C U R R I C U L U M V I T A E

CHRISTOPHER ANDREW BEATTIE
Department of Mathematics
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061
(540) 231-8279

PERSONAL DATA:

Citizenship: US, Public Trust Clearance Resident of Blacksburg, Virginia

EDUCATION:

Ph.D. 1982 — Mathematics (Mathematical Sciences), The Johns Hopkins University
Dissertation Title: Some Convergence Results for Intermediate Problems that Displace Essential Spectra. (David Fox, supervising professor)

M.A. 1981 — Mathematics (Mathematical Sciences), The Johns Hopkins University

M.S. 1977 — Mechanical Engineering, minor in Mathematics, Duke University, Thesis Title: A Semianalytic Model of Middle Ear Dynamics. (Donald Wright, supervising professor)

B.S.E. 1975 — Biomedical Engineering/Computer Science (Double Major), Duke University

PROFESSIONAL EMPLOYMENT:

Professor, Department of Mathematics,
Virginia Polytechnic Institute and State University, 1998-present
(Associate Professor, 1989-1998; Assistant Professor, 1983-1989)
(Courtesy appointment with Department of Computer Science, 1992-present)

Adjunct Faculty, Institut für Mathematik, Technische Universität - Berlin, 2015 - 2018

Visiting Scientist, Ocean Dynamics and Prediction Branch, Oceanography Division, Naval Research Laboratory-SSC, 2010-2011; Summer, 2012; 2013-2014

Visiting Scientist, Max Plank Institute for Complex Dynamical Systems, Magdeburg, Germany, Summer/Fall, 2012; Summer, 2013 (supported in part by DFG SFB: ``Thermo-Energetische Gestaltung von Werkzeugmaschinen")

Visiting Scientist, Applied Sciences Division, NASA Stennis Space Center, 2008-2009 (work assignment from VT to NASA on Intergovernmental Personnel Act)

Visiting Scientist, Department of Mathematics, Technische Universität - Berlin, Germany, Summer Semester, April-July, 2004

Alexander von Humboldt Foundation Fellow, Institut für Angewandte Mathematik, Braunschweig, Germany, June, 1991 - July, 1992.

Visiting Fellow, Minnesota Supercomputer Institute and Department of Computer Science, University of Minnesota, 1986-1987.

NSF Visiting Scholar, Institut für Mathematik, Technische Universität - Clausthal, Clausthal-Zellerfeld, West Germany, November, 1986 - February, 1987.

Visiting Assistant Professor, Department of Mathematics, University of Arizona, Tucson, 1982-1983.

Associate Engineer, Environmental Testing Laboratory, Space Division, JHU Applied Physics Laboratory, Summer 1982.

Research Fellow, The Johns Hopkins University Applied Physics Laboratory, 1980-1982.

Post-graduate work at Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, Warsaw, Poland, 1977-1978.

AWARDS:

2015-2017	Einstein Visiting Fellow, Einstein Foundation - Berlin.
1991-1992	Alexander von Humboldt Foundation Research Fellow.
1980-1981	The Johns Hopkins University Applied Physics
1981-1982	Laboratory Research Fellowships

PROFESSIONAL ORGANIZATIONS AND ACTIVITIES:

Member: American Mathematical Society; Association for Computing Machinery; Mathematical Association of America; Society for Industrial and Applied Mathematics.

Referee for: Numerical Algorithms; Electronic Transactions of Numerical Analysis (ETNA); SIAM Review; SIAM Journal of Mathematical Analysis; SIAM Journal of Scientific and Statistical Computing; Numerische Mathematik; Journal of Computational Physics; Journal of Mathematical Physics; Linear Algebra and its Applications; Journal of Applied Mechanics; IEEE Transactions on Acoustics, Speech, and Signal Processing; and National Science Foundation. Reviewer for Academic Press.

Department of Energy review panel to draft recommendations for funding priorities in scientific computing. April 12-15, 1993, Washington, D.C.

Co-organizer (with F. Goerisch) of special session on "Eigenvalue Problems" 13th World Congress on Computation and Applied Mathematics - IMACS '91, July 22-26, 1991, Dublin, Ireland.

