

## REFERENCE LIST

ZHENGBO ZHOU\*

March 7, 2023

### References

- [1] Andrew A. Anda and Haesun Park. [Fast plane rotations with dynamic scaling](#). *SIAM Journal on Matrix Analysis and Applications*, 15(1):162–174, 1994. No citations.
- [2] Edward Anderson, Zhaojun Bai, Christian Bischof, L. Susan Blackford, James Demmel, Jack Dongarra, Jeremy Du Croz, Anne Greenbaum, Sven Hammarling, Alan McKenney, and Danny Sorensen. [LAPACK Users' Guide](#). 3rd edition, Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, 1999. 429 pp. ISBN 0-89871-447-8. No citations.
- [3] Zhaojun Bai and James Demmel. [Using the matrix sign function to compute invariant subspaces](#). *SIAM Journal on Matrix Analysis and Applications*, 19(1):205–225, 1998. No citations.
- [4] George A. Baker. *Essentials of Padé approximants*. Academic Press, New York, 1975. xi+306 pp. ISBN 0-12-074855-X. No citations.
- [5] Richard H. Bartels and Gilbert W. Stewart. [Solution of the matrix equation  \$AX + XB = C\$](#) . *Communications of the ACM*, 15(9):820–826, 1972. No citations.
- [6] Pierre R. Belanger and Thomas P. McGillivray. [Computational experience with the solution of the matrix Lyapunov equation](#). *IEEE Transactions on Automatic Control*, 21(5):799–800, 1976. No citations.
- [7] Adi Ben-Israel. [An iterative method for computing the generalized inverse of an arbitrary matrix](#). *Mathematics of Computation*, 19(91):452–455, 1965. No citations.
- [8] Rajendra Bhatia. [Matrix Analysis](#). Springer-Verlag, New York, 1997. xi+347 pp. ISBN 978-1-4612-6857-4. No citations.
- [9] Rajendra Bhatia and Peter Rosenthal. [How and why to solve the operator equation  \$AX - XB = Y\$](#) . *Bulletin of the London Mathematical Society*, 29(1):1–21, 1997. No citations.
- [10] Åke Björck. [Numerical methods for least squares problems](#). Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, January 1996. xvii+408 pp. ISBN 978-0-89871-360-2. No citations.

---

\*Department of Mathematics, University of Manchester, Manchester, M13 9PL, England (zhengbo.zhou@postgrad.manchester.ac.uk).

- [11] Åke Björck and Clazett Bowie. [An iterative algorithm for computing the best estimate of an orthogonal matrix](#). *SIAM Journal on Numerical Analysis*, 8(2):358–364, 1971. No citations.
- [12] Åke Björck and Sven Hammarling. [A Schur method for the square root of a matrix](#). *Linear Algebra and its Applications*, 52–53:127–140, 1983. No citations.
- [13] Peter Businger and Gene H. Golub. [Linear least squares solutions by householder transformations](#). *Numerische Mathematik*, 7(3):269–276, 1965. No citations.
- [14] Sheung Hun Cheng, Nicholas J. Higham, Charles S. Kenney, and Alan J. Laub. [Approximating the logarithm of a matrix to specified accuracy](#). *SIAM Journal on Matrix Analysis and Applications*, 22(4):1112–1125, 2001. No citations.
- [15] Philip I. Davies, Nicholas J. Higham, and Françoise Tisseur. [Analysis of the Cholesky method with iterative refinement for solving the symmetric definite generalized eigenproblem](#). *SIAM Journal on Matrix Analysis and Applications*, 23(2):472–493, 2001. No citations.
- [16] P. P. M. de Rijk. [A one-sided Jacobi algorithm for computing the singular value decomposition on a vector computer](#). *SIAM Journal on Scientific and Statistical Computing*, 10(2):359–371, 1989. No citations.
- [17] Edvin Deadman, Nicholas J. Higham, and Rui Ralha. [Blocked Schur algorithms for computing the matrix square root](#). In *Applied Parallel and Scientific Computing: 11th International Conference, PARA 2012, Helsinki, Finland*, P. Manninen and P. Öster, editors, volume 7782 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, Germany, 2013, pages 171–182. No citations.
- [18] James Demmel and Krešimir Veselić. [Jacobi’s method is more accurate than QR](#). *SIAM Journal on Matrix Analysis and Applications*, 13(4):1204–1245, 1992. No citations.
- [19] Eugene D. Denman. [Roots of real matrices](#). *Linear Algebra and its Applications*, 36: 133–139, 1981. No citations.
- [20] Eugene D. Denman and Alex N. Beavers. [The matrix sign function and computations in systems](#). *Applied Mathematics and Computation*, 2(1):63–94, 1976. No citations.
- [21] Inderjit S. Dhillon and Beresford N. Parlett. [Orthogonal eigenvectors and relative gaps](#). *SIAM Journal on Matrix Analysis and Applications*, 25(3):858–899, 2003. No citations.
- [22] Froilán M. Dopico, Juan M. Molera, and Julio Moro. [An orthogonal high relative accuracy algorithm for the symmetric eigenproblem](#). *SIAM Journal on Matrix Analysis and Applications*, 25(2):301–351, 2003. No citations.
- [23] Zlatko Drmač. *Computing the Singular and the Generalized Singular Values*. PhD thesis, Lehrgebiet Mathematische Physik, Fernuniversität Hagen, September 1994. No citations.
- [24] Zlatko Drmač. [Implementation of Jacobi rotations for accurate singular value computation in floating point arithmetic](#). *SIAM Journal on Scientific Computing*, 18(4): 1200–1222, 1997. No citations.

