Vers. December 4, 2017

Yousef Saad

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Education

Doctorat d'Etat	University of Grenoble, France	1983
Doctorat de troisieme cycle	University of Grenoble, France	1974
B. S. in Mathematics	University of Algiers, Algeria	1970

Professional Experience

- CSE Distinguished Professor, University of Minnesota, Department of Computer Science, May 2005 – present.
- Professor, University of Minnesota, Department of Computer Science, Nov. 1990–present.
- Head of the department of Computer Science and Engineering, University of Minnesota. Jan 1997 – June 2000.
- Senior Scientist, Research Institute for Advanced Computer Science (RIACS), Jul. 1988–Nov. 1990.
- Senior Computer Scientist, Center for Supercomputing Research and Development (CSRD) and Associate Professor, Mathematics Department, University of Illinois at Urbana-Champaign. Aug. 1986–June 1988.
- Research Scientist, then Senior Research Scientist, Computer Science Department, Yale University. July 1984–Aug. 1986.
- Associate professor, University of Tizi-Ouzou, Algeria. Sept. 1983–June 1984.
- Research Scientist, Computer Science Department, Yale University. Aug. 1981–Aug. 1983.
- Visiting Lecturer, Mathematics and Computer Science departments, University of California at Berkeley, Berkeley, CA. January 1981–July 1981.
- Visiting Assistant Professor, Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois. January 1980–December 1980.

Research Interests

Iterative methods for solving large sparse linear systems and eigenvalue problems; Sparse matrix computations; Parallel algorithms in numerical linear algebra. Numerical algorithms for materials science. Matrix methods for information sciences.

Awards and Honors

- SIAM Fellow class of 2010.
- Fellow of the AAAS, 2011.

- CSE Distinguished professor (as of May 2005)
- William Norris chair, Jan. 2006 to date.

PhD Students (graduated)

- Ruipeng Li, Univ. Minnesota, Jun. 2015
- Thanh Ngo, Univ. of Minnesota, Jun. 2014
- D. Osei-Kuffuor, Phd in Scientific computation, Sept. 2011.
- Jie Chen, Univ. of Minnesota, Jun. 2011.
- Na Li, PhD, Univ. of Minnesota, Jun. 2006.
- Bernard Sheehan, PhD, Univ. of Minnesota, Nov. 2005.
- Irene Moulitsas, PhD, Univ. of Minnesota, Nov. 2005. [Co-adviser. Main advisor: G. Karypis]
- Abdelkader Baggag, PhD, Univ. of Minnesota, Feb. 2003. [Co-adviser. Main advisor: A. Sameh]
- Edmond Chow, PhD, Univ. of Minnesota, Dec. 1997.
- Kesheng Wu, PhD, Univ. of Minnesota, Mar. 1997.
- Sangback Ma, PhD, Univ. of Minnesota, Aug. 1993.

PhD Students (current)

- Shashanka Ubaru (4th year) Grad. Student in CSE.
- Vasileios Kalantzis (4th year) Grad. Student in CSE.
- Zach Bookey (1st year) Grad. Student in CSE.

Post-docs and Visitors

Naoufal Nifa, (F 2016 –, Visiting graduate student); Yuanzhe Li (2014 –, Post-doc); Geoffrey Dillon (2014 –, Post-doc) Amokrane Mehi (2015-2016, Visiting graduate student); Agnieszka Miedlar (2015 – 2016, Post-doc); Pierre Carrier (2008-2012, Post-Doc); Da Gao (2009-2012, Post-doc); Jok Tang (2009-2010, Post-Doc); Haw-Ran Fang (2006-2008, and 2010-2012 Post-Doc); Scott Mac Lachlan (2006-2007, Post-Doc); Prakash Dayal (2006-2007, Post-Doc); Suzanne Shontz (2004-2006, Post-Doc); Yunkai Zhou (2004-2006, Post-Doc); Kostas Bekas (2003-2005) Post-Doc); Pascal Henon (2002, Post-doc); Laurent Smoch (2001, Post-doc); Matthias Bollhoeffer (1999, Post-doc); Emmanuel Lorin de la Grandmaison (2002, Post-doc); Leigh Little (1998-2000, Post-doc); Zhongze Li (1999-2001, Post-doc); Caroline Lecalvez (1998, Post-doc); Philippe Guillaume (1999, Visiting faculty); Brian Suchomel (1997-1999, Post-doc); Thierry Braconnier (1997-1998, Post-doc); Jun Zhang (1997-1998, Post-doc); Sergey Kuznetsov (1997, Post-doc); Laurent Jay (Post-doc 1995-1996); Andrew Chapman (1995-1996, Post-doc); Andrei Malevsky (1995, Post-doc); Jen-Chin Lo (1994-1995, Post-doc); Andreas Stathopoulos (Post-doc 1993-1995); Xiao-Chuan Cai (1991 Post-Doc).