Organizer of minisymposium at 49th SIAM National Meeting, San Diego, CA, July 9-13, 2001,“Krylov Methods for Model Reduction of Large-scale Dynamical Systems”

Organizer of minisymposium at Joint SIAM/GAMM Conference on Applied Linear Algebra, Dusseldorf, Germany July 24-27, 2006, “Model Reduction of Large-scale Dynamical Systems”

Local organizing committee of *18th International Symposium on the Mathematical Theory of Networks and Systems - MTNS 2008*, Blacksburg, Virginia. July 28, 2008 - August 1, 2008.

Co-organizer (with S. Gugercin) of minisymposium , “Model Reduction of Large-scale Dynamical Systems” at SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009

Organizer of *"Model Reduction of Transport-dominated Phenomena" a workshop sponsored by the Einstein Foundation, Berlin, May 19-20, 2015 (http://www3.math.tu-berlin.de/numerik/MoRTransPhen/)*

Co-organizer (with S. Gugercin, P. Schulze, and B. Unger) of minisymposium, “Modeling and simulation of transport-dominated phenomena” at 7th European Congress of Mathematics, Berlin July 18 - 22, 2016.

Local organizing committee of Householder Symposium XX on Numerical Linear Algebra, June 18–23, 2017 in Blacksburg, Virginia.

PRESENTATIONS:

Invited Short Courses and Lecture Series (4 or more Lectures):

(1) "Variational Methods of Eigenvalue Estimation in Quantum Mechanics," (4 lectures) at University of La Laguna, Tenerife, Spain, June 22-23, 1983.

(2) "Eigenvalue Bracketing with Intermediate Problem Techniques," Invited short course (5 lectures), University of Catania, Italy, January 26-30, 1987.

(3) "Potential Theory in the Analysis of Iterative Methods" Invited short course (5 lectures) April-June 2004, Technical University of Berlin, Germany

(4) "The numerical treatment of inverse problems and data assimilation", (8 week Master's level seminar), Summer Semester, 2017, Technical University of Berlin, Germany

Invited Presentations:

(5) "The Construction of Convergent Intermediate Hamiltonians," Conference on Numerical Treatment of Eigenvalue Problems, Oberwolfach, West Germany, June 12-18, 1983.

(6) "Spectral Estimation for Sparse Structure Dynamics," Invited Lecturer at NASA-NSF-AFOSR Joint Workshop on Control of Large Flexible Structures, Tampa, FL, March 4-8, 1985.

(7) "An approach for bracketing the eigenfrequencies of sparse frame structures," Invited paper at Society of Engineering Science 22nd Annual Meeting, University Park, PA, October 7-9, 1985.

(8) "Rapid computational approaches for resolving intermediate problems," Workshop on Eigenvalue problems in Engineering Science, Oberwolfach, West Germany, November 30 - December 6, 1986.

(9) "Intermediate operator methods for eigenvalue estimation," Invited speaker, University of Arizona Year of Concentration in Computational Mathematics, Tucson, AZ. Feb. 22 - March 14, 1987.

(10) "Low rank modifications of the spectral factorization," Invited speaker, 845th meeting of the American Mathematical Society, Special session on numerical linear algebra, Lawrence, Kansas, October 28-29, 1988.

(11) "How long does it take to trap an eigenvalue? " Workshop on Eigenvalue Problems in Natural and Engineering Science and Their Numerical Treatment, Oberwolfach, West Germany, February 25 - March 3, 1990.

(12) "Matrix approximation in the identification of vibrating structures," Invited speaker, International Conference on New Developments in Structural Mechanics, July 4-6, 1990. Catania, Italy.

(13) "Parameterized Intermediate Problems - Computational Strategies for Eigenvalue Bounds," Invited speaker, Annual meeting of Gesellschaft für Angewandte Mathematik und Mechanik, Braunschweig, Germany, April 4-8, 1994.

(14) "Trapping eigenvalues in the presense of essential spectrum," Invited speaker at minisymposium on Numerical Treatment of Eigenvalue Problems at ICIAM '95 Congress in Hamburg, Germany. July 3-7, 1995.

(14) "Proving existence of bound states," Invited speaker at an international workshop on numerical analysis and spectral theory, Clausthal, Germany July 17-19, 1995.

