

Praise of Daniel Kreßner's work on the occasion of the nomination for the John Todd award.

The computation of eigenvalues, eigenvectors, and invariant subspaces is at the heart of most applications in quantum physics and chemistry and most dynamics applications in structural and mechanical engineering. Despite the fact that this topic has been investigated for many decades, the challenge of solving large scale eigenvalue problems efficiently and accurately remains. In most applications the problems have even further algebraic structures which results from the physics of the underlying problem or and the existing symmetries. Highly efficient and accurate methods can only be expected when this structure is clearly identified and exploited. In a nutshell this is the main topic of Daniel Kreßner's current research. It involves theory (linear algebra, matrix theory, perturbation analysis), development of numerical methods, in particular linear and nonlinear eigenvalue problems, model reduction methods (with applications in electronics, optics, quantum dots and many other application areas), and high performance computing.

One of the many highlights of his work is the 2006, SIAM J. Matrix Analysis, paper *'Multishift variants of the QZ algorithm with aggressive early deflation'* (with B. Kagström) in which a new algorithmic approach for the fast solution of full dense large scale generalized eigenvalue problems was developed that is not only much faster and more accurate than previous methods but also is much better on multi-processor machines. Furthermore, it is well analyzed with respect to stability. A real master-piece.

Another highlight is his recent method for nonlinear eigenvalue problems *'A block Newton method for nonlinear eigenvalue problems'* that should be soon or has already appeared in Numerische Mathematik. Here for the first time a sound procedure (including perturbation and error analysis) has been introduced for the computation of multiple eigenvalues for nonlinear eigenvalue problems, a real challenge in many application problems.

Daniel Kreßner is (despite his young age) a worldwide accepted expert in Numerical Analysis and Scientific Computing and his work is fully in the spirit of the John Todd award.

Volker Mehrmann

Curriculum Vitae, Daniel Kressner

- PERSONAL DATA Address: Geeringstrasse 73, 8049 Zurich, Switzerland
Date/place of birth: 07.04.1978, Karl-Marx-Stadt (Chemnitz), GDR
Marital status: married, 2 children
Citizenship: German
Languages: German, English, Croatian
- EDUCATION **2001 – 2004:** PhD studies in mathematics (numerical linear algebra), TU Berlin, thesis topic: *Numerical Methods and Software for General and Structured Eigenvalue Problems*, thesis supervisor: Volker Mehrmann, grade: summa cum laude.
1997 – 2001: Diploma studies in mathematics, TU Chemnitz, thesis topic: *Numerical Methods for Structured Matrix Factorizations*, thesis supervisor: Volker Mehrmann.
- EMPLOYMENT **since 9/2007:** Assistant professor in applied mathematics, ETH Zurich.
4/2007 – 8/2007: Research assistant, TU Berlin
5/2005 – 4/2007: Emmy Noether fellow of the DFG; 1st year: Department of Mathematics, University of Zagreb, Croatia; 2nd year: Department of Computing Science, Umeå University, Sweden.
8/2002 – 4/2005: Research assistant, TU Berlin, DFG (Deutsche Forschungsgemeinschaft) research center MATHEON: Mathematics for key technologies.
9/2001 – 7/2002: Research assistant, TU Berlin, Sfb 557: Control of complex turbulent shear flows.
8/1998 – 8/2001: Student assistant, TU Chemnitz.
11/1997 – 8/1998: Student assistant, OPTUM Umwelttechnik GmbH, Chemnitz.
7/1996 – 4/1997: Mandatory military service, Volkach, Germany.
- AWARDS & FELLOWSHIPS **7/2007:** 2nd prize at Leslie Fox prize competition.
12/2005: Tiburtius prize for second best dissertation at all departments of Berlin universities in 2004.
6/2004: Prize for best poster at IWASEP (International Workshop on Accurate Solution of Eigenvalue Problems).
9/2000, 7/2003: SIAM student travel award.
1/2003 – 7/2003: Marie Curie fellowship.
3/2000 – 8/2001: Scholarship from Studienstiftung des deutschen Volkes (German merit foundation).

