Bibliography on the Solution of Sparse Linear Systems and Related Areas of Computation

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Abstract

This bibliographic list of references was originally compiled during the elaboration of my PhD thesis, and has been gradually expanded since them, counting now with more than 2000 selected references, covering the *solution of sparse linear systems* and *related areas* of computation, including: *computational linear algebra*, *high performance computing*, *mathematical programming* and *graph theory*.

One additional aspect of this bibliography is the citation of a significant number of *"classical"* textbook references.

For the future, a commented version by subject areas is planned, with the indication of selected works from the literature.

Key words: *Sparse Linear Systems, Direct Methods, Computational Linear Algebra, High Performance Computing*

Bibliography

[1] Aasen, J. O. On the reduction of a symmetric matrix to tridiagonal form. *BIT*, 11:233–242, 1971.

[2] Abadie, J., editor. *Nonlinear Programming.* North-Holland, 1967.

[3] Abramowitz, M. and Stegun, I. A., editors. *Handbook of Mathematical Functions.* Dover Publications, 1964.

[4] ACM. Special Issue : Programming. ACM Computing Surveys, 6(4), 1974.

[5] Acton, F. S. *Numerical Methods That Work.* Harper and Row, 1970.

[6] Adler, I., Karmarkar, N., Resende, M. G. C., and Veiga, G. Data structures and programming techniques for the implementation of Karmarkar's algorithm for linear programming. *ORSA J. Computing*, 1(2):84–106, 1989.

[7] Adler, I., Karp, R. M., and Shamir, R. A simplex variant solving an m x d linear program in $O(min(m^2, d^2))$ expected number of pivot steps. *J. Complexity*, 3:372–387, 1987.

[8] Adler, I., Resende, M. G. C., Veiga, G., and Karmarkar, N. An implementation of Karmarkar's algorithm for linear programming. *Math. Programming*, 44:297–335, 1989. (Errata in Math. Programming, 50, page 415, 1991).

[9] Agerwala, T. and Cocke, J. High performance reduced instruction set processors. Tech. Report, IBM, 1987.

[10] Ahlberg, H. H., Nilson, E., and Walsh, J. L., editors. *The Theory of Splines and Their Applications.* Academic Press, 1967.

[11] Aho, A. V., Garey, M. R., and Ullmann, J. D. The transitive reduction of a directed graph. *SIAM J. Comput.*, 1:131–137, 1972.

[12] Aho, A. V., Hopcroft, J. E., and Ullman, J. D. *The Design and Analysis of Computer Algorithms.* Addison-Wesley, 1974.

[13] Aho, A. V., Hopcroft, J. E., and Ullman, J. D. *Data Structures and Algorithms.* Addison-Wesley, 1983.

[14] Aho, A. V., Hopcroft, J. E., and Ullmann, J. D. On finding lowest common ancestors in trees. *SIAM J. Comput.*, 5:115–132, 1976.

[15] Aho, A. V., Sethi, R., and Ullman, J. D. *Compilers : Principles, Techniques and Tools.* Addison-Wesley, 1986.

[16] Aho, A. V. and Ullman, J. D. *The Theory of Parsing, Translation and Compiling, volume 2 : Compiling.* Prentice-Hall, 1973.

[17] Aho, A. V. and Ullman, J. D. *Principles of Compiler Design.* Prentice-Hall, 1977.

[18] Akl, S. G. *Parallel Sorting Algorithms.* Academic Press, 1985.

[19] Akl, S. G. *The Design and Analysis of Parallel Algorithms.* Prentice-Hall, 1989.

[20] Akl, S. G. and Lyons, K. A. *Parallel Computational Geometry.* Prentice-Hall, 1993.

[21] Al-Bassam, S. and El-Rewini, H. Processor allocation for hypercubes. *J. of Parallel and Distributed Computing*, 16:394–401, 1992.

[22] Alaghband, G. Parallel pivoting combined with parallel reduction. Tech. Report 87-75, ICASE, NASA Langley Research Center, Hampton, 1987.

[23] Alaghband, G. *Multiprocessor Sparse LU Decomposition with Controlled Fill-in.* PhD thesis, Univ. of Colorado, Boulder, 1988.

[24] Alaghband, G. Parallel pivoting combined with parallel reduction and fill-in control. *Parallel Computing*, 11:201–221, 1989.

[25] Alaghband, G. Parallel sparse matrix solution and performance. *Parallel Computing*, 21:1407–1430, 1995.

[26] Alaghband, G. and Jordan, H. F. Parallelization of the MA28 sparse matrix package for the HEP. Tech. Report CSDG-83-3, Dept. of Electrical and Computer Eng., Univ. of Colorado, Boulder, 1983.

[27] Alaghband, G. and Jordan, H. F. Parallelizing a sparse matrix package. Tech. Report CSDG-83-3, Computer System Design Group, Electrical and Computer Eng. Dept., Univ. of Colorado, 1983.

[28] Alaghband, G. and Jordan, H. F. Multiprocessor sparse L/U decomposition with controlled fill-in. Tech. Report 85-48, ICASE, NASA Langley Research Center, Hampton, 1985.

[29] Alaghband, G. and Jordan, H. F. Sparse Gaussian elimination with controlled fill-in on a shared memory multiprocessor. Tech. Report ECSE 86-1-5, Dept. of Electrical and Computer Eng., Univ. of Colorado, 1986.

[30] Alaghband, G. and Jordan, H. F. Sparse Gaussian elimination with controlled fill-in on a shared memory multiprocessor. *IEEE Trans. Comput.*, C-38(11):1539–1557, 1989.

[31] Alavi, Y., Chung, F. R. K., Graham, R. L., and Hsu, F., editors. *Graph Theory, Combinatorics, Algorithms, and Applications, Proc. Conference held at San Francisco State University, 1989.* SIAM Publications, 1991.

[32] Alfeld, P. and Eyre, D. J. Algorithm 701 : GOLIATH, A software system for the exact analysis of rectangular rank-deficient sparse rational linear systems. *ACM Trans. Math. Software*, 17(4):519–532, 1991.

[33] Alfeld, P. and Eyre, D. J. The exact analysis of sparse rectangular linear systems. *ACM Trans. Math. Software*, 17(4):502–518, 1991.

[34] Allen, R. H. Fast computer aided analysis of nonlinear electronic circuits. In *Proc. Cornell Conference on Computerized Electronics*, pages 326–345, Ithaca, 1969. Cornell Univ.

[35] Almasi, G. S. and Gottlieb, A. *Highly Parallel Computing.* The Benjamin/Cummings Publishing Co., 1989.

[36] Alpern, B. and Carter, L. Performance programming : A science waiting to happen. In Vishkin, U., editor, *Developing a Computer Science Agenda for High-Performance Computing.* ACM Press, 1994.

[37] Alpern, B. and Carter, L. Is scalability relevant ? : A look at sparse matrix-vector product. In *Proc.* 7^{th} *SIAM Conference on Parallel Processing*, San Francisco, 1995.

[38] Alpern, B. and Carter, L. Message compression for high performance. In *Proc.* 7^{th} *SIAM Conference on Parallel Processing*, San Francisco, 1995.

[39] Alpern, B. and Carter, L. The myth of scalable high performance. Tech. Report, Computer Science and Eng. Dept., San Diego Supercomputer Center, Univ. of California, San Diego, 1995.

[40] Alpern, B., Carter, L., Feig, E., and Selker, T. The uniform memory hierarchy model of computation. Tech. Report, IBM Thomas J. Watson Research Center, Yorktown Heights, 1992.

[41] Alpern, B., Carter, L., and Ferrante, J. Modeling parallel computers as memory hierarchies. In *Proc. Programming Models for Massively Parallel Computers*, 1993.

[42] Alpern, B., Carter, L., and Selker, T. Visualizing computer memory architectures. In *IEEE Visualization '90 Conference*, 1990.

[43] Alsaç, O., Stott, B., and Tinney, W. F. Sparsity-oriented compensation methods for modified network solutions. *IEEE Trans. Power Apparatus and Systems*, PAS-102(5):1050–1060, 1983.

[44] Alvarado, F. L. Computational complexity in power systems. *IEEE Trans. Power Apparatus and Systems*, PAS-95(4):1028–1037, 1976.

[45] Alvarado, F. L. A note on sorting sparse matrices. *Proc. of the IEEE*, 67(9):1362–1363, 1979.

[46] Alvarado, F. L. Parallel solution of transient problems by trapezoidal integration. *IEEE Trans. Power Apparatus and Systems*, PAS-98:1080–1090, 1979.

