Literatur

[1] R. ACCORNERO, M. ARTIGLIA, G. COPPA, P. DI VITA, G. LAPENTA, M. POTENZA, P. RAVETTO. Finite Difference Methods for the Analysis of Integrated Optical Waveguides. Electronic Letters **26**, S. 1959-1960, 1990.

[2] M. AIGNER. Diskrete Mathematik. Vieweg Braunschweig Wiesbaden, 1993.

[3] I. BABUŠKA, J. OSBORN. Eigenvalue Problems. In P. G. CIARLET, J. L. LIONS. *Handbook of Numerical Analysis, Vol. II: Finite Element Methods (Part 1)*, S. 641-788. Elsevier Science Publishers B. V. (North-Holland) Amsterdam New York Oxford Tokyo, 1991.

[4] R. E. BANK. Analysis of a Multilevel Inverse Iteration Procedure for Eigenvalue Problems. SIAM J. Numer. Anal. **19**, S. 886-898, 1982.

[5] R. E. BANK, T. F. CHAN. PLTMGC: A Multi-Grid Continuation Program for Parameterized Nonlinear Elliptic Systems. SIAM J. Sci. Stat. Comput. **7**, S. 540-559, 1986.

[6] W. W. BRADBURY, R. FLETCHER. New Iterative Methods for Solution of the Eigenproblem. Numer. Math. **9**, S. 259-267, 1966.

[7] D. BRAESS. Finite Elemente. Springer-Verlag Berlin Heidelberg New York, 1992.

[8] J. H. BRAMBLE, A. V. KNYAZEV, J. E. PASCIAK. A Subspace Preconditioning Algorithm for Eigenvector/Eigenvalue Computation. Advances Comp. Math. **6**, S. 159-189, 1996.

[9] Z. CAI, J. MANDEL, S. MCCORMICK. Multigrid Methods for Nearly Singular Linear Equations and Eigenvalue Problems. SIAM J. Numer. Anal. **34**, S. 178-200, 1997.

[10] T. F. CHAN, I. SHARAPOV. Subspace Correction Multilevel Methods for Elliptic Eigenvalue Problems. CAM Report **96-34**, University of California Los Angeles, 1996.

[11] R. COURANT, D. HILBERT. Methoden der mathematischen Physik. Springer-Verlag Berlin Heidelberg New York, 1993.

[12] J. K. CULLUM, R. A. WILLOUGHBY. Lanczos Algorithms for Large Symmetric Eigenvalue Computations, Vol. I: Theory. Birkhäuser Boston Basel Stuttgart, 1985.

[13] P. DEUFLHARD, T. FRIESE, F. SCHMIDT, R. MÄRZ, H.-P. NOLTING. Effiziente Eigenmodenberechnung für den Entwurf integriert-optischer Chips. In K.-H. HOFFMANN, W. JÄGER, T. LOHMANN, H. SCHUNCK. *Mathematik-Schlüsseltechnologie für die Zukunft*, S. 267-280. Springer-Verlag Berlin Heidelberg New York, 1996.

[14] P. DEUFLHARD, A. HOHMANN. Numerische Mathematik I (2. Auflage). Walter de Gruyter Berlin New York, 1993.

[15] B. DÖHLER. Ein neues Gradientenverfahren zur simultanen Berechnung der kleinsten oder größten Eigenwerte des allgemeinen Eigenwertproblems. Numer. Math. **40**, S. 79-91, 1982.

[16] N. DUNFORD, J. T. SCHWARTZ. Linear Operators Part I: General Theory. Wiley Interscience New York, 1958.

[17] N. DUNFORD, J. T. SCHWARTZ. Linear Operators Part II: Spectral Theory (Self Adjoint Operators in Hilbert Space). Wiley Interscience New York, 1963.

[18] K. J. EBELING. Integrierte Optoelektronik. Springer-Verlag Berlin Heidelberg New York, 1989.

[19] D. K. FADDEJEW, W. N. FADDEJEWA. Numerische Methoden der linearen Algebra (2. Auflage). Oldenbourg Verlag München Wien, 1970.