- RESEARCH GRANTS**
- 7/2010–6/2011:** CRUS Scientific Exchange Program: *Preconditioned Krylov subspace methods for large-scale model reduction*. PI: Daniel Kressner.
 - 10/2009–9/2012:** SNF ProDoc Research Module: *Robust numerical methods for solving nonlinear eigenvalue problems*. PI: Daniel Kressner.
 - 9/2009:** SNF support for GAMM workshop on Applied and Numerical Linear Algebra.
 - 4/2009–3/2012:** SNF ProDoc Research Module: *Preconditioned methods for large-scale model reduction*. PI: Daniel Kressner.
 - 10/2008–9/2011:** SNF ProDoc Graduate Programme: *Efficient Numerical Methods for Partial Differential Equations*. Jointly with Stefan Sauter (coordinator), Marcus Grote, Ralf Hiptmair, and Christoph Schwab.
 - 5/2008:** Research fellowship from the Indo Swiss Bilateral Research Initiative (ISBRI). Jointly with Shreemayee Bora, IIT Guhawati.
- EDITORSHIP**
- since 10/2009:** Editorial board member of *ACM Transactions on Mathematical Software*.
 - since 3/2009:** Editorial board member of *Electronic Transactions on Numerical Analysis*.
 - 2008–2009:** Editorial board member of special issue 15th ILAS Conference of *Linear Algebra and Its Applications*.
 - 2007–2008:** Editorial board member of special volume Computational Methods with Applications of *Electronic Transactions on Numerical Analysis*.
- REFEREEING**
- Mathematical journals: BIT, Computing, Electron. J. Linear Algebra, J. Franklin Inst., Linear Algebra Appl., Math. Comp., Numer. Algorithms, Numer. Math., SIAM J. Matrix Anal. Appl., SIAM J. Sci. Comput., and others.
- Engineering and Physics journals: Automatica, IEEE Trans. Automat. Control, IEEE Trans. Circuits and Systems, Communications in Computational Physics, Intern. J. of Control, Systems Control Lett., and others.
- Computing science journals: ACM Trans. Math. Software, Parallel Computing.
- SIAM book series, Springer book series on Computational Science and Engineering.
- Funding agencies: DFG, Chilean National Commission for Scientific and Technological Research, NSF, NWO.
- Phd theses (Aalto University, TU Berlin, TU Braunschweig, KU Leuven).
- ACADEMIC SERVICES**
- since 2010:** Chair of *IEEE action group Control Numerics and Software* within *IEEE Technical Committee on CACSD*.
 - since 2009:** Vice chair of *GAMM activity group on Applied and Numerical Linear Algebra*.
 - since 2008:** Member of *Master admission committee*, *library committee*, and one *hiring committee* at Department for Mathematics, ETH Zurich.
- INTERNATIONAL RESEARCH PROJECTS**
- since 2006:** Research project *Numerical solution of Lyapunov equations* (jointly with Ninoslav Truhar) funded by the Croatian Ministry of Science, Education and Sports.
 - since 2005:** Member of an international consortium of researchers with the aim of improving and extending (Sca)LAPACK.
 - since 2003:** Member of the research project *Matrix Pencil Computations in Computer-Aided Control System Design: Theory, Algorithms and Software Tools*, Umeå University, funded by the Swedish Foundation for Strategic Research (SSF).
 - 1999–2003:** Member of the interdisciplinary research network *NICONET* (Numerics in Control Network), funded by the European Union.

TEACHING
(LECTURES)**ETH Zurich**

- Fall 2010:** *Linear algebra* for students in mathematics and physics (4h/week)
- Spring 2010:** *Numerical methods* for students in mathematics and physics (4h/week)
Numerical for large-scale eigenvalue problems for students in computer science, CSE, and mathematics. (4h/week, jointly with Peter Arbenz)
Wave Propagation in Unbounded Domains for graduate students (4h/week, jointly with Christian Engström and Carlos Hanckes)
- Fall 2009:** *Numerical methods for elliptic and parabolic partial differential equations* for students in mathematics (4h/week)
Linear algebra for students in computer science (4h/week, jointly with Marc Pollefeys)
- Spring 2009:** *Theoretical and numerical aspects of model reduction* for graduate students (4h/week, jointly with Martin Gutknecht)
Numerical methods in quantum molecular dynamics (seminar 2h/week, jointly with Vasile Gradinaru)
- Fall 2008:** *Linear algebra* for students in computer science (4h/week, jointly with Marc Pollefeys)
- Spring 2008:** *Numerical methods* for students in mathematics and physics (4h/week)
Top ten computational algorithms (seminar 2h/week, jointly with Manuel Torilhon)
- Fall 2007:** *Numerical analysis* for students in CSE (4h/week)
Google, linear algebra and beyond (seminar 2h/week)