[47] Alvarado, F. L. Manipulation and visualization of sparse matrices. *ORSA J. Computing*, 2(2):186–207, 1990.

[48] Alvarado, F. L. Sparse matrix technology for power system computer applications. Technical report, Univ. of Wisconsin, Madison, 1990. (Presented at IEEE Winter Power Meeting).

[49] Alvarado, F. L. and Enns, M. K. Blocked sparse matrices in electric power systems. Paper A-76-362-4, Univ. of Wisconsin, Madison, 1976. (Presented at IEEE Summer Power Meeting, Portland).

[50] Alvarado, F. L., Enns, M. K., and Tinney, W. F. Sparsity enhancement in mutually coupled networks. *IEEE Trans. Power Apparatus and Systems*, PAS-103:1582–1509, 1984.

[51] Alvarado, F. L., Mong, S. K., and Enns, M. K. A fault program with macros, monitors and direct compensation in mutual groups. *IEEE Trans. Power Apparatus and Systems*, PAS-104:1109–1120, 1985.

[52] Alvarado, F. L., Reitan, D. K., and Bahari-Kashani, M. Sparsity in diakoptic algorithms. *IEEE Trans. Power Apparatus and Systems*, PAS-96(5):1450–1459, 1977.

[53] Alvarado, F. L. and Schreiber, R. Optimal parallel solution of sparse triangular systems. Contractor Report CR-188872, NASA, 1990.

[54] Alvarado, F. L. and Schreiber, R. Optimal parallel solution of sparse triangular systems. *SIAM J. Sci. and Stat. Comput.*, 14:446–460, 1993.

[55] Alvarado, F. L. and Tinney, W. F. State estimation using augmented block matrices. Paper 90-WM-241-0-PWRS, Univ. of Wisconsin, Madison, 1990. (Presented at IEEE Winter Power Meeting).

[56] Alvarado, F. L., Tinney, W. F., and Enns, M. K. Sparse matrix inverse factors. Paper 88-SM-728-8, Univ. of Wisconsin, Madison, 1988. (Presented at IEEE Summer Power Meeting, Portland, to be published at IEEE Trans. Power Systems, 1990).

[57] Alvarado, F. L., Yu, D. C., and Betancourt, R. Ordering schemes for partitioned sparse inverses. Technical report, Univ. of Wisconsin, Madison, 1989. (Presented at SIAM Symposium on Sparse Matrices, Salishan Lodge, Oregon).

[58] Alvarado, F. L., Yu, D. C., and Betancourt, R. Partitioned sparse A^{-1} methods. *IEEE Trans. Power Systems*, PWRS-5(2):452–459, 1990.

[59] Alway, G. G. and Martin, D. W. An algorithm for reducing the bandwidth of a matrix of symmetric configuration. *Computing J.*, 8:264–272, 1965.

[60] Amano, H., Boku, T., Kudoh, T., and Aiso, H. A new version of the sparse matrix solving machine. In *Proc.* 12^{th} *International Symposium on Computer Architecture*, pages 100–107, 1985.

[61] Amdahl, G. M. The validity of the single processor approach to achieving large scale computing capabilities. *AFIPS Conf. Proc.*, 30:483–485, 1967.

[62] Amdahl, G. M. Limits of expectation. *Int. J. of Supercomputer Appl.*, 2(1):88–97, 1988.

[63] Amdahl, G. M., Blaauw, G. A., and Brooks, F. P. Jr. Architecture of the IBM System/360. *IBM J. of Research and Development*, 8(2):87–101, 1964.

[64] American Standards Association, Inc. *X3.9 1966 American National Standard FORTRAN*, 1966.

[65] American Standards Association, Inc. *X3.9 1978 American National Standard FORTRAN*, 1978.

[66] Ames, W. F., editor. *Nonlinear Partial Differential Equations in Engineering.* Academic Press, 1965.

[67] Amestoy, P. R. Vectorization of a multiprocessor multifrontal code. *Int. J. of Supercomputer Appl.*, 3(3):41–59, 1989.

[68] Amestoy, P. R. *Factorization of Large Sparse Matrices Based on a Multifrontal Approach in a of Multiprocessor Environment.* PhD thesis, CERFACS, Toulouse, 1991. (Report TH-PA-91-2).

[69] Amestoy, P. R. and Duff, I. S. Memory allocation issues in sparse multiprocessor multifrontal methods. *Int. J. of Supercomputer Appl.*, 7:64–82, 1993.

[70] Amestoy, P. R. and Duff, I. S. MUPS : A parallel package for solving sparse unsymmetric sets of linear equations. Tech. Report, CERFACS, 1994.

[71] Amorim, C. L. Simulated performance of a class of vector processors. In Kartashev, L. P. and Kartashev, S. I., editors, *Proc. 2^{nd} International Conference on Supercomputing*, pages 350–358, 1987.

[72] Amorim, C. L., Citro, R., Souza, A. F., and Chaves Filho, E. M. O sistema de computação paralela NCP I. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 89–102, 1993.

[73] Andersen, J., Mitra, G., and Parkinson, D. The scheduling of sparse matrix-vector multiplication on a massively parallel DAP computer. *Parallel Computing*, 18:675–697, 1992.

[74] Anderson, D. W., Sparacio, F. J., and Tomasulo, R. M. The IBM 360 Model 91 : Machine philosophy and instruction handling. *IBM J. of Research and Development*, 11(1):8–24, 1967.

[75] Anderson, E., Bai, Z., Bischof, C., Demmel, J., Dongarra, J. J., Du Croz, J., Greenbaum, A., Hammarling, S., McKenney, A., Ostrouchov, S., and Sorensen, D. C. *LAPACK "User's Guide"*. SIAM Publications, 2^{nd} edition, 1995.

[76] Anderson, E. and Saad, Y. Solving sparse triangular linear systems on parallel computers. *Internat. J. High Speed Comput.*, 1:73–95, 1989.

[77] Anderson, J. P. Program structures for parallel processing. *Comm. ACM*, 8:786–788, 1965.

[78] Andrews, H. C. Degrees of freedom and modular structure in matrix multiplications. *IEEE Trans. Comput.*, C-20:133–141, 1971.

[79] Angelaccio, M. and Colajanni, M. Subcube matrix decomposition : A unifying view for LU factorization on multicomputers. *Parallel Computing*, 20:257–270, 1994.

[80] Anon. *Modern Computing Methods*, volume 16 of *Notes in Applied Science*. Her Majesty's Stationery Office, London, 1961.

[81] Anon. *Harwell Subroutine Library : A Catalogue of Subroutines (Release 11)*. Theoretical Studies Department, AEA Industrial Technology, 1993.

[82] Arantes, R. D. An hybrid approach by symbolic processing for the efficient solution of sparse linear systems with static structure specially applicable to interior point methods for linear programming. Tech. Report 102/91, CEPEL Electric Energy Research Center, Rio de Janeiro, 1990. (in Portuguese).

[83] Arantes, R. D. Symbolic methodologies for the efficient solution of sparse linear systems with static structure. Master's thesis, Systems and Computation Engineering Dept., COPPE / Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 1994. (in Portuguese).

[84] Arantes, R. D. New methodologies for the solution of sparse positive definite linear systems. In *Annals of XIX National Congress of Computational and Applied Mathematics*, pages 419–420, Goiânia, Brazil, 1996. (in Portuguese).

[85] Arantes, R. D. *Structural Codifications for the Scalar Solution of Sparse Symmetric Positive Definite Linear Systems.* PhD thesis, Systems and Computation Engineering Dept., COPPE / Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 1996. (in Portuguese).

[86] Arantes, R. D. Code orderings for the solution of sparse positive definite linear systems, September 1997. (Talk to be presented at the II Pan American Workshop on Applied and Computational Mathematics).

[87] Arantes, R. D. Implicit reorderings for the scalar solution of sparse positive definite linear systems, February 1997. (Talk presented at the 2nd Summer School of the Brazilian National Laboratory for Scientific Computation).

[88] Arantes, R. D. and Amorim, C. L. Parallel solution of sparse systems of linear equations. In *Annals of V Brazilian Symposium of Computer Architectures and High Performance Computing – XIII Congress of the Brazilian Computing Society*, pages 202–216, Florianópolis, Brazil, 1993. (in Portuguese).

[89] Arden, B. W. *An Introduction to Digital Computing.* Addison-Wesley, 1963.