(16) "Matrix approximants in inverse vibration problems," Invited speaker at special session in computational linear algebra, AMS Regional Meeting, Kent, Ohio, November 3-4, 1995

(17) "Matrix/Operator Approximation Methods for Inverse Vibration Problems," Invited speaker at special session in inverse vibration problems, SIAM National Meeting in Charlotte, October 23-25, 1995.

(18) "Trapping eigenvalues in the presense of essential spectrum," Colloquium speaker in Department of Computational and Applied Mathematics, Rice University, Houston, April 22, 1996

(19) "Reconciling modeled dynamics with experimental data," Invited speaker at minisymposium on Spectral Information in Inverse Problems, SIAM National Meeting, Kansas City, Missouri, July 22-26, 1996

(20) "Trapping Lanczos Eigenvalues and Why Rubies are Red," Invited speaker at Workshop on the Use of Iterative Methods for Large-Scale Eigenvalue Problems, Argonne National Laboratory, May 14-16, 1997

(21) "An On-line course in Linear Algebra," Invited Speaker at minisymposium on Educational Issues in Linear Algebra. 7th Annual ILAS Conference, Madison, WI, June 3-6, 1998

(22) "New Variational Characterizations for Trapping Eigenvalues," Invited speaker at International Workshop on Accurate Calculation of Eigenvalue Problems. Penn State University, July 22-26, 1998

(23) "Relative Lehman Bounds for Restricted Eigenvalue Problems," Invited Speaker at Conference on Computation and Analytic Problems in Spectral Theory held in Gregynog, Wales, UK. July 11-16, 1999

(24) "The Potential of Krylov Iterates to Attract Invariant Subspaces," Invited Speaker at International Workshop on Accurate Solution of Eigenvalue Problems, Hagen, Germany, July 2-7, 2000

(25) "Convergence to Invariant Subspaces by Krylov Methods with Rational Filters," Invited Speaker at Seventh SIAM Conference on Applied Linear Algebra, Raleigh, October 21-27, 2000

(26) "Approximation of Invariant Subspaces with Krylov-like Subspaces," Invited participant at Householder Symposium on Numerical Linear Algebra, Peebles, Scotland. June 17-21, 2002

(27) "Singular value decay for solutions to matrix equations," Invited speaker at Fourth International Workshop on Accurate Calculation of Eigenvalue Problems. Split, Croatia. June 24-27, 2002

(28) "Low rank approximate solutions to matrix equations," Invited speaker at Electronic Transactions of Numerical Analysis 10th Anniversary Conference, Kent, Ohio. May 29-31, 2003.

(29) "Low rank Riccati residuals and finding the nearest Krylov space," (with Kenneth Massey), Eighth SIAM Conference on Applied Linear Algebra, Williamsburg, VA,. July 15-19, 2003

(30) "Projection methods for reduced order modeling," plenary speaker at GAMM Workshop in Applied and Numerical Linear Algebra, July 2 - 3, 2004, Hagen, Germany

(31) "Approximating f(A)b for large sparse A," Invited speaker at Fifth International Workshop on Accurate Solution of Eigenvalue Problems, June 28th - July 1st, 2004, Hagen, Germany

(32) "Projection methods for model reduction of dynamical systems," Invited speaker at minisymposium on Model Reduction, SIAM Conference on Computational Science and Engr, Orlando, FL, February 2005.

(33) "Pure POD," Invited speaker at minisymposium on Model Reduction for Large Scale Dynamical Systems at 2005 SIAM Annual Meeting, New Orleans, July, 2005

(34) "Model reduction of large scale second-order systems with modal damping," Ninth Copper Mountain Conference On Iterative Methods, Copper Mountain, CO. April, 2006.