TU Berlin

- Spring 2007:** *Linear algebra* for students in mathematics (4h/week)

Umeå University

- Fall 2006:** *Numerical analysis* for students in computer science (2h/week)

University of Dubrovnik

- Fall 2006:** *Logika, skupovi i diskretna matematika* for students in computer science (4h/week)
- Fall 2005:** *Logika, skupovi i diskretna matematika* for students in computer science (4h/week)

University of Zagreb

- Fall 2005:** *Numerical linear algebra and control theory* for students in mathematics (2h/week)

TEACHING
(SUPERVISION)**Diploma/Bachelor/Master theses, Term Projects at ETH Zurich**

- In progress: Alexandros Gekendis, *Multi-path compensation in 3D cameras*. (Bachelor thesis)
- In progress: Michael Olbrecht, *Numerical algorithms for high-dimensional eigenvalue problems*. (Term project)
- October 2010: Alejandro Ojeda, *T-matrix computation and model reduction for ECG simulation*. (Master thesis)
- June 2010: Stefan Pauli, *HSS matrix arithmetic for solving Lyapunov equations*. (Term project)
- May 2010: Michael Steinlechner, *Boundary element methods for solving Dirichlet eigenvalue problems*. (Bachelor thesis)
- May 2010: Patrick Lengacher, *Detection of image manipulations*. (Bachelor thesis)
- March 2009: Daniel Vetter, *Improved Lanczos methods for computing partial singular value decompositions*. (Master thesis)

February 2009: Michael Stadelmann, *Matrix functions – analysis and implementation*. (Master thesis, jointly supervised with Martin Mächler)

September 2008: Christine Tobler, *Krylov subspace methods for large linear systems with tensor product structure*. (Master thesis)

May 2008: Christine Bolliger, *Linear scaling electronic structure methods*. (Term project)

PhD theses

ETH Zurich, in progress: Cedric Effenberger, *Robust numerical methods for nonlinear eigenvalue problems*.

ETH Zurich, in progress: Holger Brandsmeier, jointly with Christoph Schwab.

ETH Zurich/Umeå University, in progress: Meiyue Shao, *Novel algorithms for solving dense eigenvalue problems on heterogeneous distributed memory HPC systems*, jointly with Bo Kågström.

ETH Zurich, in progress: Christine Tobler, *Numerical algorithms for linear systems and eigenvalue problems with tensor product structure*.

TEACHING (EXTRA ACTIVITIES)

12/2010: 1-week lecture on *Advanced Techniques in Numerical Linear Algebra* at IIT Guwahati, India.

4/2009: 1-day lecture on *Eigenvalue solvers on multi-core and heterogeneous architectures* at CEA-EDF-INRIA school on *Robust Methods and algorithms for solving large algebraic systems on modern HPC systems*, INRIA Sophia Antipolis.

8/2008: 1-day lecture on *Modern Eigenvalue Solvers* at summer school on *Eigenvalue problems* organised by U/ETH Zurich. See <http://www.math.ethz.ch/~kressner/zss/>.

8/2008: 2-weeks lecture on *Eigenvalue Problems and Applications* at summer school organised by German National Academic Foundation (Studienstiftung des deutschen Volkes), Schloss Salem. See <http://www.math.ethz.ch/~kressner/schloss/>.

TALKS

Invited conference talks

- 7/2010: *Plenary talk* at 9th China Matrix Theory and Applications International Conference, Shanghai, China.
- 6/2010: *Plenary talk* at BIT 50 – Trends in Numerical Computing, Lund, Sweden.
- 8/2009: Oberwolfach Workshop Linear and Nonlinear Eigenproblems for PDEs.
- 6/2009: CICADA/MIMS Workshop on Numerics for Control and Simulation, Manchester.
- 3/2009: *Plenary talk* at ALGORITMY Conference on Scientific Computing, High Tatra Mountains, Slovakia.
- 6/2008: *Plenary talk* at XVII Householder symposium, Berlin.
- 6/2008: *Plenary talk* at ILAS conference, Cancun.
- 8/2007: Conference on Computational Mathematics with Applications, Harrachov.
- 6/2007: Workshop on Matrix Equations, Chemnitz.
- 6/2006: International Conference on Structured Matrices, Hong Kong.
- 5/2005: *Plenary talk* at XVI Householder symposium, Pennsylvania.

