

B. David Saunders' Publications

This page is in reverse order by date and includes all manner of things such as journal papers, conference contributions, tech reports. Here papers are given by title only. For a page with a little more about some of the papers, see the abstracts.

- [1] Robert M. Corless, Mark Giesbrecht, Leili Rafiee Sevyeri, and B. David Saunders. On parametric linear system solving. In *CASC 2020, to appear*, 2020.
- [2] Gavin Harrison, Jeremy R. Johnson, and B. David Saunders. Probabilistic analysis of block wiedemann for leading invariant factors. *CoRR*, abs/1803.03864, 2018.
- [3] Matthew A. Lambert and B. David Saunders. Compiler auto-vectorization of matrix multiplication modulo small primes. In Jean-Charles Faugère, Michael B. Monagan, and Hans-Wolfgang Loidl, editors, *Proceedings of the International Workshop on Parallel Symbolic Computation, PASCOS@ISSAC 2017, Kaiserslautern, Germany, July 23-24, 2017*, pages 7:1–7:10. ACM, 2017.
- [4] Gavin Harrison, Jeremy Johnson, and B. David Saunders. Poster abstract: Probabilistic analysis of block wiedemann for leading invariant factors. In *ACM Communications in Computer Algebra*, volume 50, pages 173–175, 2016.
- [5] A. Novocin, B. D. Saunders, A. Stachnik, and B. Youse. 3-ranks for strongly regular graphs. In J-G Dumas and E. Kaltofen, editors, *Proceedings of the 2015 International Workshop on Parallel Symbolic Computation PASCOS'15*, pages 101–108. ACM Press, 2015.
- [6] B. David Saunders. Matrices with two nonzero entries per row. In *Proc. 2015 Internat. Symp. Symbolic Algebraic Comput. ISSAC'15*, pages 323–330. ACM Press, 2015.
- [7] Gavin Harrison, Jeremy Johnson, and B. David Saunders. Probabilistic analysis of Wiedemann's algorithm for minimal polynomial computation. *Journal of Symbolic Computation*, 74:55–69, 2016. (available online June 12, 2015, final version online 20-NOV-2015, also arXiv:1412.5071 [cs.SC]).
- [8] Brice Boyer, Jean-Guillaume Dumas, Pascal Giorgi, Clément Pernet, and B. David Saunders. Elements of design for containers and solutions in the linbox library. *arXiv:1407.3262 [cs.MS]*, 2014.
- [9] Gavin Harrison, Jeremy Johnson, and B. David Saunders. Probabilistic analysis of Wiedemann's algorithm for minimal polynomial computation. In *ACM Commun. Comput. Algebra*, volume 47, pages 118–119, January 2014.
- [10] B. Youse and B. D. Saunders. Computing the rank of a huge matrix over $\text{gf}(3)$. In *ACM Communications in Computer Algebra*, volume 47, number 1/2, pages 65–66, 2013.
- [11] Christopher Thorpe, Feng Li, Zijia Li, Zhan Yu, David Saunders, and Jingyi Yu. A co-prime blur scheme for data security in video surveillance. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 35(12):16–23, 2013. arXiv:1203.4874v1.