- [25] Zlatko Drmač. [Algorithm 977: A QR-preconditioned QR SVD method for computing the SVD with high accuracy](#). *ACM Transactions on Mathematical Software*, 44(1):1–30, 2017. No citations.
- [26] Zlatko Drmač. [A posteriori computation of the singular vectors in a preconditioned Jacobi SVD algorithm](#). *IMA Journal of Numerical Analysis*, 19(2):191–213, 1999. No citations.
- [27] Zlatko Drmač and Krešimir Veselić. [Approximate eigenvectors as preconditioner](#). *Linear Algebra and its Applications*, 309(1):191–215, 2000. No citations.
- [28] Zlatko Drmač and Krešimir Veselić. [New fast and accurate Jacobi SVD algorithm. I](#). *SIAM Journal on Matrix Analysis and Applications*, 29(4):1322–1342, 2008. No citations.
- [29] Zlatko Drmač and Krešimir Veselić. [New fast and accurate Jacobi SVD algorithm. II](#). *SIAM Journal on Matrix Analysis and Applications*, 29(4):1343–1362, 2008. No citations.
- [30] Ky Fan and A. J. Hoffman. [Some metric inequalities in the space of matrices](#). *Proceedings of the American Mathematical Society*, 6(1):111–116, 1955. No citations.
- [31] George E. Forsythe and Peter Henrici. [The cyclic Jacobi method for computing the principal values of a complex matrix](#). *Transactions of the American Mathematical Society*, 94(1):1–23, 1960. No citations.
- [32] Carl E. Fröberg. [Introduction to Numerical Analysis](#). *Adiwes international series*. 2nd edition, Addison-Wesley Publishing Company, 1965. No citations.
- [33] Felix R. Gantmacher. [The Theory of Matrices](#). Chelsea Publishing Company, New York, 1980. x+374 pp. ISBN 0-8218-1376-5. No citations.
- [34] Weiguo Gao, Yuxin Ma, and Meiyue Shao. [A mixed precision Jacobi SVD algorithm](#), 2022. No citations.
- [35] W. Morven Gentleman. [Error analysis of QR decompositions by Givens transformations](#). *Linear Algebra and its Applications*, 10(3):189–197, 1975. No citations.
- [36] Herman H. Goldstine, Francis J. Murray, and John von Neumann. [The Jacobi method for real symmetric matrices](#). *Journal of the ACM*, 6(1):59–96, 1959. No citations.
- [37] Gene H. Golub, Steve G. Nash, and Charles F. Van Loan. [A Hessenberg-Schur method for the problem  \$AX + XB = C\$](#) . *IEEE Transactions on Automatic Control*, 24(6):909–913, 1979. No citations.
- [38] Gene H. Golub and Henk A. van der Vorst. [Eigenvalue computation in the 20th century](#). *Journal of Computational and Applied Mathematics*, 123(1):209–239, 2001. No citations.
- [39] Gene H. Golub and Charles F. Van Loan. [Matrix Computations](#). *Johns Hopkins studies in the mathematical sciences*. 4th edition, Johns Hopkins University Press, Baltimore, MD, USA, 2013. ISBN 978-1-4214-0794-4. No citations.
- [40] Robert T. Gregory. [Computing eigenvalues and eigenvectors of a symmetric matrix on the ILLIAC](#). *Mathematics of Computation*, 7(44):215–220, 1953. No citations.