Recent Research Grants

- *AF: Medium: Collaborative research: Advanced algorithms and high-performance software for large scale eigenvalue problems* PI: Y. Saad; 07/15/15-07/14/2018. NSF. Budget: $ 300,00.
- *"Advances in robust multilevel preconditioners for linear systems"*. NSF. (sole) PI: Y. Saad. 08/1/2015 – 07/31/2018. Budget: $265,500.

- *"Advances in robust multilevel preconditioners for linear systems". NSF. (sole) PI: Y. Saad. 08/15/2012 – 07/31/2015.* Budget: $300,000.
- *Scalable Computational Tools for Discovery and Design: Excited State Phenomena in Energy Materials,* PI: J. Chelikowsky (UT Austin); 4-5 other co-PIs from U. cal Berkeley; 09/01/2012 – 08/31/2017. DOE-SCIDAC, U of Minn. Budget: $ 746,000. Committed to the project: 0.35 summer mo /year effort.
- "SI2-SSE: Collaborative: Extensible Languages for Sustainable Development of High Performance Software in Materials Science", NSF, PI: E. Van Wyk (Univ. Minnesota), co-PIs: Y. Saad, J. Chelikowsky (UT Austin); 09/15/2010 – 08/31/2013. Total amount $300,000.
- "Collaborative research: Development of efficient petascale algorithms for inhomogeneous quantum-mechanical systems", PI: J. K. Freericks (Georgetown University), co-PIs: Y. Saad (U of M), Tarek El-ghazaoui (G. Washington univ.), Marcos Rigol (G.Washington univ.),
  Start Date: Aug. 15th, 2009. Duration 4 years, Agency: NSF. Total Univ. of Minn. amount: 375K.
- "TMS: Theory and simulation of defects in oxide materials" PI: J. Chelikowsky (UT Austin), co-PIs Y. Saad (U of M), A. Demkov (UT Austin), Steve Louis (Berkeley). Start Date: Sept. 1st, 2009. Duration 3 years, Agency: DOE. Total Univ. of Minn. amount: $ 450K.
- "CDI Type I–Collaborative research–materials informatics: computational tools for discovery and design", PI: Y. Saad. co-PI: J. Chelikowsky (UT Austin), Start Date: Sept. 1st, 2009. Duration 3 years, Agency: NSF. Total Univ. of Minn. amount: 346K.
- "Numerical Linear Algebra and Approximation Theory Methods for Efficient Data Exploration." (sole) PI. $ 275,000 July 2008, 3 years. NSF/DMS.
- "Robust iterative methods for linear systems and least-squares problems", DOE, PI. (Co-PI: M. Sosonkina, Univ. of Iowa and Ames lab.) Start date: 06/15/2008 end Date: 06/14/2011. 405K.

Journal Editorships

- Associate editor, SIAM J. on Matrix Analysis (Oct. 2007 – 2010)
- Associate editor, Computer Physics Communications, Jan 2007 – Jan 2008.
- Associate editor, Electronic Transactions of Numerical Analysis (ETNA), March 2001 to date.
- Associate editor, J. of Numerical Linear Algebra with Applications, 1992 to date.
- Associate editor, IEEE J. Parallel and Distributed Computing. Jan. '96– Jan. '99.
- Associate editor, SIAM J. on Numerical Analysis (June '85 – '94)
- Associate editor, series *Algorithms and Architectures for Advanced Scientific Computing*, Manchester University Press, 1989 – 1992.