[90] Arden, B. W. and Astill, K. N. *Numerical Algorithms : Origins and Applications.* Addison-Wesley, 1970.

[91] Argyris, J. H., editor. *Energy Theorems and Structural Analysis.* Butterworths, London, 1960.

[92] Argyris, J. H., editor. *Recent Advances in Matrix Methods of Structural Analysis.* Macmillan, New York, 1964.

[93] Arioli, M., Demmel, J. W., and Duff, I. S. Solving sparse linear systems with sparse backward error. Tech. Report CSS-214, Computer Science and Systems Division, AERE, Harwell Laboratory, Didcot, England, 1988. (Published at SIAM J. Matrix Anal. Appl. 10(2):165–190, 1989).

[94] Arioli, M. and Duff, I. S. Experiments tearing large sparse systems. Tech. Report CSS-217, Computer Science and Systems Division, AERE, Harwell Laboratory, Didcot, England, 1988. (To be published at Proc. of Advances in Numerical Computation, from National Propulsion Laboratory, 1987 in the memory of James Wilkinson).

[95] Arioli, M., Duff, I. S., Noailles, J., and Ruiz, D. A block projection method for sparse matrices. *SIAM J. Sci. and Stat. Comput.*, 13:47–70, 1990.

[96] Arioli, M., Duff, I. S., and Rijk, P. P. M. On the augmented system approach to sparse least-squares problem. *Numer. Math.*, 55:667–684, 1989.

[97] Armijo, L. Minimization of functions having Lipschitz-continuous first partial derivatives. *Pacific J. Math.*, 16:1–3, 1980.

[98] Armstrong, B. A. Near minimal matrix profiles and wavefronts for testing nodal resequencing algorithms. *Int. J. Numer. Meth. Eng.*, 21:1785–1790, 1986.

[99] Arnborg, S. Efficient algorithms for combinatorial problems on graphs with bounded decomposability : A survey. *BIT*, 25:2–23, 1985.

[100] Arnborg, S., Corneil, D. G., and Proskurowski, A. Complexity of finding embeddings in a k-tree. *SIAM J. Alg. and Discr. Meth.*, 8:277–284, 1987.

[101] Arnborg, S., Lagergren, J., and Seese, D. Easy problems for tree-decomposable graphs. *J. of Algorithms*, 12:308–340, 1991.

[102] ASCE. Extensive Bibliography on the use of Digital Computers in Structural Engineering. J. Amer. Soc. Civil Engrs., Structural Division, 89, pp. 461–491, 1963.

[103] Ashcraft, C. A vector implementation of the multifrontal method for large sparse symmetric positive definite linear systems. Tech. Report ETA-TR-51, Engineering Technology Applications (ETA) Division, Boeing Computer Services, Seattle, Washington, 1987.

[104] Ashcraft, C. *The Aggregate Model for the Factorization of Symmetric Positive Definite Matrices.* PhD thesis, Dept. of Computer Science, Yale Univ., New Haven, 1990.

[105] Ashcraft, C. The domain/segment partition for the factorization of sparse symmetric positive definite matrices. Tech. Report ECA-TR-148, Engineering Computing and Analysis (ECA) Division, Boeing Computer Services, Seattle, Washington, 1990.

[106] Ashcraft, C. Compressed graphs and the minimum degree algorithm. *SIAM J. Sci. and Stat. Comput.*, 1995. (Tech. Report BCS-TECH-93-024, Boeing Computer Services, To be published).

[107] Ashcraft, C., Eisenstat, S. C., and Liu, J. W. H. A fan-in algorithm for distributed sparse numerical factorization. *SIAM J. Sci. and Stat. Comput.*, 11(3):593–599, 1990.

[108] Ashcraft, C., Eisenstat, S. C., Liu, J. W. H., Peyton, B., and Sherman, A. H. A compute-ahead implementation of the fan-in sparse distributed factorization scheme. Tech. Report ORNL-TM-11496, Oak Ridge National Laboratory, 1990.

[109] Ashcraft, C., Eisenstat, S. C., Liu, J. W. H., and Sherman, A. H. A comparison of 3 column-based distributed sparse factorization schemes. Tech. Report YALEU-DCS-RR-810, Dept. of Computer Science, Yale Univ., 1990.

[110] Ashcraft, C. and Grimes, R. G. The influence of relaxed supernode partitions on the multifrontal method. *ACM Trans. Math. Software*, 15(4):291–309, 1989.

[111] Ashcraft, C., Grimes, R. G., Lewis, J. G., Peyton, B. W., and Simon, H. D. Progress in sparse matrix methods for large linear systems on vector supercomputers. *Int. J. of Supercomputer Appl.*, 1(4):10–30, 1987.

[112] Ashcraft, C., Lewis, J. G., and Peyton, B. W. A supernodal implementation of general sparse factorization for vector computers. Tech. Report ETA-TR-52, ETA Division, Boeing Computer Services, Seattle, Washington, 1987.

[113] Ashcraft, C. and Liu, J. W. H. Generalized nested dissection : Some recent progress. In *Proc. 5^{th} SIAM Conf. on Applied Linear Algebra*, Snowbird, Utah, 1994.

[114] Ashcraft, C. and Liu, J. W. H. A partition improvement algorithm for generalized nested dissection. Tech. Report BCS-TECH-94-020, Boeing Computer Services, Seattle, 1994.

[115] Ashcraft, C. and Liu, J. W. H. Using domain decomposition to find graph bisectors. Tech. Report CS-95-08, Dept. of Computer Science, York Univ., North York, Ontario, 1995.

[116] Aspvall, B. and Gilbert, J. R. Graph coloring using eigenvalue decomposition. *SIAM J. Alg. and Discr. Methods*, 5:526–538, 1984.

[117] Aspvall, B. and Stone, R. E. Khachiyan's linear programming algorithm. *J. Algorithms*, 1:1–13, 1980.

[118] Atkinson, K. E. *An Introduction to Numerical Analysis*. John Wiley & Sons, 1978.

[119] Atkinson, L. V. Hashing matrix subscripts. *BIT*, 15:328–330, 1975.

[120] Avriel, M. *Nonlinear Programming : Analysis and Methods*. Prentice-Hall, 1976.

[121] Aykanat, C., Ozguner, F., Ercal, F., and Sadayapan, P. Iterative algorithms for solution of large sparse systems of linear equations on hypercubes. *IEEE Trans. Comput.*, C-37(12), 1988.

[122] Azevedo, G. P. Uma nova estratégia para a solução de problemas de estimação de estado com restrições de igualdade. Master's thesis, COPPE/UFRJ, 1989.

[123] Baase, S. *Computer Algorithms*. Addison-Wesley, 2^{nd} edition, 1985.

[124] Bacher, R. and Tinney, W. F. Faster local power flow solutions : The zero mismatch approach. *IEEE Trans. Power Systems*, PWRS-4(4):1345–1354, 1989.

[125] Backus, J. The history of FORTRAN I, II, and III. *Annals of the History of Computing*, 1:21–37, 1979.

[126] Bailey, D. H. Extra high speed matrix multiplication on the CRAY-2. *SIAM J. Sci. and Stat. Comput.*, 9:603–607, 1988.

[127] Bailey, D. H., Bjørstad, P. E., Gilbert, J. R., Mascagni, M. D., Schreiber, R., Simon, H. D., Torczon, V. J., and Watson, L. T., editors. *Proc.* 7^{th} *SIAM Conference on Parallel Processing for Scientific Computing*. SIAM Publications, 1995.

[128] Bailey, D. H., Lee, K., and Simon, H. D. Using Strassen's algorithm to accelerate the solution of linear systems. (Manuscript), 1990.

[129] Baker, J. M. A note on multiplying Boolean matrices. *Comm. ACM*, 5:102, 1962.

[130] Bakoglu, H. B., Grohoski, G. F., Thatcher, L. E., Kahle, J. A., Moore, C. R., Tuttle, D. P., Maule, W. E., Hardell, W. R., Hicks, D. A., Nguyen phu, M., Montoye, R. K., Glover, W. T., and Dhawan, S. Ibm second-generation RISC machine organization. In *Proc. International Conference on Computer Design*, pages 138–142. IEEE, 1989.

[131] Bank, R. E. FORTRAN implementation of marching algorithms. Tech. Report TR-17-75, Center for Research in Computing Technology, Harvard Univ., Cambridge, 1975.

[132] Bank, R. E. *Marching Algorithms for Elliptic Boundary Value Problems*. PhD thesis, Harvard Univ., 1975.