- [41] Robert T. Gregory and David L. Karney. *A Collection of Matrices for Testing Computational Algorithms*. Wiley, New York, USA, 1969. 154 pp. ISBN 0-88275-649-4. No citations.
- [42] Vjeran Hari. [On sharp quadratic convergence bounds for the serial Jacobi methods](#). *Numerische Mathematik*, 60(1):375–406, 1991. No citations.
- [43] Peter Henrici. *Elements of Numerical Analysis*. Wiley, New York, USA, 1964. 328 pp. ISBN 978-0471372417. No citations.
- [44] Nicholas J. Higham. The Matrix Function Toolbox. <http://www.ma.man.ac.uk/~higham/mfttoolbox>. No citations.
- [45] Nicholas J. Higham. [Computing the polar decomposition—with applications](#). *SIAM Journal on Scientific and Statistical Computing*, 7(4):1160–1174, 1986. No citations.
- [46] Nicholas J. Higham. [Newton’s method for the matrix square root](#). *Mathematics of Computation*, 46(174):537–549, 1986. No citations.
- [47] Nicholas J. Higham. [Computing real square roots of a real matrix](#). *Linear Algebra and its Applications*, 88–89:405–430, 1987. No citations.
- [48] Nicholas J. Higham. Matrix nearness problems and applications. In *Applications of Matrix Theory*, M. J. C. Gover and S. Barnett, editors, Oxford, UK, 1989, pages 1–27. Oxford University Press. No citations.
- [49] Nicholas J. Higham. [The matrix sign decomposition and its relation to the polar decomposition](#). *Linear Algebra and its Applications*, 212–213:3–20, 1994. No citations.
- [50] Nicholas J. Higham. [Stable iterations for the matrix square root](#). *Numerical Algorithms*, 15(2):227–242, 1997. No citations.
- [51] Nicholas J. Higham. *Accuracy and Stability of Numerical Algorithms*. 2nd edition, Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, January 2002. xxx+680 pp. ISBN 0-89871-521-0. No citations.
- [52] Nicholas J. Higham. *Functions of Matrices: Theory and Computation*. Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, 2008. xx+425 pp. ISBN 978-0-898716-46-7. No citations.
- [53] Nicholas J. Higham and Edwin Hopkins. [A catalogue of software for matrix functions. Version 3.0](#). MIMS EPrint 2020.7, Manchester Institute for Mathematical Sciences, The University of Manchester, UK, March 2020. 24 pp. No citations.
- [54] Nicholas J. Higham, D. Steven Mackey, Niloufer Mackey, and Françoise Tisseur. [Functions preserving matrix groups and iterations for the matrix square root](#). *SIAM Journal on Matrix Analysis and Applications*, 26(3):849–877, 2005. No citations.
- [55] Nicholas J. Higham and Theo Mary. [Mixed precision algorithms in numerical linear algebra](#). *Acta Numerica*, 31:347–414, 2022. No citations.
- [56] Nicholas J. Higham and Srikara Pranesh. [Simulating low precision floating-point arithmetic](#). *SIAM Journal on Scientific Computing*, 41(5):C585–C602, 2019. No citations.