- [12] Mustafa ElSheik, Mark Giesbrecht, Andrew Novocin, and B. D. Saunders. Fast computation for Smith forms of sparse matrices over local rings. In *Proc. 2012 Internat. Symp. Symbolic Algebraic Comput. ISSAC'12*, pages 146–153. ACM Press, 2012.
- [13] Matthew Wezowicz, B. D. Saunders, and Michela Taufer. Dealing with performance/portability and performance/accuracy trade-offs in heterogeneous computing systems: A case study with matrix multiplication modulo primes. In *Proceedings of the DSS11 SPIE Defense, Security, and Sensing Symposium - Modeling and Simulation for Defense Systems and Applications VI*, 2012.
- [14] B. D. Saunders, D. H. Wood, and B. Youse. Numeric-symbolic exact rational linear system solver. In *Proc. 2011 Internat. Symp. Symbolic Algebraic Comput. ISSAC'11*, pages 305–312. ACM Press, 2011.
- [15] E. Kaltofen, M. Nehring, and B. D. Saunders. Quadratic-time certificates in linear algebra. In *Proc. 2011 Internat. Symp. Symbolic Algebraic Comput. ISSAC'11*, pages 171–176. ACM Press, 2011.
- [16] Feng Li, B. D. Saunders, and Jingyi Yu. A theory of coprime blurred pairs. In *Proc. 2011 ICCV*, 2011.
- [17] B. Youse and B. D. Saunders. Poster abstract: Numeric-symbolic exact rational linear system solver. In M. Kauers and I. Kotsireas, editors, *ACM Communications in Computer Algebra*, volume 45, page 104, 2011.
- [18] B. Youse and B. D. Saunders. Poster abstract: Bitslicing with matrix algorithms oblivious to the data compression. In M. Kauers and I. Kotsireas, editors, *ACM Communications in Computer Algebra*, volume 44, 2010.
- [19] J-G Dumas, T. Gautier, C. Pernet, and B. D. Saunders. Linbox founding scope allocation, parallel building blocks, and separate compilation. In K. Fukuda, J. vander Hoeven, M. Joswig, and N. Takayama, editors, *ICMS'10, Proceedings of the Third international congress conference on Mathematical software*, pages 77–83. Springer Verlag, LNCS 6327, 2010.
- [20] B. D. Saunders and B. Youse. Large matrix, small rank. In *Proc. 2009 Internat. Symp. Symbolic Algebraic Comput. ISSAC'09*, pages 317–324. ACM Press, 2009.
- [21] Jean-Guillaume Dumas, Clement Pernet, and B. D. Saunders. On finding multiplicities of characteristic polynomial factors of sparse matrices. In *Proc. 2009 Internat. Symp. Symbolic Algebraic Comput. ISSAC'09*, pages 135–142. ACM Press, 2009.
- [22] J. P. May, B. D. Saunders, and Z. Wan. Efficient matrix rank computation with application to the study of strongly regular graphs. In *Proc. 2007 Internat. Symp. Symbolic Algebraic Comput. ISSAC'07*, pages 277–284. ACM Press, 2007.
- [23] B. W. Char, B. D. Saunders, and B. Youse. Linbox and future high performance computer algebra. In *Internat. Symp. Parallel Symbolic Comput. PASC0*, pages 102–103. ACM Press, 2007.
- [24] J. P. May, B. D. Saunders, and D. H. Wood. Numerical techniques for computing the inertia of products of matrices of rational numbers. In *SNC'07*, pages 125–132. ACM Press, 2007.

- [25] J. Adams, B. D. Saunders, and Z. Wan. Signature of symmetric rational matrices and the unitary dual of lie groups. In *Proc. 2005 Internat. Symp. Symbolic Algebraic Comput. ISSAC'05*, pages 13–20. ACM Press, 2005.
- [26] B. D. Saunders and Z. Wan. Smith normal form of dense integer matrices, fast algorithms into practice. In *Proc. 2004 Internat. Symp. Symbolic Algebraic Comput. ISSAC'04*, pages 274–281. ACM Press, 2004.
- [27] Z. Wan and B. D. Saunders. Tighter probability bounds for randomized linear algebra algorithms. May 8, 2004.
- [28] B. D. Saunders, A. Storjohann, and G. Villard. Matrix rank certification. *Electronic J. of Linear Algebra*, 11:16–23, 2004.
- [29] J-G Dumas, F. Heckenbach, D. Saunders, and V. Welker. Computing simplicial homology based on efficient Smith normal form algorithms. In M. Joswig and N. Takayama, editors, *Algebra, Geometry, and Software Systems*, pages 177–206. Springer Verlag, 2003.
- [30] A. Duran, B. D. Saunders, and Z. Wan. Rank of sparse (1,0,-1)-matrices. In *Proceeding of the SIAM International Conference on Applied Linear Algebra*. online at www.siam.org/meetings/la03/proceedings, 2003.
- [31] A. Lobo, B. D. Saunders, and Z. Wan. Rank and Smith form of extremely sparse matrices. In *International Conference on Applications of Computer Algebra*. No proceedings, 2003.
- [32] E. Kaltofen and B. D. Saunders. Linear systems. In J. Grabmeier, E. Kaltofen, and V. Weispfenning, editors, *Computer Algebra Handbook*, pages 36–38. Springer Verlag, 2003.
- [33] Z. Wan and D. Saunders. Exact solution to large sparse integer linear systems. 2002.
- [34] A. Duran and D. Saunders. Genblas: Basic linear algebra subroutines in c++ over any fields. 2002.
- [35] Dumas, Gautier, Giesbrecht, Giorgi, Hovinen, Kaltofen, Saunders, Turner, and Villard. Linbox: A generic library for exact linear algebra. In A. Cohen, X-S Gao, and N. Takayama, editors, *Mathematical Software: ICMS 2002 (Proceedings of the first International Congress of Mathematical Software)*, pages 40–50. World Scientific, 2002.
- [36] L. Chen, W. Eberly, E. Kaltofen, W. J. Turner, B. D. Saunders, and G. Villard. Efficient matrix preconditioners for black box linear algebra. *Linear Algebra and Applications*, 343-344:119–146, 2002.
- [37] B. D. Saunders. Black box methods for least squares problems. In *Proc. 2001 Internat. Symp. Symbolic Algebraic Comput. ISSAC'01*, pages 297–302. ACM Press, 2001.
- [38] J-G. Dumas, B. D. Saunders, and G. Villard. On efficient sparse integer matrix Smith normal form computations. *J. Symbolic Comput.*, 32:71–99, 2001.
- [39] J-G. Dumas, B. D. Saunders, and G. Villard. Integer Smith form via the valence: Experience with large sparse matrices from homology. In *Proc. 2000 Internat. Symp. Symbolic Algebraic Comput. ISSAC'00*, pages 95–105. ACM Press, 2000.