Invited talks in minisymposia

- 10/2009: SIAM Linear Algebra Conference 2009, Monterey.
- 6/2009: 23rd Biennial Conference on Numerical Analysis, Strathclyde.
- 3/2009: SIAM Conference on CSE, Miami.
- 10/2008: IEEE CACSD meeting, San Antonio.
- 6/2008: PMAA, Parallel Matrix Algorithms and Applications, Neuchâtel.
- 7/2007: ICIAM, Zurich.
- 10/2006: IEEE CACSD meeting, Munich.
- 7/2006: GAMM-SIAM Conference on Applied Linear Algebra, Düsseldorf.
- 7/2006: ILAS Conference, Amsterdam.
- 6/2006: PARA, Workshop on Scientific and Parallel Computing, Umeå.
- 3/2006: GAMM Jahrestagung, Berlin.
- 8/2001: SIAM Conference on Linear Algebra in Signals, Systems and Control, Boston.

Selected invited talks at universities and research institutes

- 7/2010: Dept. of Mathematics, Fudan University, China.
- 9/2009: Dept. of Mathematics, Heriot Watt University Edinburgh UK.
- 7/2009: Lawrence Livermore National Laboratory, Berkeley, USA.
- 7/2009: Dept. of Mathematics, U Karlsruhe, Germany.
- 6/2009: Dept. of Computer Science, UP Valencia, Spain.
- 5/2009: Dept. of Mathematics, U Basel, Switzerland.
- 4/2009: Dept. of Mathematics, U Oxford, UK.
- 11/2008: Dept. of Mathematics, TU Ilmenau, Germany.
- 12/2007: Dept. of Mathematics, U Zurich, Switzerland.
- 10/2006: Dept. of Mathematics, TU Berlin, Germany.
- 10/2006: Dept. of Mathematics, TU Freiberg, Germany.
- 9/2006: Dept. of Computing Science, U Umeå, Sweden.
- 5/2006: Dept. of Mathematics, U Bielefeld, Germany.
- 3/2006: Dept. of Mathematics, Virginia Polytech, USA.
- 3/2006: Compt. Science Dept., UC at Santa Barbara, USA.
- 3/2006: Courant Institute of Math. Sciences, New York University, USA.
- 2/2006: The MathWorks, Natick, USA.

- CONFERENCE ORGANISATION
- 6/2010:** Contributed minisymposium *Polynomial and Nonlinear Eigenvalue Problems* at ILAS 2010, Pisa (jointly with Volker Mehrmann).
 - 10/2009:** Contributed minisymposium *Eigenvalue Solvers for Hybrid HPC Architectures* at SIAM LA conference 2009, Monterey (jointly with Bo Kågström).
 - 9/2009:** Organizer of GAMM workshop on *Applied and Numerical Linear Algebra* (jointly with Martin Gutknecht).
 - 2/2009:** Organizer of section on *Applied and Numerical Linear Algebra* at GAMM annual meeting, Gdansk (jointly with Krystyna Zietak).
 - 10/2008:** Invited session *Numerical methods for control* at IEEE CACSD meeting, San Antonio (jointly with Vasile Sima). Member of international program committee.
 - 6/2008:** Member of international program committee of *Parallel Matrix Algorithms and Applications*, Neuchâtel.
 - 7/2007:** Contributed minisymposium *Numerical methods for structured eigenvalue problems* at ICIAM 2007, Zurich (jointly with Peter Benner).
 - 6/2007:** Co-organiser of workshop *Matrix equations*, Chemnitz.
 - 10/2006:** Invited session *Robust numerical methods for control* at IEEE CACSD meeting, Munich (jointly with Vasile Sima).
 - 7/2006:** Contributed minisymposium *Numerical solution of large eigenvalue problems* at GAMM-SIAM Conference on Applied Linear Algebra, Düsseldorf (jointly with Michiel Hochstenbach and Yvan Notay).
 - 6/2006:** Invited minisymposium *Recent advances in dense linear algebra* at PARA 2006, Umeå (jointly with Julien Langou); member of the local organising committee.
 - 3/2006:** Young researchers' minisymposium *Large structured eigenvalue problems* at GAMM annual meeting 2006, Berlin (jointly with Bor Plestenjak).