[133] Bank, R. E. Marching algorithms and block Gaussian elimination. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, 1976.

[134] Bank, R. E. *PLTMG : A Software Package for Solving Elliptic Partial Differential Equations, "User's Guide" 7.0*. SIAM Publications, 1994.

[135] Bank, R. E. and Rose, D. J. Marching algorithms for elliptic boundary value problems – I : The constant coefficient case. *SIAM J. Numer. Anal.*

[136] Bank, R. E. and Rose, D. J. An $O(n^2)$ method for solving constant coefficient boundary value problems in two dimensions. *SIAM J. Numer. Anal.*

[137] Bank, R. E. and Rose, D. J. On the complexity of sparse Gaussian elimination via bordering. *SIAM J. Sci. and Stat. Comput.*, 11(1):145–160, 1990.

[138] Bank, R. E. and Smith, R. K. General sparse elimination requires no permanent integer storage. *SIAM J. Sci. and Stat. Comput.*, 8(4):574–584, 1987.

[139] Barbosa, V. C., Fernandes, E. S. T., and Amorim, C. L. Perspectivas em processamento paralelo para computação científica. *Pesquisa Operacional*, 8(1):20–40, 1988.

[140] Barbosa, V. C. and Lima, P. M. V. On the distributed parallel simulation of Hopfield's neural networks. *Software Practice and Experience*, 20(10):967–983, 1990.

[141] Bard, Y. *Nonlinear Parameter Estimation.* Academic Press, 1970.

[142] Barker, V. A. *Course in Advanced Sparse Matrix Techniques : Copenhagen 1976*, volume 572 of *Lecture Notes in Mathematics.* Springer-Verlag, 1977.

[143] Barnes, G. H., Brown, R. M., Kato, M., Kuck. D. J., Slonick, D. L., and Stokes, R. A. The ILLIAC IV computer. *IEEE Trans. Comput.*, C-17:746–757, 1968.

[144] Barret, R., Berry, M., Chan, T., Demmel, J., Donato, J., Dongarra, J., Eijkhout, V., Romine, C., and van der Vorst, H. *Templates for the Solution of Linear Systems : Building Blocks for Iterative Methods.* SIAM Publications, 1993.

[145] Barret, W. W., Johnson, C. R., Olesky, D. D., and van den Driessche, P. Inherited matrix entries : Principal submatrices of the inverse. *SIAM J. Alg. and Discr. Methods*, 8:313–322, 1987.

[146] Barron, D. W., editor. *Recursive Techniques in Programming.* American Elsevier, 1968.

[147] Barron, D. W. and Swinnerton-Dyer, H. P. F. Solution of simultaneous linear equations using a magnetic tape store. *Computing J.*, 3:28–33, 1960.

[148] Bartels, R. H. A stabilization of the simplex method. *Numer. Math.*, 16:414–434, 1971.

[149] Bartels, R. H. and Golub, G. H. The simplex method of linear programming using LU decomposition. *Comm. ACM*, 12:266–268, 1969.

[150] Bartholomew-Biggs, M. C. Recursive quadratic programming methods for nonlinear constraints. In Powell, M. J. D., editor, *Nonlinear Optimization 1981.* Academic Press, 1982.

[151] Barwell, V. and George, A. A comparison of algorithms for solving symmetric indefinite systems of linear equations. *ACM Trans. Math. Software*, 2:242–251, 1976.

[152] Baskow. T. R., editor. *Engineering Applications of Digital Computers.* Academic Press, 1968.

[153] Baty, J. P. and Stewart, K. L. Dissection of structures. *J. Struct. Div. ASCE*, 5:217–232, 1967.

[154] Baty, J. P. and Stewart, K. L. Organization of network equations using dissection theory. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 169–190. Academic Press, 1971.

[155] Bau, D. and Trefethen, L. N. *Numerical Linear Algebra*. SIAM Publications, 1996. (To be published).

[156] Bauer, F. L. Optimally scaled matrices. *Numer. Math.*, 5:73–87, 1963.

[157] Bauer, F. L. Remarks on optimally scaled matrices. *Numer. Math.*, 13:1–3, 1969.

[158] Bauer, F. L. et al. *Compiler Construction, An Advanced Course*, volume 21 of *Lecture Notes in Computer Science*. Springer-Verlag, 1974.

[159] Baumann, R. Some new aspects on load-flow calculation – I : Impedance matrix generation controlled by network topology. In *Power System Computation Conference*, Stockholm, 1966.

[160] Bayer, D. A. and Lagarias, J. C. The nonlinear geometry of linear programming – I : Affine and projective scaling trajectories. *Trans. of the American Math. Soc.*, 314:499–526, 1989.

[161] Bayer, D. A. and Lagarias, J. C. The nonlinear geometry of linear programming – II : Legendre transform coordinates. *Trans. of the American Math. Soc.*, 314:527–581, 1989.

[162] Bayer, R. and McCreight. Organization and maintenance of large ordered indexes. *Acta Informatica*, 1:173–189, 1972.

[163] Beale, E. M. L. *Nonlinear Programming using a General Mathematical Programming System*. Design and Implementation of Optimization Software. Stijthoff and Noordhoff, Holland, 1978.

[164] Beale, F. Numerical methods. In Abadie, J., editor, *Nonlinear Programming*. North-Holland, 1967.

[165] Beasley, J. E. An SST-based algorithm for the Steiner problem in graphs. *Networks*, 19:1–16, 1989.

[166] Belady, L. A. A study of replacement algorithms for a virtual-storage computer. *IBM Systems Journal*, 5:78–101, 1966.

[167] Belady, L. A. and Kuehner, C. J. Dynamic space-sharing computer systems. *Comm. ACM*, 12:282–285, 1969.

[168] Bell, C. G., Cady, R., McFarland, H., DeLagi, B., O'Laughlin, J., Noonan, R., and Wulf, W. A new architecture for mini-computers : The DEC PDP-11. In *Proc. AFIPS SJCC*, pages 657–675, 1970.

[169] Bell, C. G. and Newell, A., editors. *Computer Structures : Readings and Examples*. McGraw-Hill, 1971.

[170] Bell, E. T. *Men of Mathematics*. Simon and Schuster, 1975.

[171] BELL Labs. BELL System Tech. Journal, 57(6), part 2, 1978. (Special Issue devoted to UNIX).

[172] Bellman, R. Dynamic programming treatment of the traveling salesman problem. *J. ACM*, 9, 1962.

[173] Bellman, R. *Introduction to Matrix Analysis.* SIAM Publications, 1995. (First edition by McGraw-Hill, 1960).

[174] Bellman, R., Cooke, K. L., and Lockett, J. A. *Algorithms, Graphs and Computers.* Academic Press, 1970.

[175] Bellmore, M. and Nemhauser, G. L. The traveling salesman problem : A survey. *Operations Res.*, 16:538–558, 1968.

[176] Ben-Ari, M. *Principles of Concurrent Programming.* Prentice-Hall, 1982.

[177] Bender, C. M. and Orszag, S. A., editors. *Advanced Mathematical Methods for Scientists and Engineers.* McGraw-Hill, 1978.

[178] Benders, J. F. Partitioning procedures for solving mixed-variable programming problems. *Numer. Math.*, 4:238–252, 1962.

[179] Benner, R., Montry, G., and Weigand, G. Concurrent multifrontal methods : Shared memory, cache and frontwidth issues. *Int. J. of Supercomputer Appl.*, 1(3):26–44, 1987.

[180] Bennet, J. M. Triangular factors of modified matrices. *Numer. Math.*, 7:216–221, 1965.

[181] Bentley, J. L. *Writing Efficient Programs.* Prentice-Hall, 1982.

[182] Bentley, J. L. *Programming Pearls.* Addison-Wesley, 1986.

[183] Bentley, J. L. More Programming Pearls, 1988.

[184] Bentley, J. L., Weide, B. W., and Yao, A. C. Optimal expected-time algorithms for closest point problems. *ACM Trans. Math. Software*, 6:563–580, 1980.

[185] Berge, C. *The Theory of Graphs and its Applications.* John Wiley & Sons, 1962.

[186] Berge, C., editor. *The Theory of Graphs, International Symposium*, Rome, 1967. Dunod.

[187] Berge, C. *Graphs and Hypergraphs.* North-Holland, 1973.

[188] Berger, A., Mulvey, J., Rothberg, E., and Vanderbei, R. Solving multistage stochastic programs using tree dissection. Tech. Report SOR-97-07, Program in Statistics and Operations Research, Princeton Univ., New Jersey, 1995.