Professional Activities

- Householder committee, 2009-2014
- Org. Committee, *International conference on preconditioning methods, Vancouver, Canada, Jul. 31 – Aug. 2, 2017.*
- Org. Committee, *International conference on preconditioning methods, Einhhoven, The Netherlands, Jun. 17-19, 2015.*

- International Org. Committee, *Parallel Matrix Algorithms and Applications* (PMAA 2016) July 6–8, Bordeaux, France.
- NSF Panel, 2014, 2015, 2016.
- Org. committee of the "International conference on preconditioning methods," meetings, every other year since 1999 (co-founder of this series of meetings).
- International Org. Committee, *Parallel Matrix Algorithms and Applications* (PMAA 2012) 28-30 June 2012, Birkbeck University of London, UK.
- Conference co-Chair 6th International Workshop on Parallel Matrix Algorithms and Applications (PMAA'10). June 29 - July 02, 2010, University of Basel, Switzerland.
- Organizing committee for IMA Workshop on "Development and Analysis of Multiscale Methods", U of M, Nov. 3-7, 2008.
- Organizing committee for IMA Workshop on "Classical and Quantum Approaches in Molecular Modeling", U of M, July 23-August 3, 2007.
- Committee co-chair for 5th International Workshop on Parallel Matrix Algorithms and Applications (PMAA'08), 20-22 June 2008, Neuchatel Switzerland,
- Committee co-chair for the series of "Precondiontiong xx" meetings, every 2 years since 1999 (Started the first one in June 1999, in Minneapolis).
- Consultant for: Scientific Computing Associates (1985–1986), Kuck and Associates Inc. (1986–1988), Dassault Aviation (1988-1989), Object Reservoir (1996), Chevron-Texaco (2002–2004).

University and Department Service

- Tenured Faculty Evaluation Committee: 2016-2017
- Graduate admissions committee: 2016-2017
- Member of the mentoring committee for H. Park, F'2016 –
- Member of the Ad-hoc committee to review the faculty evaluation committee – Fall 2015
- Tenured Faculty Evaluation Committee: 2010 – 2013 (chair in 2013).
- MSI committee for seed-grants selection 2008-2009
- CSE Dept. head evaluation committee, 2010.
- IMA committee for post-doc selection, 2008.
- Department Head, Jan. 1997 - June 2000.
- Director of Graduate Studies, Program in Scientific Computation, Sept 15, F 1996 - F 1998.
- Chair, Head search committee, academic year 1992-1993.
- Chair, faculty search committee, Academic year 1991-1992.
- Planning Committee, Minnesota Supercomputer Institute (MSI), 1992-1999. Various other committees with MSI since 1991.

Recent Invited Presentations (2010 –)

Note: a ⊛sign indicates a *plenary invited speaker* or a *special colloquium* presentation.

- Feb 28 2017, *"Polynomial and rational function filtering techniques for Hermitian eigenvalue problems"*, SIAM Conference on Computational Science and Engineering (CSE17) Atlanta, GA

⊛ Jan 19, 2017. *Divide and conquer algorithms and software for large Hermitian eigenvalue problems.* Math + X Symposium on Seismology and Inverse Problems, Rice University, Houston, TX.

⊛ Nov 12 – Nov 13, 2016 - Workshop on Fast Direct Solvers, CCAM, Purdue Univ., Lafayette, IN .

⊛ Oct 24 – Oct 28, 2016, Numerical Linear Algebra and Applications (NL2A) CIRM, Luminy, France.

⊛ Oct 07, 2016. *" Divide and conquer algorithms and software for large Hermitian eigenvalue problems"*, Samuel Conte Distinguished lecture, Purdue University, West-Lafayette, IN.