[20] J. G. F. FRANCIS. The QR Transformation: A Unitary Analogue to the LR Transformation, Parts I and II. Comput. J. **4**, S. 265-271, 332-345, 1961.

[21] R. W. FREUND, M. H. GUTKNECHT, N. M. NACHTIGAL. An Implementation of the look-ahead Lanczos Algorithm for Non-Hermitian Matrices. SIAM J. Sci. Comput. **14**, S. 137-158, 1993.

[22] T. FRIESE. MATLAB-Programme zur Lösung von Eigenwertproblemen mit einem adaptiven, nichtlinearen Mehrgitter-Verfahren. Technical Report TR **97-01**, Konrad-Zuse-Zentrum für Informationstechnik Berlin, 1997.

[23] I. C. GOHBERG, M. G. KREĬN. Introduction to the Theory of Linear Nonselfadjoint Operators. Transl. Math. Monographs Vol. **18**, Amer. Math. Soc. Providence, 1969.

[24] G. H. GOLUB, C. F. VAN LOAN. Matrix Computations (Second Edition). The Johns Hopkins University Press Baltimore London, 1989.

[25] W. HACKBUSCH. On the Computation of Approximate Eigenvalues and Eigenfunctions of Elliptic Operators by Means of a Multi-Grid Method. SIAM J. Numer. Anal. **16**, S. 201-215, 1979.

[26] W. HACKBUSCH. Multi-Grid Methods and Applications. Springer-Verlag Berlin Heidelberg New York, 1985.

[27] W. HACKBUSCH. Multi-Grid Eigenvalue Computation. In D. BRAESS, W. HACKBUSCH, U. TROTTENBERG. *Advances in Multi-Grid Methods*, S. 24-32. Notes on Numerical Fluid Mechanics Vol. **11**, Vieweg Braunschweig Wiesbaden, 1985.

[28] W. HACKBUSCH. Theorie und Numerik elliptischer Differentialgleichungen. B. G. Teubner Stuttgart, 1986.

[29] M. R. HESTENES, W. KARUSH. A Method of Gradients for the Calculation of the Characteristic Roots and Vectors of a Real Symmetric Matrix. J. Res. Nat. Bur. Stand. **47**, S. 45-61, 1951.

[30] H. HEUSER. Funktionalanalysis. B. G. Teubner Stuttgart, 1992.

[31] C. G. J. JACOBI. Über ein leichtes Verfahren, die in der Theorie der Säkularstörungen vorkommenden Gleichungen numerisch aufzulösen. Crelle's J. **30**, S. 51-94, 1846.

[32] M. JUNG, U. LANGER, A. MEYER, W. QUECK, M. SCHNEIDER. Multigrid Preconditioners and their Applications. In G. TELSCHOW. *Third Multigrid Seminar*, S. 11-52. Report R-MATH-**03/89**, Karl-Weierstrass-Institut für Mathematik Berlin, 1989.

[33] W. KAHAN, B. N. PARLETT, E. JIANG. Residual Bounds on Approximate Eigensystems of Nonnormal Matrices. SIAM J. Numer. Anal. **19**, S. 470-484, 1982.

[34] T. KATO. Perturbation Theory for Linear Operators (Second Edition). Springer-Verlag Berlin Heidelberg New York, 1984.

[35] V. E. KATSNELSON. Conditions under which systems of eigenvectors of some classes of operators form a basis. Functional Anal. Appl. **1**, S. 122-132, 1967.

[36] V. N. KUBLANOVSKAYA. On Some Algorithms for the Solution of the Complete Eigenvalue Problem. USSR Comp. Math. Phys. **3**, S. 637-657, 1961.

[37] R. B. LEHOUCQ. Analysis and Implementation of an Implicitly Restarted Arnoldi Iteration. Ph.D. Thesis, Rice University Houston, 1995.