[189] Berman, P. and Schnitger, G. On the performance of the minimum degree ordering for Gaussian elimination. *SIAM J. Matrix Anal. and Appl.*, 11:83–88, 1990.

[190] Berry, M. A FORTRAN-77 software library for the sparse singular value decomposition. Tech. Report CS-92-159, Univ. of Tennessee, Knoxville, 1992.

[191] Berry, M. SVDPACKC : version 1.0 "User's Guide". Tech. Report CS-93-194, Univ. of Tennessee, Knoxville, 1993.

[192] Berry, M. A survey of public-domain Lanczos-based software. In Brown, J. D., Chu, M. T., Ellison, D. C., and Plemmons, R. J., editors, *Proc. of the Cornelius Lanczos International Centenary Conference, Rayleigh, 1993*, pages 332–334. SIAM Publications, 1994.

[193] Berry, R. D. An optimal ordering of electronic circuit equations for a sparse matrix solution. *IEEE Trans. Circuit Theory*, CT-18:139–145, 1971.

[194] Bertsekas, D. P. On penalty and multiplier methods for constrained optimization. *SIAM J. Control and Optim.*, 14:216–235, 1976.

[195] Bertsekas, D. P. On the Goldstein-Levitin-Polyak gradient projection method. *IEEE Trans. Automatic Control*, 21:174–184, 1976.

[196] Bertsekas, D. P. *Constrained Optimization and Lagrange Multiplier Methods*. Academic Press, 1982.

[197] Bertsekas, D. P. Projected Newton methods for optimization problems with simple constraints. *SIAM J. Control and Optim.*, 20(2):221–246, 1982.

[198] Bertsekas, D. P. and Eckstein, J. Dual coordinate step methods for linear network flow problems. *Math. Programming*, 42(2):203–244, 1988.

[199] Bertsekas, D. P. and Tsitsiklis, J. N. *Parallel and Distributed Computation – Numerical Methods*. Prentice Hall, 1989.

[200] Betancourt, R. An efficient heuristic ordering algorithm for partial matrix refactorization. *IEEE Trans. Power Systems*, PWRS-3(3):1181–1187, 1988.

[201] Bhat, M. V., Habash, W. G., Liu, J. W. H., Nguyen, V. N., and Peeters, M. F. A note on nested dissection for regular grids. *SIAM J. Matrix Anal. and Appl.*, 14(1):253–258, 1993.

[202] Bickley, W. G. and McNamee, J. Matrix and other direct methods for the solution of systems of linear difference equations. *Philos. Trans. Royal Soc. London, series A*, 252:69–131, 1960.

[203] Bik, A. J. C. and Wijshoff, H. A. G. Compilation techniques for sparse matrix computations. In *ACM International Conference on Supercomputing*, Tokyo, 1993.

[204] Birge, J. R., Freund, R. M., and Vanderbei, R. J. Prior reduced fill-in in solving equations in interior point algorithms. *Operations Res. Letters*, 11:195–198, 1992.

[205] Birkhoff, G. and George, A. Elimination by nested dissection. In Traub, J. F., editor, *Complexity of Sequential and Parallel Numerical Algorithms*. Academic Press, 1973.

[206] Birkhoff, G. and Varga, R. S. Implicit alternating direction methods. *Trans. Amer. Math. Soc.*, 92:13–24, 1959.

[207] Birkhoff, G. and Varga, R. S., editors. *Numerical Solution of Field Problems in Continuum Physics*. American Math. Soc., Providence, 1970.

[208] Birkhoff, G., Varga, R. S., and Young, D. M. Alternating direction implicit method. In *Advances in Computers, volume 3*, pages 189–273. Academic Press, 1962.

[209] Birkhoff, G., Young, D. M., and Zarantonello, E. H. Numerical methods in conformal mapping. In Abadie, J., editor, *Proc. of the Symposium Applied Mathematics, volume 4*, pages 117–140. McGraw-Hill, 1953.

[210] Bischof, C. H., Carle, A., Khademi, P., and Maurer, A. The ADIFOR 2.0 system for the automatic differentiation of FORTRAN 77 programs. Tech. Report CPRC-TR-94-491, Center for Research on Parallel Computation, Rice Univ., Houston, Texas, 1994.

[211] Bischof, C. H. and Dongarra, J. J. A project for developing a linear algebra library for high-performance computers. Tech. Report MCS-P-105-0989, Argonne National Laboratory, 1989.

[212] Bischof, C. H. and Hovland, P. Using ADIFOR to compute dense and sparse Jacobians. Tech. Memorandum ANL-MCS-TM-158, Mathematics and Computer Science Division, Argonne National Laboratory, 1991. (ADIFOR Working Note # 2).

[213] Bischof, C. H., Lewis, J. G., and Pierce, D. J. Incremental condition estimation for sparse matrices. *SIAM J. Matrix Anal. Appl.*, 11:644–659, 1990.

[214] Bischof, C. H., Pan, C. T., and Tang, P. T. P. A Cholesky up-and-downdating algorithm for systolic and SIMD architectures. *SIAM J. Sci. and Stat. Comput.*, 1992. (To be published).

[215] Bisseling, R., Doup, T., and Loyens, L. A parallel interior point algorithm for linear programming on a network of transputers. *Annals of Oper. Res.*, 43:51–86, 1993.

[216] Bixby, R. E. Implementing the simplex method : The initial basis. *ORSA J. Computing*, 4(3):267–284, 1992.

[217] Bixby, R. E. Progress in linear programming. *ORSA J. Computing*, 6(1):15–22, 1994.

[218] Bixby, R. E., Dennis, J. E. Jr., and Wu, Z. Solving nonlinear integer programs with a subgradient approach on parallel computers. *SIAM News*, 25(4):1, 18–19, 1992.

[219] Bixby, R. E., Gregory, J. W., Lustig, I. J., Marsten, R. E., and Shanno, D. F. Very large-scale linear programming : A case study in combining interior point and simplex methods. *Operations Res.*, 40:885–897, 1992.

[220] Bjørstad, P. E. A large scale, sparse, secondary storage, direct linear equation solver for structural analysis and its implementation on vector and parallel architectures. *Parallel Computing*, 5:3–12, 1987.

[221] Björck, A. Solving linear least squares problems by Gram-Schmidt orthogonalization. *BIT*, 7:1–21, 1967.

[222] Björck, A. Methods for sparse least squares problems. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, 1976.

[223] Björck, A. A direct method for sparse least squares problems with lower and upper bounds. *Numer. Math.*, 54:19–32, 1988.

[224] Björck, A. A note on scaling in the augmented system methods. (Unpublished Manuscript), 1991.

[225] Björck, A. *Numerical Methods for Least Squares Problems*. SIAM Publications, 1996. (To be published).

[226] Björck, A. and Duff, I. S. A direct method for the solution of sparse linear least squares problems. Tech. Report, AERE, Harwell Laboratory, 1979. (To be published at Lin. Alg. Appl.).

[227] Björck, A., Plemmons, R. J., and Schneider, H., editors. *Large Scale Matrix Problems*. North-Holland, 1981.

[228] Blair, J. R. S. and Peyton, B. W. On finding minimum-diameter clique trees. Tech. Report ORNL-TM-11850, Oak Ridge National Laboratory, 1991.

[229] Bloch, E. The engineering design of the STRETCH computer. In *Proc. Fall Joint Computer Conference*, pages 48–59, 1959.

[230] Blum, L. Lectures on a theory of computation and complexity over the reals (or an arbitrary ring). Tech. Report TR-89-065, International Computer Science Institute, Berkeley, 1989.

[231] Blum, L., Shub, M., and Smale, S. On a theory of computation and complexity over the real numbers : NP-completeness, recursive functions and universal machines. *Bull. AMS*, 21(1):1–46, 1989.

[232] Bodewig, E. *Matrix Calculus.* Amsterdam, 2^{nd} edition, 1959.

[233] Bodlaender, H., Gilbert, J. R., Hafsteinsson, H., and Kloks, T. Approximating treewidth, pathwidth, frontsize, and minimum elimination tree height. Tech. Report CSL-90-10, XEROX Palo Alto Research Center, 1990. (To be published at J. Algorithms).

[234] Bodlaender, H. L. Polynomial algorithms for graph isomorphism and chromatic index on partial k-trees. *J. of Algorithms*, 11:631–644, 1990.