- [57] Nicholas J. Higham and Robert S. Schreiber. [Fast polar decomposition of an arbitrary matrix](#). *SIAM Journal on Scientific and Statistical Computing*, 11(4):648–655, 1990. No citations.
- [58] Roger A. Horn and Charles R. Johnson. [Topics in Matrix Analysis](#). Cambridge University Press, Cambridge, UK, April 1991. viii+607 pp. ISBN 0-521-30587-X. No citations.
- [59] Roger A. Horn and Charles R. Johnson. [Matrix Analysis](#). 2nd edition, Cambridge University Press, Cambridge, UK, 2013. ISBN 978-0-521-83940-2 (Hardback). No citations.
- [60] William D. Hoskins and Desmond J. Walton. [A faster method of computing the square root of a matrix](#). *IEEE Transactions on Automatic Control*, 23(3):494–495, 1978. No citations.
- [61] William D. Hoskins and Desmond J. Walton. [A faster, more stable method for computing the  \$p\$ th roots of positive definite matrices](#). *Linear Algebra and its Applications*, 26: 139–163, 1979. No citations.
- [62] Alston S. Householder. *The Theory of Matrices in Numerical Analysis*. Blaisdell, New York, 1964. xi+257 pp. Reprinted by Dover, New York, 1975. ISBN 0-486-61781-5. No citations.
- [63] Carl G. J. Jacobi. [Über ein leichtes verfahren die in der Theorie der Säcularstörungen vorkommenden Gleichungen numerisch aufzulösen](#). *Journal für die reine und angewandte Mathematik*, 1846(30):51–94, 1846. No citations.
- [64] Elizabeth R. Jessup and Ilse C. F. Ipsen. [Improving the accuracy of inverse iteration](#). *SIAM Journal on Scientific and Statistical Computing*, 13(2):550–572, 1992. No citations.
- [65] Charles Kenney and Alan J. Laub. [Rational iterative methods for the matrix sign function](#). *SIAM Journal on Matrix Analysis and Applications*, 12(2):273–291, 1991. No citations.
- [66] Charles Kenney and Alan J. Laub. [On scaling newton's method for polar decomposition and the matrix sign function](#). *SIAM Journal on Matrix Analysis and Applications*, 13(3): 688–706, 1992. No citations.
- [67] Andrzej Kiełbasiński and Krystyna Ziętak. [Numerical behaviour of Higham's scaled method for polar decomposition](#). *Numerical Algorithms*, 32(2/4):105–140, 2003. No citations.
- [68] Pentti Laasonen. [On the iterative solution of the matrix equation  \$AX^2 - I = 0\$](#) . *Mathematical Tables and Other Aids to Computation*, 12(62):109, 1958. No citations.
- [69] Xiaobo Liu. [On the Cross-Shaped matrices](#). MIMS EPrint, 2023. No citations.
- [70] Walter F. Mascarenhas. [On the convergence of the Jacobi method for arbitrary orderings](#). *SIAM Journal on Matrix Analysis and Applications*, 16(4):1197–1209, 1995. No citations.
- [71] Roy Mathias. [Accurate eigensystem computations by Jacobi methods](#). *SIAM Journal on Matrix Analysis and Applications*, 16(3):977–1003, 1995. No citations.



- [72] Beatrice Meini. [The matrix square root from a new functional perspective: Theoretical results and computational issues](#). *SIAM Journal on Matrix Analysis and Applications*, 26(2):362–376, 2004. No citations.
- [73] Leon Mirsky. [Symmetric gauge functions and unitarily invariant norms](#). *The Quarterly Journal of Mathematics*, 11(1):50–59, 1960. No citations.
- [74] Peter Mörters and Yuval Peres. [Brownian Motion](#). Cambridge University Press, Cambridge, UK, January 2010. ISBN 978-0-521-76018-8 (Hardback). No citations.
- [75] Yuji Nakatsukasa, Zhaojun Bai, and François Gygi. [Optimizing halley’s iteration for computing the matrix polar decomposition](#). *SIAM Journal on Matrix Analysis and Applications*, 31(5):2700–2720, 2010. No citations.
- [76] Yuji Nakatsukasa and Roland W. Freund. [Computing fundamental matrix decompositions accurately via the matrix sign function in two iterations: The power of Zolotarev’s functions](#). *SIAM Review.*, 58(3):461–493, 2016. No citations.
- [77] Yuji Nakatsukasa and Nicholas J. Higham. [Backward stability of iterations for computing the polar decomposition](#). *SIAM Journal on Matrix Analysis and Applications*, 33(2):460–479, 2012. No citations.
- [78] Yuji Nakatsukasa and Nicholas J. Higham. [Stable and efficient spectral divide and conquer algorithms for the symmetric eigenvalue decomposition and the SVD](#). *SIAM Journal on Scientific Computing*, 35(3):A1325–A1349, 2013. No citations.
- [79] James M. Ortega. [Numerical Analysis. A Second Course](#). Academic Press, New York, 1972. xiii+201 pp. ISBN 9780125285605. No citations.
- [80] Beresford N. Parlett. [The Symmetric Eigenvalue Problem](#). Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, January 1998. xxiv+398 pp. ISBN 978-0-89871-402-9. No citations.
- [81] Pèter Pulay. [An iterative method for the determination of the square root of a positive definite matrix](#). *Zeitschrift für Angewandte Mathematik und Mechanik*, 46(2):151–151, 1966. No citations.
- [82] Noah H. Rhee and Vjeran Hari. [On the global and cubic convergence of a quasi-cyclic Jacobi method](#). *Numerische Mathematik*, 66(1):97–122, 1993. No citations.
- [83] J. Douglas Roberts. [Linear model reduction and solution of the algebraic Riccati equation by use of the sign function](#). *International Journal of Control*, 32(4):677–687, 1980. No citations.
- [84] Marvin Rosenblum. [The operator equation  \$BX - XA = Q\$  with selfadjoint  \$A\$  and  \$B\$](#) . *Proceedings of the American Mathematical Society*, 20(1):115, 1969. No citations.
- [85] ———. [IEEE standard for floating-point arithmetic](#). *IEEE Std 754-2019 (Revision of IEEE 754-2008)*, pages 1–84, 2019. No citations.
- [86] Heinz Rutishauser. Solution of eigenvalue problems with the LR-transformation. *National Bureau of Standards Applied Mathematics Series*, 49(3):47–81, 1958. No citations.