(35) "Inexact Krylov Reduction for Modally Damped Structural Vibration" plenary speaker at Sixth International Workshop on Accurate Solution of Eigenvalue Problems (IWASEP6), State College, PA, May, 2006

(36) "Inexact Krylov Projection Methods for Model Reduction," invited speaker at minisymposium on Model Reduction of Dynamical Systems at 2006 SIAM Annual Meeting, Boston, July, 2006

(37) "Inexact interpolation for model reduction," (self-) invited speaker at minisymposium on Model Reduction at GAMM–SIAM Conference on Applied Linear Algebra in Dusseldorf, Germany. July, 2006

(38) "Structured Perturbations in Rational Krylov Methods for Model Reduction," invited speaker at *Workshop on Structured Perturbations and Distance Problems in Matrix Computations*, Bedlewo, Poland, March 26-30 (2007)

(39) "Structure Preserving Model Reduction with Interpolatory Projection Methods", *6th International Congress on Industrial and Applied Mathematics,* Zurich, Switzerland, July 16-20 (2007).

(40) "*A Krylov-Based Descent Approach for the Optimal H_2 Model Reduction of Large-Scale Dynamical Systems,"* invited speaker at 15th ILAS Conference, Cancun, June 2008

(41) *"H_2-Optimal Interpolation for Model Reduction of Parameterized Systems,"* invited speaker at minisymposium on *Model Order Reduction for Dynamical Systems*, SIAM Conference on Applied Linear Algebra, Monterrey CA, October 26-29, 2009

(42) *"Projection Methods for Structure-preserving Model Reduction"* invited speaker at minisymposium on Model Reduction at SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009

(43) *"Model Reduction for Data Assimilation",* invited speaker at minisymposium on Structure-Preserving Model Reduction, ICIAM 2011 - 7th International Congress on Industrial and Applied Mathematics, July 18 – 22, 2011, Vancouver, BC, Canada

(44) *"Structure Preserving Interpolatory Model Reduction",* invited speaker at minisymposium on Model Order Reduction Using Graph Theory and Numerical Linear Algebra, SIAM Conference on Computational Science and Engineering, Feb 28 – Mar 4, 2011, Reno, NV

(45) "*H_2 Optimal Reduced Models for Structured Systems*", invited speaker at Conference on Model Reduction and Approximation of Complex Dynamical Systems , June 10-14, 2013, Luminy, France

(46) "*Variational Approximation for Selfadjoint Eigenvalue Problems*", invited participant and speaker at Workshop on Numerical Solution of PDE Eigenvalue Problems, Oberwolfach, Germany, Nov 17 - 23, 2013.

(47) "*Relative Variational Principles for Eigenvalues of Self-adjoint Operators*", plenary speaker at 10th International Workshop on Accurate Solution of Eigenvalue Problems, Dubrovnik, Croatia, June 2-5, 2014

(48) "*An Overview of Interpolatory Model Reduction*", Invited speaker at Tegernsee Workshop on Computational Methods in Systems and Control Theory, Tegernsee, Germany June 25 - 28, 2014

(49) "*Diffusion Models for Covariance",* Plenary speaker at Householder Symposium XIX on Numerical Linear Algebra, Spa, Belgium June 8-13, 2014.

(50) *"Structure-Preserving Model Reduction".* Plenary speaker at Model Reduction of Parametrized Systems III (MoRePaS 3), SISSA, International School for Advanced Studies, Trieste, Italy. October 13-16, 2015

(51) *"Model Order Reduction in Data Assimilation".* Keynote speaker at Workshop on Data-driven Model Order Reduction and Machine Learning (MORML '16), University of Stuttgart, Germany March 27-April 1, 2016

(52) "Preserving passivity in data-driven settings". Invited speaker at minisymposium on *Data-Driven Model Reduction,* 20th Conference of the International Linear Algebra Society (ILAS), KU Leuven, Belgium, July 11–15, 2016

(53) "Data-driven Modeling and Optimization of Dissipative Dynamics". Plenary speaker at Workshop on the Mathematics of Reduced Order Models, ICERM Brown University, Providence, Rhode Island. February 17-21, 2020

GRANT SPONSORSHIP:

2019-2022 Co-principal investigator with M. Embree, and S. Gugercin, and V. Kekatos, National Science Foundation, Division of Mathematical Sciences, Title: "*AMPS: Model Reduction for Analysis, Identification, and Optimal Design of Power Networks*," $376,481.