[235] Bodlaender, H. L. A linear time algorithm for finding tree-decompositions of small treewidth. In *Proc.* 25^{th} *Annual Symposium on Theory of Computing*, pages 226–234. ACM Press, 1993.

[236] Bodlaender, H. L. and Möhring, R. H. The pathwidth and treewidth of cographs. *SIAM J. Alg. and Discr. Meth.*, 6:181–188, 1993.

[237] Boggs, P. T., Byrd, R. H., and Schnabel, R. B., editors. *Numerical Optimization 1984.* SIAM Publications, 1985.

[238] Boisvert, R. F., Howe, S. E., and Kahaner, D. K. The guide to available mathematical software. Tech. Report PB-84-171305, National Technical Information Service, Virginia, 1984.

[239] Bondy, J. A. and Murty, U. S. R. *Graph Theory with Applications.* North-Holland, 1976.

[240] Boom, H. J. and De Jong, E. A critical comparison of several programming language implementations. *Software Practice and Experience*, 10(6):435–473, 1980.

[241] Booth, A. D. *Numerical Methods.* Butterworths, London, 1955.

[242] Boothby. *Introduction to Differentiable Manifolds and Riemannian Geometry.* Academic Press, 1975.

[243] Boothroyd, J. Algorithm 302 : Transpose vector stored array. *Comm. ACM*, 10(5):292–293, 1967.

[244] Borges, C. L. T. Investigação do desempenho de métodos de solução do fluxo de potência para processamento paralelo e vetorial. Master's thesis, COPPE/UFRJ, 1991.

[245] Borgwardt, K. *The Simplex Method : A Probabilistic Analysis.* Springer-Verlag, 1987.

[246] Borosh, I. and Fraenkel, A. S. Exact solution of linear equations with rational coefficients by congruence techniques. *Math. of Computation*, 20(93):107–112, 1966.

[247] Borovkov, K. A. *Russian-English English-Russian Dictionary on Probability, Statistics and Combinatorics*. SIAM Publications, 1994.

[248] Bowdler, H. J., Martin, R. S., Peters, G., and Wilkinson, J. H. Solution of real and complex systems of linear equations. *Numer. Math.*, 8:217–234, 1966.

[249] Boyer, C. B. *A History of Mathematics*. John Wiley & Sons, 1968.

[250] Brameller, A., Allan, R. N., and Haman, Y. M. *Sparsity*. Pittman Press, New York, 1976.

[251] Brandon, D. M. Jr. *IMP – "General Manual", A General Simulator for Multivariate Differential or Algebraic Systems*. Chemical Engineering Dept., Univ. of Connecticut, Storrs, 1972.

[252] Brandon, D. M. Jr. The implementation and use of sparse matrix techniques in general simulation programs. *Computing J.*, 17:165–170, 1974.

[253] Branin, F. H. Jr., Hall, L. V., Suez, J., Carlitz, R. M., and Chen, T. C. An interpretative program for matrix arithmetic. *IBM Systems Journal*, 4:2–24, 1965.

[254] Brassard, G. and Bratley, P. *Algorithmics : Theory and Practice*. Prentice-Hall, 1988.

[255] Bratley, P., Fox, B. L., and Schrage, L. *A Guide to Simulation*. Springer-Verlag, 1987.

[256] Brawn, B. S., Gustavson, F. G., and Mankin, E. S. Sorting in a paging environment. *Comm. ACM*, 13:483–494, 1970.

[257] Brayton, R. K. and Cullum, J. An algorithm for minimizing a differentiable function subject to box constraints and errors. *Journal Optim. Theory Appl.*, 29(4):521–558, 1979.

[258] Brayton, R. K., Gustavson, F. G., and Willoughby, R. A. Some results on sparse matrices. *Math. of Computation*, 24:937–954, 1970. (Originally in Tech. Report RC-2332, IBM Research Center, Yorktown Heights, New York, 1969).

[259] Bree, D. Jr. Some remarks on the application of graph theory to the solution of sparse systems of linear equations. Internal Publication, Bonneville Power Administration, 1964.

[260] Bree, D. Jr. *Some Remarks on the Application of Graph Theory to the Solution of Sparse Systems of Linear Equations*. PhD thesis, Mathematics Dept., Princeton Univ., New Jersey, 1965.

[261] Brent, R. P. Algorithms for matrix multiplication. Tech. Report CS-157, Computer Science Dept., Stanford Univ., 1970.

[262] Brent, R. P. *Algorithms for Minimization Without Derivatives*. Prentice-Hall, 1973.

[263] Briggs, P. *Register Allocation via Graph Coloring*. PhD thesis, Dept. of Computer Science, Rice Univ., 1992.

[264] Briggs, W. L. *A Multigrid Tutorial*. SIAM Publications, 1987.

[265] Briggs, W. L. *The DFT : An Owner's Manual for the Discrete Fourier Transform.* SIAM Publications, 1995.

[266] Brigham, O. *The Fast Fourier Transform.* Prentice-Hall, 1974.

[267] Brinch Hansen, P. *The Architecture of Concurrent Programs.* Prentice-Hall, 1977.

[268] Brink, J. and Spillman, R. *Computer Architecture and VAX Assembly Language Programming.* The Benjamin/Cummings Co., 1987.

[269] Brooks, D. F. and Brotton, D. M. Computer system for analysis of large frameworks. *Journal ASCE, Structural Division*, 94:1–23, 1968.

[270] Brooks, F. P. Jr. Mass memory in computer systems. *IEEE Trans.*, MAG-5:635–639, 1969.

[271] Brown, D. C. A unified lunar control network. *Photogrammetric Engineering*, 34:1272–1292, 1968.

[272] Brown, R. J. and Tinney, W. F. Digital solutions for large scale power networks. *IEEE Trans. Power Apparatus and Systems*, PAS-76(3):347, 1957.

[273] Brown, W. S. An operating environment for dynamic-recursive computer programming systems. *Comm. ACM*, 8(6):371–377, 1965.

[274] Browne, J., Dongarra, J., Karp, A. H., Kennedy, K., and Kuck, D. 1988 Gordon Bell prize. *IEEE Software*, 6:78–85, 1989. (Special Report).

[275] Broyden, C. G. A new method of solving nonlinear simultaneous equations. *Computing J.*, 12:94–99, 1969.

[276] Brualdi, R. A. and Ryser, H. J. *Combinatorial Matrix Theory.* Cambridge Univ. Press, 1991.

[277] Brualdi, R. A. and Shader, B. L. Strong Hall matrices. IMA Preprint Series 909, Institute for Mathematics and Its Applications, Univ. of Minnesota, 1991.

[278] Bruce, W. H. *Recursive Programming Techniques.* Addison-Wesley, 1975.

[279] Bucholtz, W., editor. *Planning a Computer System : Project STRETCH.* McGraw-Hill, 1962.

[280] Buckingham, R. A. *Numerical Methods.* Pittman Press, London, 1957.

[281] Bunch, J. R. *On Direct Methods for Solving Symmetric Systems of Linear Equations.* PhD thesis, Univ. of California, Berkeley, 1969.

[282] Bunch, J. R. Analysis of sparse elimination. *SIAM J. Numer. Anal.*, 11:847–873, 1974.

[283] Bunch, J. R. Partial pivoting strategies for symmetric matrices. *SIAM J. Numer. Anal.*, 11:521–528, 1974.

[284] Bunch, J. R. Block methods for solving sparse linear systems. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[285] Bunch, J. R. and Hopcroft, J. E. Triangular factorization and inversion by fast matrix multiplication. *Math. Comp.*, 28:231–236, 1974.

[286] Bunch, J. R. and Kaufman, L. Some stable methods for calculating inertia and solving symmetric indefinite systems of linear equations. *Math. of Computation*, 31:163–179, 1977.

[287] Bunch, J. R., Kaufman, L., and Parlett, B. N. Decomposition of a symmetric matrix. *Numer. Math.*, 27:95–110, 1976.

[288] Bunch, J. R. and Parlett, B. N. Direct methods for solving symmetric indefinite systems of linear equations. *SIAM J. Numer. Anal.*, 8:639–655, 1971.

[289] Bunch, J. R. and Rose, D. J. Partitioning, tearing and modification of sparse linear systems. *J. Math. Anal. Appl.*, 48:574–593, 1974.

[290] Bunch, J. R. and Rose, D. J. *Sparse Matrix Computations*. Academic Press, 1976.

[291] Buoni, J. J., Farrel, P. A., and Ruttan, A. Algorithms for LU decomposition on a shared memory multiprocessor. *Parallel Computing*, 19:925–937, 1993.

