini), Numer. Linear Algebra Appl., 20 (2013), pp. 302–326.
34. The structure of matrices in rational Gauss quadrature (with C. Jagels), Math. Comp., 82 (2013), pp. 2035–2060.
35. A note on superoptimal generalized circulant preconditioners (with S. Noschese), Appl. Numer. Math., 75 (2014), pp. 188–195.
36. A CS decomposition for orthogonal matrices with application to eigenvalue computation (with D. Calvetti and H. Xu), Linear Algebra Appl., 476 (2015), pp. 197–232.
37. Approximated structured pseudospectra (with S. Noschese), Numer. Linear Algebra Appl., 24 (2017), e2082 (11 pages).
38. New zero-finders for trust-region computations (with M. Alkilayh and J. Y. Yuan), Numer. Algorithms, 76 (2017), pp. 361–375.
39. Accuracy optimization of combined multiparameter measuring systems with application to polarized light microscopy (with M. Kuian and S. V. Shiyanovskii), Phys. Rev. E, 97 (2018), 063305 (8 pages).
40. Computing unstructured and structured polynomial pseudospectrum approximations (with S. Noschese), J. Comput. Appl. Math., 350 (2019), pp. 57–68.

41. Eigenvector sensitivity under general and structured perturbations of tridiagonal Toeplitz-type matrices (with S. Noschese), Numer. Linear Algebra Appl., 26 (2019), e2232 (20 pages).
42. Fast factorization of rectangular Vandermonde matrices with Chebyshev nodes (with M. Kuian and S. V. Shiyanovskii), Numer. Algorithms, 81 (2019), pp. 547–559.
43. Optimally conditioned Vandermonde-like matrices (with M. Kuian and S. V. Shiyanovskii), SIAM J. Matrix Anal. Appl., 40 (2019), pp. 1399–1424.
44. On the banded Toeplitz structured distance to symmetric positive semidefiniteness (with S. Noschese), Electron. J. Linear Algebra, 38 (2022), pp. 260–273.

Polynomial and Rational Approximation

1. An asymptotically orthonormal polynomial family, BIT, 24 (1984), pp. 647–655.
2. On complex rational approximation by interpolation at preselected nodes, Complex Variables: Theory and Applic., 4 (1984), pp. 63–87.
3. On polynomial approximation in the complex plane with application to conformal mapping, Math. Comp., 44 (1985), pp. 425–433.
4. Some computational aspects of a method for rational approximation, SIAM J. Sci. Stat. Comput., 7 (1986), pp. 1041–1057.
5. On polynomial approximation in the uniform norm by the discrete least squares method, BIT, 26 (1986), pp. 349–368.
6. Newton interpolation in Chebyshev and Fejér points (with B. Fischer), Math. Comp., 53 (1989), pp. 265–278.
7. Newton interpolation at Leja points, BIT, 30 (1990), pp. 332–346.
8. Accuracy control for parallel evaluation of matrix rational functions (with D. Calvetti and E. Gallopoulos), in Proceedings of the Sixth SIAM Conference on Parallel Processing for Scientific Computing, eds. R.F. Sincovec, D.E. Keyes, M.R. Leuze, L.R. Petzold and D.A. Reed, SIAM, Philadelphia, 1993, pp. 652–655.
9. Gram polynomials and the Kummer function (with R.W. Barnard, G. Dahlquist, K. Pearce and K.C. Richards), J. Approx. Theory, 94 (1998), pp. 128–143.
10. On the evaluation of polynomial coefficients (with D. Calvetti), Numer. Algorithms, 33 (2003), pp. 153–161.
11. Error estimation and evaluation of matrix functions via the Faber transform (with B. Beckermann), SIAM J. Numer. Anal., 47 (2009), pp. 3849–3883.
12. Recurrence relations for orthogonal rational functions (with M. Pranić), Numer. Math., 123 (2013), pp. 629–642.
13. Convergence rates for inverse-free rational approximation of matrix functions (with C. Jagels, T. Mach, and R. Vandebril), Linear Algebra Appl., 510 (2016), pp. 291–310.
14. A rational Arnoldi process with applications (with M. Pranić, G. Rodriguez, Z. Wang, and X. Yu), Numer. Linear Algebra Appl., 23 (2016), pp. 1007–1022.
15. Optimal averaged Pad-type approximants (with D. Djukić, R. Mutavdzić Djukić, L. Reichel, and M. Spalević), Electron. Trans. Numer. Anal., 59 (2023), pp. 145–156.