2018-2021 Co-principal investigator with Jeffrey Borggaard and Serkan Gugercin, National Science Foundation, Division of Mathematical Sciences, Title: "Efficient Algorithms for Optimal Control of Time-Periodic and Nonlinear Systems" $280,000

2015-2017 Co-principal investigator with Rudibert King (TU Berlin) and Volker Mehrmann (TU Berlin), Einstein Foundation - Berlin. Title: "Model reduction for complex transport-dominated phenomena and reactive flows" €450,000

2012-2015 Co-principal investigator with Eric de Sturler, Misha Kilmer, and Serkan Gugercin, National Science Foundation, Division of Mathematical Sciences, Title: "Innovative Integrative Strategies for Nonlinear Parametric Inversion" $447,582.

2005-2008 Co-principal investigator with Serkan Gugercin, National Science Foundation, Division of Mathematical Sciences, Title: "Model Reduction with Rational Krylov Methods" $210,875.

2005-2008 Co-principal investigator with Jeff Borggaard, Serkan Gugercin, Traian Iliescu. National Science Foundation, Division of Mathematical Sciences, Title: "Computation and Analysis of Reduced-order Models for Distributed Parameter Systems" $431,342

2005-2008 Co-principal investigator with Jeff Borggaard, Serkan Gugercin, Traian Iliescu. Air Force Office of Scientific Research, Title: "High Performance Parallel Algorithms for Improved Reduced-Order Modeling" $541,539

1999-2000 Co-principal investigator with Bob Rogers, National Science Foundation Division of Undergraduate Education Course/Curriculum/Laboratory Improvement Program. "Advanced Engineering Mathematics Interactive." $75,000.

1998-1999 Co-principal investigator with Bob Rogers, Monte Boisen, David L. Russell, and Robert Wheeler in National Science Foundation, Division of Undergraduate Education, Instrumentation and Laboratory Improvement Program. "Incorporating Experimental Results into the Undergraduate Mathematics Curriculum Using Web-Based Technology." $55,194.

1997-1999 Co-principal investigator with Bob Rogers and Monte Boisen in National Science Foundation Division of Undergraduate Education, Summer Experience for Undergraduates. Title: "Mathematical Models in Materials Science." $81,000.

1997-1998 Co-principal investigator with R. Rogers, T. Herdman, R. Olin, and D.L. Russell in Center for Innovation in Learning Course Transformation Grant. "Distance learning in applied mathematics graduate courses." $60,000.

1995 Corporate matching grant for the Scientific Modeling and Visualization Classroom from Sun Microsystems and Visual Numerics. Co-PI with Ron Kriz (ESM/MSE) and Cal Ribbens (CS). $260,000.

1989-1991 Co-principal investigator (with S. W. Smith) in NASA Spacecraft Dynamics Branch Research Grant (NASA NAG-1-960 and NAG-1-1246) "Model Correlation and Damage Location for Large Space Truss Structures." Total funding: $194,911.

1988-1990 Co-principal investigator (with D. Fox) in National Science Foundation Grant (NSF 0647-5407) "High Speed Methods for Algebraic Eigenvalue Problems using Intermediate Problem Techniques." $160,000.

1986-1988 Principal investigator in National Science Foundation International Program Grant (INT 8610429) for collaborative research in Germany and Italy, "Computational Methods for Estimating Operator Eigenvalues." $5,875.

1984-1987 Co-principal investigator (with T. L. Herdman and G. Cliff) in Air Force Office of Scientific Research Grant (AFOSR 84-0326) "Well-posedness and Spectral Estimation for Infinite-dimensional Systems." $125,539.

JOURNAL PUBLICATIONS:

1. C. Beattie and W. M. Greenlee, Convergence theorems for intermediate problems. Proceedings of the Royal Society of Edinburgh, 100A, pp. 107-122. (1985)

2. C. Beattie, Convergence of essential spectra for intermediate Hamiltonians. SIAM Journal of Mathematical Analysis, 16 (3), pp. 492-499. (1985)

3. C. Beattie, An extension of Aronszajn's Rule: Slicing the spectrum for intermediate problems. SIAM Journal of Numerical Analysis, 24 (4), pp. 828-843. (1987)

4. C. Beattie, Lower bounds for the resonant frequencies of nonuniform frame structures. Zeitschrift für angewandte Mathematik und Mechanik, 67 (11) pp. 545-556. (1987)