- Jul 08, 2016. *" Filtered thick restart Lanczos algorithm and the EVSL package*, Parallel Matrix Algorithms and Applicatons (PMAA 2016) Bordeaux, France.
- Jul 07, 2016. *Applications of trace estimation techniques."*, Parallel Matrix Algorithms and Applicatons (PMAA 2016) Bordeaux, France.
- May 19, 2016 *"The trace ratio optimization problem.*, Special memorial meeting in Calais and Valenciennes, France

⊛ Apr 08, 2016. *"High performance numerical linear algebra: trends and new challenges."* HPC days in Lyon, Lyon, France.

- Oct 26, 2015, *"Spectrum slicing by polynomial and rational function filtering",* Minisymposia invited talk, SIAM conference on Applied Linear Algebra Atlanta, GA

⊛ Aug 31, 2015, "Acceleration, inexact Newton, and Nonlinear Krylov subspace methods", ICERM workshop on Numerical Methods for Large-Scale Nonlinear Problems and Their Applications, Brown University, Providence, RI

⊛ Jun 10, 2015 "Computing Approximate Spectral Densities with Applications", Workshop in low-rank optimization, Bonn, Germany.

⊛ Jun 3, 2015 "Divide and conquer algorithms for eigenvalue problems" Math. Colloquium, University of Paris VI (Jussieu), France.

⊛ Apr 22, 2015 "Divide and conquer algorithms for eigenvalue problems" Applied mathematics — LBL seminar, UC Berkeley.

⊛ Apr 21, 2015, ICME colloquium, Stanford University.

⊛ Mar 24, 2015, "Divide and conquer algorithms for large Hermitian eigenvalue problems" at Sparse Solvers for Exascale, Greifswald, Germany.

⊛ Mar 02, 2015, "Dimension reduction methods: Algorithms and Applications", colloquium, Juelich High Performance Computing center, Germany.

- Dec. 2, 2014, Colloquium, Ecole ENIM, Rabat, Morocco.

⊛ Nov. 20, 2014, Modeling and Scientific Computing in Engineering (MOCASIM-2014.), Marrakesh, Morrocco.

- Nov 7, 2014, "Schur complement and multilevel preconditioners", New Jersey Institute of Tech., Applied Math colloquium.
- Oct 31, 2014, College of William and Mary, Computer science colloquium.
- Sep 18, 2014, Computer Science Colloquium, University of Patras, Greece

⊛ Sep 12, 2014, Structured Linear Algebra and Multilinear Algebra (SLA 2014), Kalamata, Greece.

- Jul 4th, 2014, Invited Minisymposium speaker, 8th International Workshop on Parallel Matrix Algorithms and Applications (PMAA14), Lugano, Switzerland.

⊛ June 3rd, 2014, 5th IMACS conference on mathematical modeling and computational methods in sciences and engineering (Modelling 2014), Roznov, Czech Republic.

⊛ Mar 8, 2014, *Sampling algorithms in numerical linear algebra and their application*, EPASA14 – International workshop on Eigenvalue Problems: Algorithms, Software and Applications in Petascale Computations", Tsukuba, Japan, Mar 07 – Mar 09 2014.

- Feb 20, 2014, Invited Minisymposium speaker, SIAM PP14 SIAM conference on par-

allel processing. Portland, Oregon.

⊛ Jan 31, 2014, Invited colloquium speaker, NCSU (Interdisciplinary Distinguished Seminar Series)

- Nov. 11, 2013, Caltech, Applied and Computational Math. colloquium.
- Sept. 20th, 2013, Applied math colloquium, Syracuse University

⊛ June 25, 2013, NASCA13 Numerical Analysis and Scientific Computation with Applications, Calais, France.

- June 17, 2013 'Sparse Days' meeting, CERFACS, Toulouse, France.
- June 5, 2013, International Linear Algebra Society (ILAS) conference (ILAS 2013), Providence, Rhode Island. Invited minisymposium speaker.
- May 3, 2013 Invited speaker, ECE colloquium, University of Massachusetts, Amherst.
- April 19, 2013 "New Frontiers in Numerical Analysis and Scientific Computing," Invited Minisymposium speaker, Kent State University.
- April 5, 2013, College of Computing cpolloquium, Georgia Tech.

⊛ "Algebraic multilevel preconditioners for indefinite linear systems", International conference "High Frequency", Mar 19 - Mar 21, 2013, Nancy, France.