- [40] Giesbrecht, A. Lobo, and B. D. Saunders. Certifying inconsistency of sparse linear systems. In *Proc. 1998 Internat. Symp. Symbolic Algebraic Comput. ISSAC'98*, pages 113–119. ACM Press, 1998.
- [41] M. W. Giesbrecht and B. D. Saunders. Solving parametric linear systems. 1998.
- [42] M. W. Giesbrecht and B. D. Saunders. Parametric linear systems, the two parameter case. 1997.
- [43] M. W. Giesbrecht, B. D. Saunders, and A. Lobo. A fast certificate of inconsistency for large sparse linear systems. 1997.
- [44] B. D. Saunders. Parameter $\langle \rangle$ indeterminate. 1997.
- [45] Lakshman Y. N. and B. D. Saunders. On computing sparse shifts for univariate polynomials. *J. of Applic. Algebra Engin. Commun. Comput.*, 7,5:351–364, 1996.
- [46] Lakshman Y. N. and B. D. Saunders. Sparse polynomial interpolation in non-standard bases. *SIAM J. Comput.*, 24(2):387–397, 1995.
- [47] H. R. Lee and B. D. Saunders. Fraction free gaussian elimination for sparse matrices. *J. Symbolic Comput.*, 19:393–402, 1995.
- [48] B. Char, J. Johnson, B. D. Saunders, and A. Wack. Some experiments with parallel bignum arithmetic. In *Internat. Symp. Parallel Symbolic Comput. PASC0*, pages 94–103. World Scientific, 1994.
- [49] Lakshman Y. N. and B. D. Saunders. A note on computing sparse shifts for univariate polynomials. In *Proc. 1994 Internat. Symp. Symbolic Algebraic Comput. ISSAC'94*, pages 108–113, 1994.
- [50] E. Kaltofen and B. D. Saunders. On Wiedemann's method of solving sparse linear systems. In H. F. Mattson, T. Mora, and T. R. N. Rao, editors, *Proc. Applic. Algebra Engin. Commun. Comput. AAEC-9*, volume 539 of *Lect. Notes Comput. Sci.*, pages 29–38, Heidelberg, Germany, 1991. Springer Verlag.
- [51] H. R. Lee, B. D. Saunders, and R. H. Shtokhamer. On scheduling algebraic algorithms for parallel execution. Technical Report CIS TR-9015, U. of Delaware Department of Computer and Information Sciences Technical Report, 1990.
- [52] E. Kaltofen, M. S. Krishnamoorthy, and B. D. Saunders. Parallel algorithms for matrix normal forms. *Linear Algebra and Applications*, 136:189–208, 1990.
- [53] E. Kaltofen, M. S. Krishnamoorthy, and B. D. Saunders. Mr. Smith goes to Las Vegas: Randomized parallel computation of the Smith normal form of polynomial matrices. In J. H. Davenport, editor, *Proc. EUROCAL '87*, volume 378 of *Lect. Notes Comput. Sci.*, pages 317–322, Heidelberg, Germany, 1989. Springer Verlag. Journal version in [52].
- [54] B. D. Saunders, H. R. Lee, and S. K. Abdali. A parallel implementation of the cylindrical algebraic decomposition algorithm. In *The 1989 International Symposium on Symbolic and Algebraic Computation*, pages 298–307. ACM Press, 1989.