5. C. Beattie and W. M. Greenlee, Convergence rates for intermediate problems. Manuscripta Mathematica, 59, pp. 209-227. (1987)

6. C. Beattie and D. W. Fox, Schur complements and the Weinstein-Aronszajn theory for modified matrix eigenvalue problems. Linear Algebra and its Applications, 108, pp. 37-61. (1988)

7. C. Beattie and M. B. Ruskai, Location of essential spectra of intermediate Hamiltonians restricted to symmetry subspaces. Journal of Mathematical Physics, 29 (10), pp. 2236-2240. (1988)

8. C. Beattie and D. W. Fox, Localization criteria and containment for Rayleigh quotient iteration. SIAM Journal of Matrix Analysis and Applications, 10 (1), pp. 80-93. (1989)

9. C. Beattie, M. Boisen, and L. Johnson, Inertia-preserving secant updates. Journal of Optimization Theory and Applications, 62 (1), pp. 1-16. (1989)

10. F. Senese, C. Beattie, J. Schug, J. Viers, and L. Watson, A full variational calculation based on a tensor product decomposition. Chemical Physics Letters, 160 (4), pp. 423-431. (1989)

11. S. W. Smith and C. Beattie, Secant-method adjustment for structural models. AIAA Journal, 29 (1), pp. 119-126. (1991)

12. C. Beattie and S. W. Smith, Optimal matrix approximants in structural identification. Journal of Optimization Theory and Applications, 74 (1), pp. 23-56. (1992)

13. C. Beattie and W. M. Greenlee, Improved convergence rates for intermediate problems. Mathematics of Computation, 59 (199), pp. 77-95. (1992)

14. D. Zigic, L. Watson, and C. Beattie, Contragredient transformations applied to the optimal projection equations. Linear Algebra and its Applications, 188/189 pp. 665-676. (1993)

15. C. Beattie and F. Goerisch, Methods for computing lower bounds to eigenvalues of self-adjoint operators. Numerische Mathematik, 72, pp. 143-172 (1995).

16. E. Matheu, M. P. Singh, and C. Beattie, Output-Feedback Sliding-Mode Control with Generalized Sliding Surface for Civil Structures under Earthquake Excitation. Journal of Earthquake Engineering and Structural Dynamics, 27, pp. 259-282 (1998).

17. C. Beattie, Harmonic Ritz and Lehmann Bounds, Electronic Transactions of Numerical Analysis (ETNA), 7, pp. 18-39, (1998).

18. C. Beattie, Galerkin Eigenvector Approximations, Mathematics of Computation. 69, pp.1409-1434. (2000)

19. M. G. Marmorino, J. C. Schug, and C. Beattie, Lower Bound Problems and Bounds to Atomic Ionization Energies, Int. J. Quantum Chem. 77 (4), pp 779-784 (2000)

20. D. J. Leo, E. M. Austin, and C.Beattie, Constrained Substructure Approach to Optimal Strain Energy Analysis, J. Vibration and Acoustics, 123 (3), pp. 340-346. (2001).

21. C. Beattie and W. M. Greenlee, Convergence Theorems for Intermediate Problems II, Proc. Royal Soc. Edinburgh. 132A pp. 1057-1072 (2002)

22. C. Beattie and I. C. F. Ipsen, Inclusion Bounds for Matrix Eigenvalues, Linear Algebra and its Applications. 358, pp.281-291 (2003)

23. Convergence of restarted Krylov subspaces to invariant subspaces, (with M. Embree and J. Rossi), SIAM J. Matrix Analysis and Applications, 25 (4), pp.1074-1109, (2004)

24. Convergence of Polynomial Restart Krylov Methods for Eigenvalue Computations, (with M. Embree, and D. Sorensen). SIAM Review, 47 (3), pp. 492 – 515, (2005)

25. H_2 model reduction of large-scale dynamical systems. (with S. Gugercin and A. C. Antoulas) SIAM Journal on Matrix Analysis and Applications, 30(2), pp. 609-638 (2008)

26. Interpolatory projection methods for structure-preserving model reduction (with S. Gugercin), Systems and Control Letters, 58(3), pp. 225-232. (2009)