- "Multilevel low-rank approximation preconditioners" Invited Minisymposium speaker, SIAM CSE 2013 conference, Boston, MA, Feb. 25 - Mar 1st, 2013.

⊛ "Multilevel preconditioning techniques with applications", The international conference "Efficient Numerical Methods for Partial Differential Equations", Aug 13 – Aug 18, 2012, Urumqi, XinJiang, China

⊛ "Linear algebra methods for data mining with applications to materials,", 2012 SIAM Annual meeting, Jul 09 – Jul 13, 2012, Minneapolis, MN.

- "The new challenges to Krylov subspace methods", Invited mini-syposium speaker at the SIAM conference on linear algebra, Jun 18 – Jun 22, 2012, Valencia, Spain.
- "Computing the diagonal of the inverse of a matrix", Invited speaker, "Sparse Days", Jun 14 – Jun 17, 2012, CERFACS, Toulouse, France.

⊛ "Linear algebra methods for data mining with applications,", The International Conference on Scientific Computing 2012, The Chinese University of Hong Kong, Hong-Kong, Jan 04 – Jan 07, 2012.

⊛ "Computing the diagonal of the inverse of a matrix" Invited plenary spealer at IMACS-10. 10th IMACS International Symposium on Iterative Methods in Scientific Computing, May 18 – May 21, 2011, Marrakesh, Morocco.

- "Multilevel graph-based methods for data mining", Invited mini-symposium speaker. CSE11 SIAM Conference on Computational Science and Engineering (CSE11). Feb 28 – Mar 04, 2011, Reno, Nevada.

⊛ Charles Hermite, one-day workshop on meshing and PDEs, Nancy (France) June 9th, 2010. "Multilevel preconditioning techniques with applications".

- Oak Ridge National Lab Computer Science and mathematics Seminar Feb 4 – Feb 5, 2010.

⊛ *Numerical Analysis and Scientific Computation with Applications*, Agadir Morrocco, May 18 – May 22, 2010.

Publications: Books

[1] M. W. Berry, K. A. Gallivan, E. Gallopoulos, A. Grama, B. Philippe, Y. Saad, and F. Saied. *High-Performance scientific computing.* Pringer, New York, 2012.

[2] Y. Saad. *Numerical Methods for Large Eigenvalue Problems- Classics in Appl. Math.* SIAM, Philadelpha, PA, 2011.

[3] Y. Saad. *Iterative Methods for Sparse Linear Systems, 2nd edition*. SIAM, Philadelpha, PA, 2003.

[4] Y. Saad. *Numerical Methods for Large Eigenvalue Problems*. Halstead Press, New York, 1992.

[5] A. Ferreira, J. Rolim, Y. Saad, and T. Yang. *Parallel Algorithms for Irregularly Structured Problems, Proceedings of Third International Workshop, IRREGULAR'96 Santa Barbara, CA USA, August 19-21, 1996*. Lecture notes in Computer Science, No 1117. Springer Verlag, Berlin, Heidelberg, New-York, 1996. (Conference proceedings).

[6] D. E. Keyes, Y. Saad, and D. G. Truhlar. *Domain-Based Parallelism and Problem Decomposition Methods in Computational Science and Engineering*. SIAM, Philadelphia, PA, 1995. (Conference proceedings).

[7] D. L. Boley, D. G. Truhlar, Y. Saad, R. E. Wyatt, and L. E. Collins. *Practical Iterative Methods for Large Scale Computations*. North Holland, Amsterdam, 1989. (Conference proceedings).

Publications: Journal Articles

[1] Shashanka Ubaru, Abd-Krim Seghouane, and Yousef Saad. Improving the incoherence of a learned dictionary via rank shrinkage. *Neural Computation*, 29(1), 2017. in Press.

[2] Yuanzhe Xi and Yousef Saad. Computing partial spectra with least-squares rational filters. *SIAM Journal on Scientific Computing*, 38:A3020–A3045, 2016.