- [87] Heinz Rutishauser. [The Jacobi method for real symmetric matrices](#). *Numerische Mathematik*, 9(1):1–10, 1966. No citations.
- [88] Heinz Rutishauser. [Lectures on Numerical Mathematics](#). Birkhäuser, Boston, MA, USA, 1990. xvi+546 pp. Edited by Martin Gutknecht, with the assistance of Peter Henrici, Peter Ullrich, Hans-Rudolf Schwarz. Translated by Walter Gautschi. ISBN 978-0-8176-3491-9. No citations.
- [89] Bernhard A. Schmitt. [An algebraic approximation for the matrix exponential in singularly perturbed boundary value problems](#). *SIAM Journal on Numerical Analysis*, 27(1): 51–66, 1990. No citations.
- [90] Arnold Schönhage. [Zur konvergenz des Jacobi-verfahrens](#). *Numerische Mathematik*, 3 (1):374–380, 1961. No citations.
- [91] Robert S. Schreiber and Beresford N. Parlett. [Block reflectors: Theory and computation](#). *SIAM Journal on Numerical Analysis*, 25(1):189–205, 1988. No citations.
- [92] Günther Schulz. [Iterative Berechnung der reziproken Matrix](#). *Zeitschrift für Angewandte Mathematik und Mechanik*, 13(1):57–59, 1933. No citations.
- [93] Gilbert W. Stewart. [Introduction to Matrix Computations](#). Computer science and applied mathematics. Academic Press, New York, 1973. xiii+411 pp. ISBN 9780126703504. No citations.
- [94] Lloyd N. Trefethen and David Bau III. *Numerical Linear Algebra*. Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, 1997. xii+361 pp. ISBN 0898713617. No citations.
- [95] J. L. van Hemmen and Tsuyoshi Ando. [An inequality for trace ideals](#). *Communications in Mathematical Physics*, 76(2):143–148, 1980. No citations.
- [96] H. P. M. van Kempen. [On the quadratic convergence of the special cyclic Jacobi method](#). *Numerische Mathematik*, 9(1):19–22, 1966. No citations.
- [97] Krešimir Veselić and Vjeran Hari. [A note on a one-sided Jacobi algorithm](#). *Numerische Mathematik*, 56(6):627–633, 1989. No citations.
- [98] Helmut Wielandt. [An extremum property of sums of eigenvalues](#). *Proceedings of the American Mathematical Society*, 6(1):106–110, 1955. No citations.
- [99] James H. Wilkinson. [Note on the quadratic convergence of the cyclic Jacobi process](#). *Numerische Mathematik*, 4(1):296–300, 1962. No citations.
- [100] James H. Wilkinson. *The Algebraic Eigenvalue Problem*. Oxford University Press, Oxford, UK, 1965. xviii+662 pp. ISBN 978-0198534181. No citations.
- [101] James H. Wilkinson. [Convergence of the LR, QR, and related algorithms](#). *The Computer Journal*, 8(1):77–84, 1965. No citations.
- [102] Zhiyuan Zhang and Zheng-Jian Bai. [A mixed precision Jacobi method for the symmetric eigenvalue problem](#), November 2022. No citations.
- [103] Zhengbo Zhou. *A mixed precision eigensolver based on the Jacobi algorithm*. Master thesis, The University of Manchester, September 2022. No citations.