27. Radial basis function collocation for the chemical master equation, (with J. Zhang, L.T. Watson, and C. Yang), International Journal of Computational Methods, 7(3), pp. 477-498, (2010)

28. Interpolatory projection methods for parameterized model reduction (with U. Baur, P. Benner, and S. Gugercin), *SIAM Journal of Scientific Computing, 33(5), pp. 2489-2518 (2011).*

29. A note on shifted Hessenberg systems and frequency response computation (with Z. Drmac and S. Gugercin) *ACM Transactions on Mathematical Software, 38(2), pp. 12:1-12:16 (2011).*

30. Inexact Solves in Interpolatory Model Reduction (with S. Gugercin and S. Wyatt) *Linear Algebra and its Applications, 436 (8), pp. 2916-2943, (2012)*

31. Structure-preserving tangential interpolation for model reduction of port-Hamiltonian Systems (with S. Gugercin, R. Polyuga, A. van der Schaft*). Automatica, 48 (9), pp. 1963-1974, (2012)*

32. Convergence of the Iterative Rational Krylov Algorithm. (with G. Flagg and S. Gugercin), *Systems and Control Letters, 61 (6), pp. 688-691, (2012)*

33. Interpolatory H_∞ Model Reduction. (with G. Flagg and S. Gugercin), *Systems and Control Letters*, 62(7), pp.567-574, (2013)

34. Interpolatory Weighted-H_2 Model Reduction. (with B. Anic, S. Gugercin, and A.C. Antoulas.) *Automatica*, 49(5), pp.1275-1280, (2013)

35. Near-optimal frequency-weighted interpolatory model reduction. (with T. Breiten and S. Gugercin), Systems and Control Letters, 78, pp. 8–18 (2015)

36. Nonlinear Parametric Inversion using Interpolatory Model Reduction, (with E. de Sturler, S. Gugercin, M. Kilmer, S. Chaturantabut, and M. O'Connell), SIAM J. on Scientific Computing, 37(3), pp. B495–B517 (2015).

37. Quadrature-Based Vector Fitting For Discretized H_2 Approximation, (with Z. Drmac and S. Gugercin), SIAM J. on Scientific Computing, 37(2),pp. A625–A652 (2015).

38. Vector Fitting for Matrix-valued Rational Approximation, (with Z. Drmac and S. Gugercin), SIAM Journal on Scientific Computing, 37(5), pp. A2151-S626 (2015).

39. Comparison of the adjoint and adjoint-free 4dVar assimilation of the hydrographic and velocity observations in the Adriatic Sea (with Max Yaremchuk, Paul Martin, and Andrey Koch), Ocean Modeling, 97, pp. 129–140 (2016)

40. Structure-Preserving Model Reduction for Nonlinear Port-Hamiltonian Systems (with S. Chaturantabut, S. Gugercin), SIAM J. on Scientific Computing, 38 (5), pp. B837-B865 (2016).

41. Model reduction for systems with inhomogeneous initial conditions (with S. Gugercin and V. Mehrmann), *Systems & Control Letters* 99 pp. 99-106 (2017).

42. A hybrid approach to generating search subspaces in dynamically constrained 4-dimensional data assimilation. (with M. Yaremchuk and P. Martin) (2017). *Ocean Modelling, 117*, pp. 41-51. (2017)

43. Linear time-periodic dynamical systems: an H_2 analysis and a model reduction framework. (with C. Magruder and S. Gugercin). *Mathematical and Computer Modelling of Dynamical Systems*, pp. 1-24. (2017)

44. Data-driven Structured Realization. (with S. Gugercin, P. Schulze, and B. Unger). *Linear Algebra and Its Applications*. 537 pp. 250-286 (2018)

45. Damping optimization of parameter dependent mechanical systems by rational interpolation. (with Z. Tomljanovic and S. Gugercin) *Advances in Computational Mathematics*, *44* (6), pp. 1797–1820 (2018). doi.org/10.1007/s10444-018-9605-9

46. Linear port-Hamiltonian descriptor systems. (with V. Mehrmann, H. Xu, and H. Zwart). *Mathematics of Control, Signals, and Systems* 30, no. 4 (2018):

47. Robust port-Hamiltonian representations of passive systems. (with V. Mehrmann and P. Van Dooren) *Automatica* 100: pp. 182-186. (2019)

PUBLISHED CONTRIBUTIONS TO ACADEMIC CONFERENCES:

48. C. Beattie, The computation of convergent lower bounds in quantum mechanical eigenvalue problems. In Numerical Treatment of Eigenvalue Problems, Vol. 3, Eds: J. Albrecht, L. Collatz, W. Velte. ISNM 69. Birkhäuser, Basel. (1984) (Invited contribution following presentation 3).