List of Publications, Daniel Kressner

BOOK D. Kressner. *Numerical Methods for General and Structured Eigenvalue Problems*. Vol. 46 of Lecture Notes in Computational Science and Engineering, Springer, Heidelberg, 2005. Revised and extended version of PhD thesis.

ARTICLES Submitted articles¹

- [1] E. Kokiopoulou, D. Kressner, and Y. Saad. Linear dimension reduction for evolutionary data. Submitted to *Pattern Recognition*, December 2010.
- [2] C. Effenberger, D. Kressner, and C. Engström. Linearization techniques for band structure calculations in absorbing photonic crystals. Submitted to *International Journal for Numerical Methods in Engineering*, October 2010.
- [3] P. Benner, P. Ezzatti, D. Kressner, E. S. Quintana-Ortí, and A. Remón. Accelerating Model Reduction of Large Linear Systems with Graphics Processors. Submitted to *PARA 2010 Proceedings*, September 2010.
- [4] D. Kressner. Bivariate matrix functions. Submitted to *Linear Algebra Appl.*, August 2010.
- [5] B. Kågström, L. Karlsson and D. Kressner. Computing Codimensions and Generic Canonical Forms for Generalized Matrix Products. Submitted to *Electronic Journal of Linear Algebra*, June 2010.
- [6] D. Kressner und C. Tobler. Low-rank tensor Krylov subspace methods for parameterized linear systems. Submitted to *SIAM J. Matrix Anal. Appl.*, June 2010.
- [7] P. Benner, P. Ezzatti, D. Kressner, E. S. Quintana-Ortí, and A. Remón. A mixed precision algorithm for the solution of Lyapunov equations on hybrid CPU-GPU platforms. Submitted to *Parallel Computing*, December 2009.
- [8] B. Adhikari, R. Alam, and D. Kressner. Structured eigenvalue condition numbers and linearizations for matrix polynomials. Under revision at *Linear Algebra Appl.*, January 2009.

Refereed journal articles

- [9] E. Kokiopoulou, D. Kressner und P. Frossard. Optimal image alignment with random projections of manifolds: algorithm and geometric analysis. To appear in *IEEE Transactions on Signal Processing*, 2011.
- [10] P. Bientinesi, F. D. Igual, D. Kressner, M. Petschow, and E. S. Quintana-Ortí. Condensed forms for the symmetric eigenvalue problem on multi-threaded architectures. To appear in *Concurrency and Computation: Practice and Experience*, 2010.
- [11] T. Betcke and D. Kressner. Perturbation, computation and refinement of invariant subspaces for matrix polynomials. To appear in *Linear Algebra Appl.*, 2010.
- [12] R. Granat, D. Kressner, and B. Kågström. A novel parallel QR algorithm for hybrid distributed memory HPC systems. *SIAM J. Sci. Comput.*, 32(4):2345–2378, 2010.
- [13] D. Kressner and C. Tobler. Krylov subspace methods for linear systems with tensor product structure. *SIAM J. Matrix Anal. Appl.*, 31(4):1688–1714, 2010.
- [14] M. Karow, E. Kokiopoulou, and D. Kressner. On the computation of structured pseudospectra. *Systems Control Lett.*, 59(2):122–129, 2010.
- [15] P. Benner, D. Kressner, V. Sima, and A. Varga. Die SLICOT-Toolboxen für Matlab. *Automatisierungstechnik*, 58(1):15–25, 2010.

¹Pdf files of submitted articles are available at <http://www.math.ethz.ch/~kressner/pubs.php>

