

Publications by Lloyd N. Trefethen

I. Books

- I.1. *Numerical Conformal Mapping*, editor, 269 pages. Elsevier, 1986.
 - I.2. *Finite Difference and Spectral Methods for Ordinary and Partial Differential Equations*, x+315 pages. Graduate textbook, privately published at people.maths.ox.ac.uk/trefethen/pdertext.html, 1996.
 - I.3. *Numerical Linear Algebra*, with David Bau III, xii+361 pages. SIAM, 1997. (This is SIAM's all-time best-seller.)
 - I.4. *Spectral Methods in MATLAB*, xviii+165 pages. SIAM, 2000.
 - I.5. *The (Unfinished) PDE Coffee Table Book*, with Kristine Embree. Online at people.maths.ox.ac.uk/trefethen/pdectb.html, 2000.
 - I.6. *Schwarz-Christoffel Mapping*, with Tobin A. Driscoll, xvi+132 pages. Cambridge U. Press, 2002.
 - I.7. *Spectra and Pseudospectra: The Behavior of Nonnormal Matrices and Operators*, with Mark Embree, xviii+606 pages. Princeton U. Press, 2005.
 - I.8. *Trefethen's Index Cards: Forty years of Notes about People, Words, and Mathematics*, xv + 368 pages. World Scientific Publishing, 2011.
 - I.9. *Approximation Theory and Approximation Practice*. SIAM, 2013.
 - I.10. *The Chebfun Guide*, edited with T. A. Driscoll and N. Hale. Pafnuty Publications, 2014.
- In addition to these a book has been published about the international problem solving challenge I organised in 2002 (item X.8 below): F. Bornemann, D. Laurie, S. Wagon and D. Waldvogel, *The SIAM 100-Digit Challenge*, SIAM, 2004; also in German translation as *Vom Lösen Numerische Probleme*, Springer, 2006.

II. Finite difference and spectral methods for partial differential equations

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- II.3. On L^p -instability and dispersion at discontinuities in finite difference schemes. In R. Vichnevetsky and R. Stepleman, eds., *Proc. Fifth IMACS Int. Symp. on Computer Methods for Partial Diff. Eqs.*, IMACS, 1984.
- II.4. Instability of finite difference models for hyperbolic initial boundary value problems. *Comm. Pure Appl. Math.* 37 (1984), 329-367. (This article won the first Fox Prize in Numerical Analysis.)
- II.5. Stability of finite-difference models containing two boundaries or interfaces. *Math. Comp.* 45 (1985), 279-300.
- II.6. Stability of hyperbolic finite-difference models with one or two boundaries. In B. E. Engquist, et al., eds., *Large-Scale Computations in Fluid Mechanics*, v. 2, Amer. Math. Soc., 1985.
- II.7. Dispersion, dissipation, and stability. In D. F. Griffiths and G. A. Watson, eds., *Numerical Analysis*, Longman, 1986.
- II.8. Well-posedness of absorbing boundary conditions and one-way wave equations, with L. Halpern. *Math. Comp.* 47 (1986), 421-435.

- II.9. An instability phenomenon in spectral methods, with M. R. Trummer. *SIAM J. Numer. Anal.* 24 (1987), 1008-1023.
- II.10. Wide-angle one-way wave equations, with L. Halpern. *J. Acoust. Soc. Amer.* 84 (1988), 1397-1404.
- II.11. Fourier analysis of the SOR iteration, with R. J. LeVeque. *IMA J. Numer. Anal.* 8 (1988), 273-279.
- II.12. Ill-posedness of absorbing boundary conditions for migration, with L. H. Howell. *Geophysics* 53 (1988), 593-603.
- II.13. The eigenvalues of second-order spectral differentiation matrices, with J. A. C. Weideman. *SIAM J. Numer. Anal.* 25 (1988), 1279-1298.
- II.14. Lax-stability vs. eigenvalue stability of spectral methods. In K. W. Morton and M. J. Baines, eds., *Numerical Methods for Fluid Dynamics III*, Clarendon Press, 1988.
- II.15. Stability of the method of lines, with S. C. Reddy. *Numer. Math.* 62 (1992), 235-267.
- II.16. Stiffness of ODEs, with D. J. Higham. *BIT* 33 (1993), 285-303.
- II.17. Fourth-order time-stepping for stiff PDEs, with A. K. Kassam. *SIAM J. Sci. Comp.* 26 (2003), 1214-1233.
- II.18. Reviving the method of particular solutions, with T. Betcke. *SIAM Review* 47 (2005), 469-491.
- II.19. Computations of eigenvalue avoidance in planar domains, with T. Betcke. *Proc. Appl. Math. Mech.* 4 (2004), 634-635.
- II.20. Computed eigenmodes of planar regions, with T. Betcke, *Contemp. Math.* 412 (2006), 297-314.
- II.21. A rational spectral collocation method with adaptively transformed Chebyshev grid points, with T.-W. Tee, *SIAM J. Sci. Comp.* 28 (2006), 1798-1811.

III. Numerical linear algebra

- III.1. Three mysteries of Gaussian elimination. *ACM SIGNUM Newsletter*, October 1985.
- III.2. Average-case stability of Gaussian elimination, with R. S. Schreiber. *SIAM J. Matrix Anal. Applics.* 11 (1990), 335-360.
- III.3. Approximation theory and numerical linear algebra. In J. C. Mason and M. G. Cox, eds., *Algorithms for Approximation II*, Chapman and Hall, 1990.
- III.4. A hybrid GMRES algorithm for nonsymmetric linear systems, with N. M. Nachtigal and L. Reichel. *SIAM J. Matrix Anal. Applics.* 13 (1992), 796-825.
- III.5. How fast are nonsymmetric matrix iterations?, with N. M. Nachtigal and S. C. Reddy. *SIAM J. Matrix Anal. Applics.* 13 (1992), 778-795.
- III.6. GMRES/CR and Arnoldi/Lanczos as matrix approximation problems, with A. Greenbaum. *SIAM J. Sci. Comput.* 15 (1994), 359-368.
- III.7. Calculation of pseudospectra by the Arnoldi iteration, with K.-C. Toh. *SIAM J. Sci. Comp.* 17 (1996), 1-15.
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- III.9. From potential theory to matrix iterations in six steps, with T. A. Driscoll and K.-C. Toh. *SIAM Review* 40 (1998), 547-578.
- III.10. Condition numbers of random triangular matrices, with D. Viswanath. *SIAM J. Matrix Anal. Applics.* 19 (1998), 564-581.