[292] Burke, J. and Moré, J. On the identification of active constraints. *SIAM J. Numer. Anal.*, 25:1197–1211, 1988.

[293] Burke, J., Moré, J., and Toraldo, G. Convergence properties of trust region methods for linear and convex constraints. Tech. Report ANL-MCS-TM-116, Argonne National Laboratory, Argonne, Illinois, 1988.

[294] Busacker, R. G. and Saaty, T. L. *Finite Graphs and Their Networks : An Introduction with Applications*. McGraw-Hill, 1965.

[295] Busing, W. R. and Levy, H. A. A procedure for inverting large symmetric matrices. *Comm. ACM*, 8:445–446, 1962.

[296] Businger, P. A. Matrices which can be optimally scaled. *Numer. Math.*, 12:346–348, 1968.

[297] Businger, P. A. and Golub, G. H. Linear least-squares solutions by householder transformations. *Numer. Math.*, 7:269–276, 1965.

[298] Buzby, B. R. *Techniques and Experience Solving Really Big Nonlinear Programs*. Optimization Methods. English Universities Press, 1974.

[299] Byrd, R. H., Schnabel, R. B., and Shultz, G. A. A trust region algorithm for nonlinearly constrained optimization. Tech. Report CU-CS-313-85, Dept. of Computer Science, Univ. of Colorado at Boulder, Boulder, Colorado, 1985.

[300] Byrd, R. H., Schnabel, R. B., and Shultz, G. A. Approximate solution of the trust region problem by minimization over two-dimensional subspaces. *Math. Programming*, 40:247–263, 1988.

[301] Byrd, R. H., Schnabel, R. B., and Shultz, G. A. Parallel quasi-Newton methods for unconstrained optimization. *Math. Programming*, 42(2):273–306, 1988.

[302] Byrnes, F. D. A program for the direct solution of matrix equations. Tech. Report, Bonneville Power Administration, Portland, 1967.

[303] Cabay, S. and Lam, T. P. L. Congruence techniques for the exact solution of integer systems of linear equations. *ACM Trans. Math. Software*, 3(4):386–397, 1977.

[304] Cabay, S. and Lam, T. P. L. ESOLVE : Congruence techniques for the exact solution of integer systems of linear equations. *ACM Trans. Math. Software*, 3(4):404–410, 1977.

[305] Cabral, R. G. Avaliação do desempenho do método dos gradientes conjugados em multiprocessadores com arquitetura hipercúbica. Master's thesis, COPPE/UFRJ, 1991.

[306] Cabral, R. G. and Kaskurewicz, E. Uma implementação do método dos gradientes conjugados em multiprocessadores com arquitetura hipercúbica. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 412–425, 1993.

[307] Cáceres, E. N. Algoritmos paralelos para problemas em grafos. Master's thesis, COPPE/UFRJ, 1992.

[308] Cáceres, E. N. and Szwarficter, J. L. Cliques maximais em grafos círculo. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 398–411, 1993.

[309] Cachard, F. Logiciel numerique associé à une modélisation de systèmes informatiques, 1981. Thèse, Univ. Scientifique et Médicale de Grenoble, et l'Institut National Polytechnique de Grenoble.

[310] Calahan, D. A. *Computer Aided Network Design.* McGraw-Hill, 1968.

[311] Calahan, D. A. Switching circuit optimization. In *Proc. Cornell Conference on Computerized Electronics*, pages 282–292, Ithaca, 1969. Cornell Univ.

[312] Calahan, D. A. Parallel solution of sparse simultaneous linear equation. In *Proc.* 11^{th} *Annual Allerton Conference on Circuits and System Theory*, pages 729–738, 1973.

[313] Calahan, D. A. A block-oriented sparse equation solver for the CRAY-1. In *Proc. 1979 International Conference on Parallel Processing*, pages 116–123, 1979.

[314] Calahan, D. A. Vectorized sparse elimination. In *Proc. of Scientific Computer Information Exchange Meeting*, Livermore, 1979.

[315] Calahan, D. A. Multi-level vectorized sparse solution of LSI circuits. In *Proc. IEEE Conference on Circuits and Computers*, pages 976–979, Rye, New York, 1980.

[316] Calahan, D. A. Direct solution of linear equations on the CRAY-1. *CRAY Channels*, 3:1–5, 1981.

[317] Calahan, D. A. Performance of linear algebra codes on the CRAY-1. *SPE Journal*, pages 558–564, 1981.

[318] Calahan, D. A. High performance banded and profile equation-solvers for the CRAY-1 : The unsymmetric case. Tech. Report 160, Systems Eng. Laboratory, Univ. of Michigan, 1982.

[319] Calahan, D. A. Influence of task granularity on vector multiprocessor performance. In *Proc. 1984 International Conference on Parallel Processing*, pages 278–284, 1984.

[320] Calahan, D. A. Task granularity studies on a many-processor CRAY X-MP. *Parallel Computing*, 2:109–118, 1985.

[321] Calahan, D. A. Block-oriented, local-memory-based linear equation solution on the CRAY-2 : Uniprocessor algorithms. In *Proc. 1986 International Conference on Parallel Processing*, pages 375–378, 1986.

[322] Calahan, D. A. and Ames, W. G. Vector processors : Models and applications. *IEEE Trans. Circuits and Systems*, CAS-26(9):715–726, 1979.

[323] Calahan, D. A., Dongarra, J. J., and Levine, D. Vectorizing compilers : A test suite and results. In *Supercomputer '88*, pages 98–105. IEEE Press, 1988.

[324] Calahan, D. A., Dongarra, J. J., and Levine, D. Vectorizing compilers : A test suite and results. In *Supercomputing '88*, pages 409–426, Orlando, 1988. ACM/IEEE.

[325] Calahan, D. A. and Grapes, T. E. Description of a sparse matrix compiler with applications. Tech. Report AFORS-TR-71-2676, Systems Engineering Lab., Univ. Michigan, Ann Arbor, 1971.

[326] Calahan, D. A. and McCalla, W. J. Eigenvalue methods for sparse matrices. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 25–30. Plenum Press, New York, 1972.

[327] Calahan, D. A. and Schlansker, M. S. Addendum to sparse matrix compiler manual. Tech. Report AFORS-TR-72-1973, Systems Engineering Lab., Univ. Michigan, Ann Arbor, 1972.

[328] Calamai, P. and Moré, J. Projected gradient methods for linearly constrained problems. *Math. Programming*, 39:93–116, 1987.

[329] Campagnolo, J. M., Martins, N., and Falcão, D. M. An efficient and robust eigenvalue method for small-signal stability assessment using parallel processing. Paper 94-SM-558-7-PWRS, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1994. (Presented at IEEE Winter Power Meeting).

[330] Campagnolo, J. M., Martins, N., and Falcão, D. M. Refactored bi-iteration : A high performance eigensolution method for large power system matrices. Technical report, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1995. (Submitted to 1995 IEEE Summer Power Meeting).

[331] Campagnolo, J. M., Martins, N., Pereira, J. L. R., and Falcão, D. M. Algoritmo paralelo para o cálculo de autovalores associado a avaliação da estabilidade a pequenas perturbações. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 562–576, 1993.

[332] Campagnolo, J. M., Martins, N., Pereira, J. L. R., Lima, L. T. G., Pinto, H. J. C. P., and Falcão, D. M. Fast small-signal stability assessment using parallel processing. *IEEE Trans. Power Systems*, PWRS-9(2):949–956, 1994.

[333] Cantin, G. An equation solver of very large capacity. *Int. J. Numer. Meth. Eng.*, 3:379–388, 1971.

[334] Carlsson, M. and Scharmer, G. B. A new approach to multi-level non-LTE radiative transfer problems. Technical report, 1985.

[335] Carnahan, B., Luther, H. A., and Wilkes, J. O. *Applied Numerical Methods.* John Wiley & Sons, 1969.

[336] Carnahan, B. and Wilkes, J. O. *Digital Computing and Numerical Methods with FORTRAN IV, WATFOR, and WATFIV Programming.* John Wiley & Sons, 1973.

[337] Carnevali, P. et al. Efficient FORTRAN implementation of the Gaussian elimination and Householder reduction algorithms on the IBM3090 vector multiprocessor. *Mathematical Modelling and Numerical Analysis*, 23(1):63–86, 1989.

[338] Carpaneto, G., Fichetti, M., and Toth, P. New lower bounds for the symmetric travelling salesman problem. *Mathematical Programming*, 5:233–254, 1989.