49. C. Beattie and A. Banach, Rapid resolution of truncated intermediate problems. In Numerical Treatment of Eigenvalue Problems, Vol. 4, Eds: J. Albrecht, L. Collatz, W. Velte, W. Wunderlich. ISNM 83. Birkhauser, Basel. (1987) (Invited contribution following presentation 6).

50. S. W. Smith and C. Beattie, Secant-method matrix adjustment for structural models. In Proceedings of AIAA/ASME/ASCE/AHS/ASC 30th Structures, Structural Dynamics, and Materials (SDM) Conference, April 3-5, 1989. Mobile, AL. pp. 1041-1051. (Extended abstracts were refereed for acceptance - this is an earlier version of article 11).

51. S. W. Smith and C. Beattie, Simultaneous expansion and orthogonalization of measured modes for structure identification. In Proceedings of AIAA Dynamics Specialist Conference, April 5-6, 1990. Long Beach, CA. pp. 261-270. (Extended abstracts were refereed for acceptance).

52. C. Beattie and W. M. Greenlee, Some remarks concerning closure rates for Aronszajn's method. In Numerical Treatment of Eigenvalue Problems, Eds: Albrecht, Collatz, Velte, Wunderlich. ISNM 96. Birkhäuser, Basel. (1991) (Invited contribution following presentation 9).

53. C. Beattie and S. W. Smith, Matrix approximation in the identification of vibrating structures. In Proceedings of the International Conference on New Developments in Structural Mechanics. July 4-6, 1990. Catania, Italy. pp. 271-287. (Invited contribution following presentation 10).

54. C. J. Ribbens and C. Beattie, Parallel Solution of a Generalized Symmetric Matrix Eigenvalue Problems on Shared Memory Multiprocessors. In Proceedings of SIAM Conference on Linear Algebra and Parallel Computation. March 21-24, 1991. Houston, Texas. pp. 16-21. (Extended abstracts were refereed for publication as full papers).

55. C. Beattie and G-B. Lee, Numerical Realization of Eigenvalue Bounds for Self-Adjoint Operators. IMACS '91 Proceedings, 13th World Congress on Computation and Applied Mathematics. July 22-26, 1991. Dublin, Ireland. pp. 377-378. (not refereed)

56. S. W. Smith and C. Beattie, Optimal Identification Using Inconsistent Modal Data. Proceedings of 32nd Structures, Structural Dynamics, and Materials (SDM) Conference. April 8-10, 1991. Baltimore, MD. pp. 2319-2324. (Extended abstracts were refereed for acceptance).

57. S. W. Smith and C. Beattie, Multiple-Constraint Matrix Updates for Structural Identification. Proceedings of International Conference on Structural Dynamic Modeling: Test, Analysis, and Correlation. July 7-9, 1993, Cranfield, UK. pp. 381-390. (Extended abstracts were refereed for acceptance).

58. M. P. Singh, E. Matheu, and C. Beattie, Output-Feedback Sliding Mode Control for Civil Engineering Structures. Second International Workshop on Structural Control, “Next Generation of Intelligent Structures,” HKUST. December 18-21, 1996. Hong Kong, China. pp. 609-620. (Extended abstracts were refereed for acceptance - this is an earlier version of article 16).

59. M. P. Singh, E. Matheu, and C. Beattie, Seismic Response Control of Asymmetric Torsional Building Structures. In Proceedings of 11th Symposium on Structural Dynamics and Control. L. Meirovitch (ed.), May 12-14, 1997. Blacksburg, VA. (Extended abstracts were refereed for acceptance).

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