Numerical Methods for Ordinary and Partial Differential Equations

1. The determination of boundary collocation points for solving some problems for the Laplace operator, in Proceedings of the 18th Scandinavian Congress of Mathematicians, Århus 1980, ed. E. Balslev, Birkhäuser, Basel, 1981, pp. 416–429.
2. Heat conduction in a rock mass with an annular hot water storage (with G. Rehbinder), Int'l J. Heat and Fluid Flow, 5 (1984), pp. 131–137.
3. On the determination of boundary collocation points for solving some problems for the Laplace operator, J. Comput. Appl. Math., 11 (1984), pp. 175–196.
4. On the numerical solution of some 2-d electromagnetic interface problems by the boundary collocation method, Comput. Meth. Appl. Mech. Engng, 53 (1985), pp. 1–11.
5. Numerical methods for analytic continuation and mesh generation, Constructive Approx., 2 (1986), pp. 23–39.
6. Edge waves by boundary collocation (with P. Chapman), J. Comput. Appl. Math., 15 (1986), pp. 59–73.
7. On the computation of eigenvalues of the Laplacian by the boundary collocation method, in Approximation Theory V, eds. C.K. Chui, J.C. Ward and L.L. Schumaker, Academic Press, Orlando 1986, pp. 539–542.
8. The selection of subspace and collocation points in the boundary collocation method for some plane elliptic boundary value problems, in Algorithms for Approximation, eds. J.C. Mason and M.G. Cox, Clarendon Press, Oxford, 1987, pp. 541–553.
9. Boundary collocation in Fejér points for computing eigenvalues and eigenfunctions of the Laplacian, in Approximation Theory, Tampa, ed. E.B. Saff, Lecture Notes in Mathematics # 1287, Springer, Berlin 1987, pp. 146–160.
10. The ordering of tridiagonal matrices in the cyclic reduction method for Poisson's equation, Numer. Math., 56 (1989), pp. 215–227.
11. Solving a model interface problem for the Laplace operator by the boundary collocation method and applications, in Proceedings of the Third European Conference on Mathematics in Industry, eds. J. Manley, S. McKee and R. Owens, Teubner, Stuttgart, 1990, pp. 119–130.
12. Incomplete partial fractions for parallel evaluation of rational matrix functions (with D. Calvetti and E. Gallopoulos), J. Comput. Appl. Math., 59 (1995), pp. 349–380.
13. Exponential integration methods for large stiff systems of differential equations (with D. Calvetti), in Iterative Methods in Scientific Computing IV, eds. D.R. Kincaid and A.C. Elster, IMACS Series in Computational and Applied Mathematics, vol. 5, IMACS, New Brunswick, 1999, pp. 237–243.

Bioinformatics

1. The relationship between protein sequences and their gene ontology functions (with Z.-H. Duan, B. Hughes, D. M. Perez, and T. Shi), BMC Bioinformatics, 7 (Suppl 4) (2006), S11 (11 pages). An initial version has been published as The relationship between protein sequences and their gene ontology functions (with Z.-H. Duan, B. Hughes, T. Shi), IEEE Proceedings

of the International Multi-Symposiums on Computer and Computational Sciences, 1 (2006), pp. 76–83.

Mathematical Software

1. Algorithm 686: FORTRAN subroutines for updating the QR decomposition of a matrix (with W.B. Gragg), ACM Trans. Math. Software, 16 (1990), pp. 369–377.
2. Algorithm 730: An implementation of a divide and conquer algorithm for the unitary eigenproblem (with G.S. Ammar and D.C. Sorensen), ACM Trans. Math. Software, 18 (1992), pp. 292–307 and 20 (1994), p. 161.
3. Algorithm 827: irbleigs: A MATLAB program for computing a few eigenpairs of a large sparse Hermitian matrix (with J. Baglama and D. Calvetti), ACM Trans. Math. Software, 29 (2003), pp. 337–348.
4. Restarted block Lanczos bidiagonalization methods (with J. Baglama), Numer. Algorithms, 43 (2006), pp. 251–272. MATLAB code and a primer describing the code are available from Netlib at `http://www.netlib.org/numeralgo/na26`
5. Algorithms for range restricted iterative methods for linear discrete ill-posed problems (with A. Neuman and H. Sadok), Numer. Algorithms, 59 (2012), pp. 325–331. MATLAB code and a primer describing the code are available from Netlib at `http://www.netlib.org/numeralgo/na33`
6. irlba: Fast truncated SVD, PCA, and symmetric eigendecomposition for large dense and sparse matrices (with J. Baglama and B. W. Lewis), R package version 2.2.3, 2019. Available at `https://CRAN.R-project.org/package=irlba` This is a package for the statistical computing environment R[1] and is the leading algorithm for truncated SVD computations. The algorithm has been downloaded more than one million times.
7. SoftNet: A package for the analysis of complex networks (with C. Fenu and G. Rodriguez), Algorithms, 15 (2022), Art. 296.
8. Solution of ill-posed problems with Chebfun (with A. Alqahtani and T. Mach), Numer. Algorithms, 92 (2023), pp. 2341–2364.

Book Reviews

1. G. Dahlquist and Å. Björck, Numerical Methods, Dover, Mineola, 2003; Math. Comp., 74 (2005), p. 519.
2. W. Gautschi, Orthogonal Polynomials: Computation and Approximation, Oxford Univ. Press, Oxford, 2004; J. Approx. Theory, 153 (2008), pp. 257–259.
3. G. H. Golub and G. Meurant, Matrices, Moments and Quadrature with Applications, Princeton Univ. Press, Princeton, 2010; Linear Algebra Appl., 434 (2011), pp. 379–380.

[1] R Core Team, R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria, 2016. URL `https://www.R-project.org/`