[3] Yuanzhe Xi, Ruipeng Li, and Yousef Saad. An algebraic multilevel preconditioner with low-rank corrections for general sparse symmetric matrices. *SIAM Journal on Matrix Analysis and Applications*, 37(1):235–259, 2016.

[4] Jiri Brabec, Lin Lin, Meiyue Shao, Niranjan Govind, Chao Yang, Yousef Saad, and Esmond G. Ng. Efficient algorithms for estimating the absorption spectrum within linear response tddft. *Journal of Chemical Theory and Computation*, 11(11):5197–5208, 2015.

[5] Lin Lin, Yousef Saad, and Chao Yang. Approximating spectral densities of large matrices. *SIAM review*, 58(1):34–65, 2016. arXiv: http://arxiv.org/abs/1308.5467.

[6] Vassilis Kalantzis, Ruipeng Li, and Yousef Saad. Spectral Schur complement techniques for symmetric eigenvalue problems. *Electronic Transactions on Numerical Analysis*, pages –, 2016. To appear.

[7] Pablo Salas, Luc Giraud, Yousef Saad, and Stephane Moreau. Spectral recycling strategies for the solution of nonlinear eigenproblems in thermoacoustics. *Numerical Linear Algebra with Applications*, 22(6):1039–1058, 2015. nla.1995.

[8] Yousef Saad. Analysis of subspace iteration for eigenvalue problems with evolving matrices. *SIAM Journal on Matrix Analysis and Applications*, 37(1):103–122, 2016.

[9] Y. Zhou, J. R. Chelikowsky, and Y. Saad. Chebyshev-filtered subspace iteration method free of sparse diagonalization for solving the kohnsham equation. *Journal of Computational Physics*, 274:770 – 782, 2014.

[10] Ruipeng Li, Yuanzhe Xi, and Yousef Saad. Schur complement based domain decomposition preconditioners with low-rank corrections. *Numerical Linear Algebra with Applications*, 23(2):na–na, 2016.

[11] Abd-Krim Seghouane and Yousef Saad. Prewhitening high dimensional fMRI data sets without eigendecomposition. *Neural Computation*, 26(5):907–919, 2014.

[12] Eugene Vecharynski and Yousef Saad. Fast updating algorithms for latent semantic indexing. *SIAM Journal on Matrix Analysis and Applications*, 35(3):1105–1131, 2014. arXiv: http://arxiv.org/abs/1310.2008.

[13] Daniel Osei-Kuffuor, Ruipeng Li, and Yousef Saad. Matrix reordering using multilevel graph coarsening for ILU preconditioning. *SIAM Journal on Scientific Computing*, 37(1):A391–A419, 2015.

[14] Edmond Chow and Yousef Saad. Preconditioned methods for sampling multivariate gaussian distributions. *SIAM Journal on Scientific Computing*, 36(2), 2013.

[15] T. T. Ngo, M. Bellalij, and Y. Saad. The trace ratio optimization problem. *SIAM review*, 54(3):545–569, 2012.

[16] Tadashi Ando, Edmond Chow, Yousef Saad, and Jeffrey Skolnick. Krylov subspace methods for computing hydrodynamic interactions in brownian dynamics simulations. *The Journal of Chemical Physics*, 137(6):064106–14, 2012.

[17] Ruipeng Li and Yousef Saad. Divide and conquer low-rank preconditioning techniques. *SIAM Journal on Scientific Computing*, 35:A2069–A2095, 2013.

[18] Y. Saad, D. Gao, T. Ngo, S. Bobbitt, J. Chelikowsky, and W. Andreoni. Data mining for materials: Computational experiments with AB compounds. *Phys. Rev. B*, 85(10):104104–13, 2012.

[19] Eugene Vecharynski, Yousef Saad, and Masha Sosonkina. Graph partitioning using matrix values for preconditioning symmetric positive definite systems. *SIAM Journal on Scientific Computing*, 36(1):A63–A87, 2014.

[20] G. Schofield, J. R. Chelikowsky, and Yousef Saad. A spectrum slicing method for the kohn-sham problem. *Computer Physics Communications*, 183(3):497–505, 2012.