- [16] D. Kressner. A block Newton method for nonlinear eigenvalue problems. *Numer. Math.*, 114(2):355–372, 2009.
- [17] R. Granat, B. Kågström, and D. Kressner. Parallel eigenvalue reordering in real Schur forms. *Concurrency and Computation: Practice and Experience*, 21(9):1225–1250, 2009.
- [18] D. Kressner, C. Schröder, and D. S. Watkins. Implicit QR algorithms for palindromic and even eigenvalue problems. *Num. Alg.*, 51(2):209–238, 2009.
- [19] D. Kressner, M. J. Peláez, and J. Moro. Structured Hölder condition numbers for multiple eigenvalues. *SIAM J. Matrix Anal. Appl.*, 31(1):175–201, 2009.
- [20] M. Karow and D. Kressner. On the structured distance to uncontrollability. *Systems Control Lett.*, 58(2): 128–132, 2009.
- [21] B. Kågström, D. Kressner, E. Quintana-Orti, and G. Quintana-Orti. Blocked algorithms for the reduction to Hessenberg-triangular form revisited. *BIT*, 48(3): 563–584, 2008.
- [22] D. Kressner. The effect of aggressive early deflation on the convergence of the QR algorithm. *SIAM J. Matrix Anal. Appl.*, 30(2):805–821, 2008.
- [23] D. Kressner. Block variants of Hammarling’s method for solving Lyapunov equations. *ACM Trans. Math. Software*, 34(1):1–15, 2008.
- [24] R. Granat, D. Kressner, and B. Kågström. Computing periodic deflating subspaces associated with a specified set of eigenvalues. *BIT Num. Math.*, 47(4):763–791, 2007.
- [25] D. Kressner. Deflation in Krylov subspace methods and distance to uncontrollability. *Annali dell’Universita di Ferrara*, 53(2): 309–318, 2007.
- [26] B. Kågström and D. Kressner. Multishift variants of the QZ algorithm with aggressive early deflation. *SIAM J. Matrix Anal. Appl.*, 29(1):199–227, 2006.
- [27] M. Karow, D. Kressner, and F. Tisseur. Structured eigenvalue condition numbers. *SIAM J. Matrix Anal. Appl.*, 28(4):1052–1068, 2006.
- [28] D. Kressner. Block algorithms for reordering standard and generalized Schur forms, 2006. *ACM Trans. Math. Software*, 32(4):521–532, 2006.
- [29] D. Kressner. A periodic Krylov-Schur algorithm for large matrix products. *Numerische Mathematik*, 103(3):461–483, 2006.
- [30] R. Byers and D. Kressner. Structured condition numbers for invariant subspaces. *SIAM J. Matrix Anal. Appl.*, 28(2):326–347, 2006.
- [31] P. Benner and D. Kressner. Balancing sparse Hamiltonian eigenproblems. *Linear Algebra Appl.*, 415(1):3–19, 2006.
- [32] P. Benner and D. Kressner. Algorithm 854: Fortran 77 subroutines for computing the eigenvalues of Hamiltonian matrices II. *ACM Trans. Math. Software*, 32(2):352–373, 2006.
- [33] D. Kressner. The periodic QR algorithm is a disguised QR algorithm. *Linear Algebra Appl.*, 417(2–3): 423–433, 2006.
- [34] H. Faßbender and D. Kressner. Structured eigenvalue problems. *GAMM Mitteilungen* 29(2): 297–318, 2006.
- [35] A. Griewank and D. Kressner. Time-lag in derivative convergence for fixed point iterations. *Revue ARIMA, Spécial CARI’04*:87–102, 2005.
- [36] D. Kressner. On the use of larger bulges in the QR algorithm. *Electron. Trans. Numer. Anal.*, 20:50–63, 2005.
- [37] D. Kressner. Perturbation bounds for isotropic invariant subspaces of skew-Hamiltonian matrices. *SIAM J. Matrix Anal. Appl.*, 26(4):947–961, 2005.
- [38] R. Byers and D. Kressner. On the condition of a complex eigenvalue under real perturbations. *BIT Num. Math.*, 44(2):209–215, 2004.

- [39] D. Kressner. Block algorithms for orthogonal symplectic factorizations. *BIT Num. Math.*, 43(4):775–790, 2003.
- [40] P. Benner, D. Kressner, and V. Mehrmann. Structure preservation: A challenge in computational control. *Future Generation Computer Systems*, 19(7):1243–1252, 2003.
- [41] N. Mastronardi, D. Kressner, V. Sima, P. Van Dooren, and S. Van Huffel. A fast algorithm for subspace state-space system identification via exploitation of the displacement structure. *J. Comput. Appl. Math.*, 132(1):71–81, 2001.

Book chapters

- [42] P. Benner, D. Kressner, and V. Mehrmann. Skew-Hamiltonian and Hamiltonian eigenvalue problems: Theory, algorithms and applications. In Z. Drmač et al. (Hrsg.), *Proceedings of the Conference on Applied Mathematics and Scientific Computing, Brinjuni (Croatia), Juni 2003*, S. 3–39. Springer-Verlag, 2005.