- [55] B. D. Saunders. Matrix computations in computer algebra systems. Technical Report CMC-8808, U. of Delaware Center for Mathematical Computation Technical Report, 1988.
- [56] E. Kaltofen, M. S. Krishnamoorthy, and B. D. Saunders. Fast parallel computation of Hermite and Smith forms of polynomial matrices. *SIAM J. Alg. Discrete Math.*, 8:683–690, 1987.
- [57] E. Kaltofen, M. S. Krishnamoorthy, and B. D. Saunders. Fast parallel algorithms for similarity of matrices. In B. W. Char, editor, *Proc. 1986 ACM Symp. Symbolic and Algebraic Comput.*, pages 65–70, New York, N. Y., 1986. ACM. Journal version in [56] and [52].
- [58] S. K. Abdali and B. D. Saunders. Transitive closure and related semiring properties via eliminants. *Theoretical Computer Science*, 40:257–274, 1985.
- [59] B.F. Caviness, B. D. Saunders, and M.F. Singer. An extension of Liouville’s theorem on integration in finite terms. *SIAM J. Comput.*, 14:966–990, 1985.
- [60] A. Kandri Rody and B. D. Saunders. Primality of ideals in polynomial rings. In *Proc. 1984 MACSYMA Users Conference*, pages 459–471, 1984.
- [61] S. Agnarsson, A. Kandri Rody, D. Kapur, P. Narendran, and B. D. Saunders. Complexity of testing whether a polynomial ideal is nontrivial. In *Proc. 1984 MACSYMA Users Conference*, pages 452–458, 1984.
- [62] N. Glinos and B. D. Saunders. Operational calculus techniques for solving differential equations. In *EUROSAM ’84*, pages 23–34, 1984.
- [63] E. Kaltofen, D. R. Musser, and B. D. Saunders. A generalized class of polynomials that are hard to factor. *SIAM J. Comput.*, 12(3):473–485, 1983.
- [64] E. Kaltofen, D. R. Musser, and B. D. Saunders. A generalized class of polynomials that are hard to factor, extended abstract. In *Proc. 1981 ACM Symp. Symbolic and Algebraic Comput.*, pages 188–194. ACM, 1981. Journal version in [63].
- [65] A. Berman and B. D. Saunders. Matrices with zero-line-sums and maximal rank. *Linear Algebra and Applications*, 40:229–235, 1981.
- [66] B.F. Caviness, B. D. Saunders, and M.F. Singer. An extension of Liouville’s theorem on integration in finite terms (extended abstract). In *Proc. 1981 ACM Symp. Symbolic and Algebraic Comput.*, pages 23–24, 1981. Journal version in [59].
- [67] B. D. Saunders. An implementation of Kovacic’s algorithm for solving second order linear homogeneous differential equations. In *Proc. 1981 ACM Symp. Symbolic and Algebraic Comput.*, pages 105–108. ACM, 1981.
- [68] B. D. Saunders and Hans Schneider. Applications of the Gordan-Stiemke theorem in combinatorial matrix theory. *SIAM Review*, 21:528–541, 1979.
- [69] B. D. Saunders and Hans Schneider. Cones, graphs and optimal scalings of matrices. *Linear and Multilinear Algebra*, 8:121–135, 1979.
- [70] B. D. Saunders and Hans Schneider. Flows on graphs applied to diagonal similarity and diagonal equivalence for matrices. *Discrete Mathematics*, 24:205–220, 1978.

- [71] B. E. Cain, B. D. Saunders, and Hans Schneider. On the geometry of dual pairs. *Studies in Appl. Math.*, 56:71–79, 1977.
- [72] B. D. Saunders. A condition for the convexity of the norm-numerical range of a matrix. *Linear Algebra and Applications*, 16:167–175, 1977.
- [73] B. D. Saunders and Hans Schneider. A symmetric numerical range for matrices. *Numerische Math.*, 26:99–105, 1976.