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- III.12. Continuous analogues of matrix factorizations, with A. Townsend. *Proc. Roy. Soc. A* 471 (2014), 20140584.
- III.13. Computing eigenvalues with rational filters, with A. Austin. *SIAM J. Sci. Comp.*, to appear.

IV. Numerical conformal mapping and complex analysis

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- IV.2. Computation and application of Schwarz-Christoffel transformations. In *Proceedings of the 1980 Army Numerical Analysis and Computers Conference*, Army Research Office, 1980.
- IV.3. Analysis and design of polygonal resistors by conformal mapping. *Z. Angew. Math. Phys.* 35 (1984), 692-704.
- IV.4. Conformal mapping solution of Laplace's equation on a polygon with oblique derivative boundary conditions, with R. J. Williams. *J. Comp. Appl. Math.* 14 (1986), 227-249.
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- IV.6. SCPACK User's Guide. Numerical Analysis Report 89-2, Dept. of Mathematics, MIT, 1989. (An earlier edition appeared as an ICASE internal report in 1983.)
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- IV.9. Schwarz-Christoffel mapping in the computer era, with T. A. Driscoll, *Proc. Int. Congress Mathematicians 1998*, pp. 533-542, 1998.
- IV.10. Green's functions for multiply connected domains via conformal mapping, with M. Embree. *SIAM Review* 41 (1999), 721-744.
- IV.11. Numerical solution of the omitted area problem of univalent function theory, with L. Banjai. *Computational Methods and Function Theory* 1 (2001), 259-273.
- IV.12. A multipole method for Schwarz-Christoffel mapping of polygons with thousands of sides, with L. Banjai. *SIAM J. Sci. Comp.* 25 (2003), 1042-1065.
- IV.13. Numerical algorithms based on analytic function values at roots of unity, with A. P. Austin and P. Kravanja. *SIAM J. Numer. Anal.* 52 (2014), 1795-1821.

V. Approximation theory and related numerical methods

- V.1. Near-circularity of the error curve in complex Chebyshev approximation. *J. Approx. Theory* 31 (1981), 344-367.
- V.2. Rational Chebyshev approximation on the unit disk. *Numer. Math.* 37 (1981), 297-320.
- V.3. Real polynomial Chebyshev approximation by the Carathéodory-Féjér method, with M. H. Gutknecht. *SIAM J. Numer. Anal.* 19 (1981), 358-371.
- V.4. Chebyshev approximation on the unit disk. In *Computational Aspects of Complex Analysis*, H. Werner, et al., eds., D. Reidel, 1983.

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- V.11. Real vs. complex rational Chebyshev approximation on complex domains, with M. H. Gutknecht. In L. Collatz et al., eds., *Numerical Methods of Approximation Theory*, v. 7, Birkhauser, 1984.
- V.12. Square blocks and equioscillation in the Padé, Walsh, and CF tables. In P. R. Graves-Morris, et al., eds., *Rational Approximation and Interpolation*, Lect. Notes in Math, v. 1105, Springer, 1984.
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- V.16. Padé, stable Padé, and Chebyshev-Padé approximation, with M. H. Gutknecht. In J. C. Mason and M. G. Cox, eds., *Algorithms for Approximation*, Clarendon Press, 1987.
- V.17. The CF table, with E. Hayashi and M. H. Gutknecht. *Constr. Approx.* 6 (1990), 195-223.
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- V.25. Robust Padé approximation via SVD, with P. Gonnet and S. Güttel. *SIAM Review* 55 (2013), 101-117.

VI. Eigenvalues, pseudospectra and dynamics

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- VI.2. Lax-stability of fully discrete spectral methods via stability regions and pseudo-eigenvalues, with S. C. Reddy. *Comp. Meth. Appl. Mech. Engr.* 80 (1990), 147-164.
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- VI.4. Pseudospectra of matrices. In D. F. Griffiths and G. A. Watson, eds., *Numerical Analysis 1991*, Longman, 1992.
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- VI.9. Matrix behaviour, unitary reducibility, and Hadamard products, with D. Viswanath. Tech. Rep. TR96-1596, Dept. of Comp. Sci., Cornell U., July, 1996.
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VII. Fluid dynamics

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VIII. Quadrature

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IX. Chebfun

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X. Other

- X.1. The definition of numerical analysis. *SIAM News* 25, 6 Nov. 1992; reprinted in *Bull. Inst. Maths. and Applics.*, 1993 and again as an appendix to L. N. Trefethen and D. A. Bau, III, *Numerical Linear Algebra*, SIAM, 2000.
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- X.3. Maxims about numerical mathematics, computers, science, and life. *SIAM News* v. 31, no. 1 (1998), p. 4.
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- X.16. BMI (Body Mass Index), people.maths.ox.ac.uk/trefethen/bmi.html and [bmi_calc.html](http://people.maths.ox.ac.uk/trefethen/bmi_calc.html), January 2013. (This contribution was covered by hundreds of newspapers and radio stations around the world and there have been half a million hits at the web pages.)
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