Refereed conference proceedings

- [43] B. Kågström, D. Kressner, and M. Shao. On aggressive early deflation in parallel variants of the QR algorithm. To appear in *Proceedings of PARA 2010*, 2011.
- [44] P. Bientinesi, F. D. Igual, D. Kressner, and E. S. Quintana-Orti. Reduction to condensed forms for symmetric eigenvalue problems on multi-core architectures. To appear in *Proceedings of PPAM 2009* (8th International Conference on Parallel Processing and Applied Mathematics).
- [45] E. Kokopoulou, D. Kressner, and P. Frossard. Optimal image alignment with random measurements. To appear in *Proceedings of EUSIPCO 2009* (17th European Signal Processing Conference).
- [46] D. Kressner. Memory-efficient Krylov subspace techniques for solving large-scale Lyapunov equations. *Proceedings of IEEE International Symposium on Computer-Aided Control Systems Design, San Antonio, 2008*, pages 613–618.
- [47] R. Granat, B. Kågström, and D. Kressner. A parallel Schur method for solving continuous-time algebraic Riccati equations. *Proceedings of IEEE International Symposium on Computer-Aided Control Systems Design, San Antonio, 2008*, pages 583–588.
- [48] B. Adlerborn, B. Kågström, and D. Kressner. Parallel variants of the multishift QZ algorithm with advanced deflation techniques. *Applied Parallel Computing: State of the Art in Scientific Computing, PARA 2006, Lecture Notes in Computer Science, LNCS 4699*, pages 117–126. Springer, 2007.
- [49] D. Kressner and E. Mengi. Structure-preserving eigenvalue solvers for robust stability and controllability estimates. *Proceedings of 45th IEEE Conference on Decision and Control, San Diego, 2006*, pages 5174–5179.
- [50] D. Kressner. Finding the distance to instability of a large sparse matrix. *Proceedings of IEEE International Symposium on Computer-Aided Control Systems Design, Munich, 2006*, pages 31–35.
- [51] R. Granat, B. Kågström, and D. Kressner. Reordering the eigenvalues of a periodic matrix pair with applications in control. *Proceedings of IEEE International Symposium on Computer-Aided Control Systems Design, Munich, 2006*, pages 25–30.
- [52] P. Benner and D. Kressner. New Hamiltonian eigensolvers with applications in control. In *Proceedings of 44th IEEE Conference on Decision and European Control Conference 2005*, pages 6551–6556.
- [53] D. Kressner. Large periodic Lyapunov equations: Algorithms and applications. In *Proceedings of European Control Conference 2003, Cambridge, UK*.

- [54] P. Johansson and D. Kressner. Semi-automatic generation of web-based computing environments for software libraries. In P.M.A. Sloot et al. (Hrsg.), *ICCS 2002*, LNCS 2329, pages 872–880. Springer-Verlag, 2002.
- [55] E. Elmroth, P. Johansson, B. Kågström, and D. Kressner. A web computing environment for the SLICOT library. In *The Third NICONET Workshop on Numerical Control Software*, pages 53–61, 2001.
- [56] D. Kressner. An efficient and reliable implementation of the periodic QZ algorithm. In *IFAC Workshop on Periodic Control Systems*, 2001.

- LECTURE NOTES *Numerische Methoden* (German), ETH Zurich, 2008. Available from <http://www.math.ethz.ch/education/bachelor/lectures/fs2008/math/nm>.
- Logika, skupovi i diskretna matematika* (English/Croatian), Dubrovnik University, 2006. Available from <http://web.math.hr/~kressner/diskret/>.
- SOFTWARE **SLICOT**: 4 benchmark collections for linear time-invariant systems (together with Volker Mehrmann and Thilo Penzl); 20+ Fortran routines for solving linear (least-squares) systems with block Toeplitz structure (together with Paul Van Dooren); Web interface for large parts of the SLICOT library (together with Pedher Johansson), see <http://www.slicot.de>.
- HAPACK**: Comprehensive Fortran and MATLAB library for solving structured eigenvalue problems (together with Peter Benner), see <http://www.tu-chemnitz.de/mathematik/hapack/>. Parts of the library have been included in the MATLAB Control System Toolbox distributed by Mathworks.
- LAPACK/ScaLAPACK**: Fortran routines for solving dense standard and generalized eigenvalue problems; partly already included and partly to be included in the next major releases of LAPACK and ScaLAPACK.