[21] S. MacLachlan, D. Osei-Kuffuor, and Yousef Saad. Modification and compensation strategies for threshold-based incomplete factorizations. *SIAM Journal on Scientific Computing*, 34(1):A48–A75, 2012.

[22] H. R. Fang and Y. Saad. A filtered Lanczos procedure for extreme and interior eigenvalue problems. *SIAM Journal on Scientific Computing*, 34(4):A2220–A2246, 2012.

[23] R. B. Sidje and Y. Saad. Rational approximation to the Fermi-Dirac function with applications in density functional theory. *Numerical Algorithms*, 56:455–479, 2011. 10.1007/s11075-010-9397-6.

[24] B. N. Sheehan, Y. Saad, and R. Sidje. Computing exp(-tA)b with laguerre polynomials. *Electronic Transactions on Numerical Analysis*, 37:147–165, 2010.

[25] L. Giraud, A. Haidar, and Y. Saad. Sparse approximations of the Schur complement for parallel algebraic hybrid solvers in 3D. *Numerical Mathematics: Theory, Methods and Applications*, 3(3):276–294, 2010.

[26] J. Tang and Y. Saad. Domain-decomposition-type methods for computing the diagonal of a matrix inverse. *SIAM Journal on Scientific Computing*, 33(5):2823–2847, 2011.

[27] Jok M. Tang and Yousef Saad. A probing method for computing the diagonal of a matrix inverse. *Numerical Linear Algebra with Applications*, 19(3):485–501, 2011.

[28] J. Tang and Y. Saad. A new method for computing the diagonal of a matrix inverse. *Hong-Kong Institution for Engineers Transactions*, 17(4):69–72, 2010.

[29] Y. Saad, J. Chelikowsky, and S. Shontz. Numerical methods for electronic structure calculations of materials. *SIAM review*, 52:3–54, 2009.

[30] Ruipeng Li, Hector Klie, Hari Sudan, and Yousef Saad. Towards realistic reservoir simulations on manycore platforms. *SPE Journal*, pages 1–23, 2010.

[31] Stefano Baroni, Ralph Gebauer, O Bari Malciolu, Yousef Saad, Paolo Umari, and Jiawei Xian. Harnessing molecular excited states with Lanczos chains. *Journal of Physics: Condensed Matter*, 22(7):074204, 2010.

[32] Jie Chen, Mihai Anitescu, and Yousef Saad. Computing f(A)b via least squares polynomial approximations. *SIAM Journal on Scientific Computing*, 33(1):195–222, 2011.

[33] Jie Chen and Yousef Saad. Finding dense subgraphs for sparse undirected, directed, and bipartite graphs. *IEEE Trans. Know. and Data. Eng.*, 24(7):1216–1230, 2012.

[34] T. T. Ngo, M. Bellalij, and Y. Saad. The trace ratio optimization problem for dimensionality reduction. *SIAM Journal on Matrix Analysis and Applications*, 31:2950–2971, 2010.

[35] Daniel Osei-Kuffuor and Yousef Saad. Preconditioning Helmholtz linear systems. *Appl. Numer. Math.*, 60:420–431, April 2010.

[36] E. Kokiopoulou, J. Chen, and Y. Saad. Trace optimization and eigenproblems in dimension reduction methods. *Numerical Linear Algebra with Applications*, 18:565–602, 2011.

[37] Caterina Calgaro, Jean-Paul Chehab, and Yousef Saad. Incremental incomplete lu factorizations with applications. *Numerical Linear Algebra with Applications*, 17(5):811–837, 2010.

[38] E. Kokiopoulou and Y. Saad. Enhanced graph-based dimensionality reduction with repulsion Laplaceans. *Pattern Recogn.*, 42(11):2392–2402, 2009.

[39] M. Bellalij, Y. Saad, and H. Sadok. Analysis of some Krylov subspace methods for normal matrices via approximation theory and convex optimization. *Electronic Transactions on Numerical Analysis*, 33:17–30, 2008.

[40] J. Chen, H. R. Fang, and Y. Saad. Fast approximate knn graph construction for high dimensional data via recursive Lanczos bisection. *Journal of Machine Learning Research*, 10:1989–2012, 2009.