[38] R. B. Lehoucq, D. C. Sorensen, C. Yang. Arpack User's Guide: Solution of Large Scale Eigenvalue Problems by Implicitly Restarted Arnoldi Methods. Rice University Houston, 1997.

[39] P. Leinen, W. Lembach, K. Neymeyr. An Adaptive Subspace Method for Elliptic Eigenproblems with Hierarchical Basis Preconditioning. SFB 382, Report **68**, Universität Tübingen, 1997.

[40] D. E. Longsine, S. F. McCormick. Simultaneous Rayleigh-Quotient Minimization Methods for $Ax = \lambda Bx$. Lin. Alg. Appl. **34**, S. 195-234, 1980.

[41] R. März. Integrated Optics: Design and Modelling. Artech House Boston London, 1995.

[42] J. Mandel, S. F. McCormick. A Multilevel Variational Method for $Au = \lambda Bu$ on Composite Grids. J. Comp. Phys. **80**, S. 442-452, 1989.

[43] S. F. McCormick. Multilevel Adaptive Methods for Elliptic Eigenproblems: A Two-Level Convergence Theory. SIAM J. Numer. Anal. **31**, S. 1731-1745, 1994.

[44] B. N. Parlett. The Symmetric Eigenvalue Problem. Prentice-Hall Englewood Cliffs, 1980.

[45] M. Reed, B. Simon. Methods of Modern Mathematical Physics I: Functional Analysis. Academic Press New York, 1972.

[46] A. Ruhe. An Algorithm for Numerical Determination of the Structure of a General Matrix. BIT **10**, S. 196-216, 1970.

[47] A. Ruhe. Computation of Eigenvalues and Eigenvectors. In V. A. Barker. *Sparse Matrix Techniques*, S. 130-184. Lecture Notes in Mathematics Vol. **572**, Springer-Verlag Berlin Heidelberg New York, 1977.

[48] A. Ruhe. Numerical Aspects of Gram-Schmidt Orthogonalization of Vectors. Lin. Alg. Appl. **52-53**, S. 591-601, 1983.

[49] H. Rutishauser. Computational Aspects of F. L. Bauer's Simultaneous Iteration Method. Numer. Math. **13**, S. 4-13, 1969.

[50] Y. Saad. Numerical Methods for Large Eigenvalue Problems. Manchester University Press, 1992.

[51] F. Schmidt. Simultaneous Computation of the Lowest Eigenvalues and Eigenvectors of the Helmholtz Equation. Technical Report TR **95-13**, Konrad-Zuse-Zentrum für Informationstechnik Berlin, 1995.

[52] F. Schmidt, D. Yevick. Discrete Transparent Boundary Conditions for Schrödinger-Type Equations. J. Comp. Phys. **134**, S. 96-107, 1997.

[53] H. R. Schwarz. Simultaneous Rayleigh-Quotient Iteration Methods for Large Sparse Generalized Eigenvalue Problems. In J. Hinze. *Numerical Integration of Differential Equations and Large Linear Systems*, S. 384-398. Lecture Notes in Mathematics Vol. **968**, Springer-Verlag Berlin Heidelberg New York, 1982.

[54] H. R. Schwarz. Methode der finiten Elemente. B. G. Teubner Stuttgart, 1991.

[55] D. C. Sorensen. Implicit Application of Polynomial Filters in a k-step Arnoldi Method. SIAM J. Matr. Anal. Appl. **13**, S. 357-385, 1992.

[56] G. W. Stewart. Simultaneous Iteration for Computing Invariant Subspaces of Non-Hermitian Matrices. Numer. Math. **25**, S. 123-136, 1976.

[57] G. Strang, G. J. Fix. An Analysis of the Finite Element Method. Prentice-Hall Englewood Cliffs, 1973.

[58] J. H. Wilkinson. The Algebraic Eigenvalue Problem. Clarendon Press Oxford, 1965.

[59] H. Yang. Conjugate Gradient Methods for the Rayleigh Quotient Minimization of Generalized Eigenvalue Problems. Computing **51**, S. 79-94, 1993.