[41] James R. Chelikowsky, Murilo L. Tiago, Yousef Saad, and Yunkai Zhou. Algorithms for the evolution of electronic properties in nanocrystals. *Computer Physics Communications*, 177(12):1 – 5, 2007. Proceedings of the Conference on Computational Physics 2006 {CCP} 2006 Conference on Computational Physics 2006.

[42] James R Chelikowsky, Alexey T Zayak, T-L Chan, Murilo L. Tiago, Yunkai Zhou, and Yousef Saad. Algorithms for the electronic and vibrational properties of nanocrystals. *Journal of Physics: Condensed Matter*, 21(6):064207, 2009.

[43] Dario Rocca, Ralph Gebauer, Yousef Saad, and Stefano Baroni. Turbo charging time-dependent density-functional theory with Lanczos chains. *The Journal of Chemical Physics*, 128(15):154105, 2008.

[44] Z. Feng, A. Soulaimani, and Y. Saad. Nonlinear krylov acceleration for CFD-based aeroelasticity. *Journal of Fluids and Structures*, 25(1):26 – 41, 2009.

[45] C. Bekas, E. Kokiopoulou, and Y. Saad. Computation of large invariant subspaces using polynomial filtered lanczos iterations with applications in density functional theory. *SIAM Journal on Matrix Analysis and Applications*, 30(1):397–418, 2008.

[46] J. Chen and Y. Saad. Lanczos vectors versus singular vectors for effective dimension reduction. *IEEE Trans. on Knowledge and Data Engineering*, 21(9):1091–1103, 2009.

[47] J. Chen and Y. Saad. On the tensor SVD and optimal low rank orthogonal approximations of tensors. *SIAM Journal on Matrix Analysis and Applications*, 30(4):1709–1734, 2008.

[48] Yunkai Zhou and Yousef Saad. A Chebyshev-Davidson algorithm for large symmetric eigenproblems. *SIAM Journal on Matrix Analysis and Applications*, 29(3):954–971, 2007.

[49] M. Alemany, M. Jain, M. L. Tiago, Y. Zhou, Y. Saad, and J. R. Chelikowsky. Efficient first principle calculations of the electronic structure of periodic systems. *Computer Physics Communications*, 177:339–347, 2007.

[50] Haw ren Fang and Yousef Saad. Two classes of multisecant methods for nonlinear acceleration. *Numerical Linear Algebra with Applications*, 16(3):197–221, 2009.

[51] J. Jones, M. Sosonkina, and Y. Saad. Component-based iterative methods for sparse linear systems. *Concurrency and Computation: Practice and Experience*, 19:625–635, 2007.

[52] M. Bellalij, Y. Saad, and H. Sadok. On the convergence of the Arnoldi process for eigenvalue problems. *SIAM Journal on Numerical Analysis*, 48(2):393–407, 2010.

[53] E. Kokiopoulou and Y. Saad. Orthogonal neighborhood preserving projections: A projection-based dimensionality reduction technique. *IEEE TPAMI*, 29:2143–2156, 2007.

[54] M. Ilic, I. W. Turner, and Y. Saad. Linear system solution by null-space approximation and projection (snap). *Numerical Linear Algebra with Applications*, 14:61–82, 2007.

[55] B. Philippe and Y. Saad. On correction equations and domain decomposition for computing invariant subspaces. *Computer Methods in Applied Mechanics and Engineering (special issue devoted to Domain Decomposition)*, 196:1471–1483, 2007.

[56] S. MacLachlan and Y. Saad. A greedy strategy for coarse-grid selection. *SIAM Journal on Scientific Computing*, 29(5):1825–1853, 2007.

[57] S. MacLachlan and Y. Saad. Greedy coarsening strategies for non-symmetric problems. *SIAM Journal on Scientific Computing*, 29(5):2115–2143, 2007.

[58] Yunkai Zhou, Yousef Saad, Murilo L. Tiago, and James R. Chelikowsky. Parallel self-consistent-field calculations via Chebyshev-filtered subspace acceleration. *Phy. rev. E*, 74:066704, 2006.

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