[339] Carpentier, J. Ordered elimination. In *Power System Computation Conference*, London, 1963.

[340] Carr, S. *Memory-Hierarchy Management.* PhD thesis, Dept. of Computer Science, Rice Univ., 1992.

[341] Carr, S. and Kennedy, K. Improving the ratio of memory operations to floating-point operations in loops. Tech. Report CRPC-TR-92-284, Center for Research on Parallel Computation (CRPC), Rice Univ., Houston, Texas, 1992.

[342] Carré, B. A. The partitioning of network equations for block iteration. *Computing J.*, 9:84–96, 1966.

[343] Carré, B. A. *Graphs and Networks.* Clarendon Press, 1979.

[344] Carter, L. RISC from a performance programmer's perspective. Tech. Report, Computer Science and Eng. Dept., San Diego Supercomputer Center, Univ. of California, San Diego.

[345] Carter, L. The RAM model and the performance programmer. Research Report RC-16319, IBM Thomas J. Watson Research Center, Yorktown Heights, 1990.

[346] Carter, L., Ferrante, J., and Hummel, S. F. Hierarchical tiling for improved superscalar performance. Tech. Report, Computer Science and Eng. Dept., San Diego Supercomputer Center, Univ. of California, San Diego.

[347] Cate, E. G. and Twigg, D. W. Algorithm 513 : Analysis of in-situ transposition. *ACM Trans. Math. Software*, 3(1):104–110, 1977.

[348] Cavers, I. Tiebreaking the minimum degree algorithm for ordering sparse symmetric positive definite matrices. Master's thesis, Dept. of Computer Science, Univ. of British Columbia, Vancouver, 1987.

[349] Celis, M. R., Dennis, J. E. Jr., and Tapia, R. A. A trust region strategy for nonlinear equality constrained optimization. In Boggs, P., Byrd, R., and Schnabel R., editors, *Numerical Optimization 1984*, pages 71–82. SIAM Publications, 1985.

[350] Celis, M. R., Dennis, J. E. Jr., and Tapia, R. A. An algorithm based on a convenient trust region subproblem for nonlinear programming. Tech. Report, Dept. of Mathematical Sciences, Rice Univ., Houston, Texas, 1988.

[351] Chaitin-Chatelin, F. and Fraysse, V. *Lectures on Finite Precision Computations.* SIAM Publications, 1996. (To be published).

[352] Chaitin, G. J., Auslander, M. A., Chandra, A. K., Cocke, J., Hopkins, M. E., and Markstein, P. W. Register allocation via coloring. *Computer Languages*, 6:47–57, 1982.

[353] Chan, S. M. and Brandwajn, V. Partial matrix refactorization. *IEEE Trans. Power Systems*, PWRS-1(1):193–200, 1986.

[354] Chan, T. F. and Saad, Y. Multigrid algorithms on the hypercube multiprocessor. *IEEE Trans. Comput.*, C-35(11), 1986.

[355] Chan, W. M. and George, A. A linear time implementation of the reverse Cuthill-McKee algorithm. *BIT*, 20:8–14, 1980.

[356] Chandra, R., Eisenstat, S. C., and Schultz, M. H. Conjugate gradient methods for partial differential equations. In Vichnevetsky, R., editor, *Proc. AICA International Symposium on Computer Methods for Partial Differential Equations, Bethlehem.* Prentice-Hall, 1975.

[357] Chang, A. Application of sparse matrix methods in electric power system analysis. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[358] Chang, S. F. *Increasing Sparsity in Matrices for Large Scale Optimization : Theoretical Properties and Implementational Aspects.* PhD thesis, Columbia Univ., 1989.

[359] Chang, S. F. and McCormick, S. T. A hierarchical algorithm for making sparse matrices sparser. *Math. Programming*, 56:1–30, 1992.

[360] Chang, S. F. and McCormick, S. T. Implementation and computational results for the hierarchical algorithm for making sparse matrices sparser. *ACM Trans. Math. Software*, 19(3):419–441, 1993.

[361] Chartres, B. A. Adaptation of the Jacobi method for a computer with magnetic-tape backing store. *Computing J.*, 5:51–60, 1962.

[362] Chazan, D. and Miranker, W. L. Chaotic relaxation. *Lin. Alg. Appl.*, 2:199–222, 1969.

[363] Chen, M. S. and Shin, K. G. Processor allocation in an N-Cube multiprocessor using gray codes. *IEEE Trans. Comput.*, C-36:1396–1407, 1987.

[364] Chen, S., Kuck, D., and Sameh, A. Practical parallel band triangular systems solvers. *ACM Trans. Math. Software*, 4:270–277, 1978.

[365] Chen, T. C. Parallelism, pipelining and computer efficiency. *Computer Design*, pages 69–74, 1971.

[366] Chen, T. C. Overlap and parallel processing. In Stone, H. S., editor, *Introduction to Computer Architecture*, pages 427–486. Science Research Associates, Chicago, 1980.

[367] Chen, W. K. The inversion of matrices by flow graphs. *SIAM J. Appl. Math.*, 12:676–685, 1964.

[368] Chen, W. K. On directed graph solution of linear algebraic equations. *SIAM Review*, 9:692–707, 1967.

[369] Chen, Y. T. Permutation of irreducible matrices to upper triangular forms. *J. Inst. Math. Appl.*, 10:15–18, 1972.

[370] Chen, Y. T. *Iterative Methods for Linear Least Squares Problems.* PhD thesis, Dept. of Computer Science, Waterloo Univ., 1975. (Report CS-75-04).

[371] Chen, Y. T. and Tewarson, R. P. On the optimal choice of pivots for the Gaussian elimination. *Computing*, 9, 1972.

[372] Cheng, Y. C., Houck, D. J. Jr., Liu, J. M., Meketon, M. S., Slutsman, L., Vanderbei, R. J., and Wang, P. AT&T KORBX system. *AT&T Technical Journal*, 68(3):7–19, 1989.

[373] Cheriton, D. and Tarjan, R. E. Finding minimum spanning trees. *SIAM J. Comput.*, 5:724–742, 1976.

[374] Chevalley, C. *Theory of Lie Groups.* Princeton University Press, 1946.

[375] Choi, I. C., Monma, C. L., and Shanno, D. F. Further development of a primal-dual interior point method. *ORSA J. Computing*, 2:304–311, 1990.

[376] Chow, F. C. and Hennessy, J. L. Register allocation by priority-based coloring. *ACM SIGPLAN Notices*, 19(6):222–232, 1984. (Presented at Proc. SIGPLAN '84 Compiler Construction).

[377] Chow, F. C., Himelstein, M., Killian, E., and Weber, L. Engineering a RISC compiler system. In *Proc. COMPCON*, pages 132–137, San Francisco, 1988. IEEE.

[378] Chow, T. S. and Kowalik, J. S. Computing with sparse matrices. *Int. J. Numer. Meth. Eng.*, 7:211–223, 1973.

[379] Christensen, J. H. The structuring of process optimization. *Amer. Inst. Chem. Eng. Journal*, 16:177–184, 1970.

[380] Christofides, N. *Graph Theory : An Algorithmic Approach.* Academic Press, 1975.

[381] Chu, E. *Orthogonal Decomposition of Dense and Sparse Matrices on Multiprocessors.* PhD thesis, Univ. of Waterloo, 1988.

[382] Chu, E. C. H. and George, A. Sparse matrix methods research using the CSM testbed software system. Contractor Report CR-4219, NASA, 1989.

[383] Chu, E. C. H. and George, A. Sparse orthogonal decomposition on a hypercube multiprocessor. *SIAM J. Matrix Anal. and Appl.*, 11:453–465, 1990.

[384] Chu, E. C. H., George, A., and Ng, E. "User's Guide" for SPARSPAK-A : Waterloo sparse linear equations package. Tech. Report CS-84-36, Univ. Waterloo, Canada, 1984.

[385] Chui, C. K. *Multivariate Splines.* SIAM Publications, 1988.

[386] Chvátal, V. *Linear Programming.* Freeman & Co., 1983.

[387] Clark, D. W. Cache performance of the VAX-11/780. *ACM Trans. Computer Systems*, 1(1):24–37, 1983.

[388] Clark, D. W. Pipelining and performance in the VAX 8800 processor. In *Proc. 2^{nd} IEEE/ACM Conference on Architectural Support for Programming Languages and Operating Systems*, pages 173–177, Palo Alto, 1987.

[389] Clark, D. W., Bannon, P. J., and Keller, J. B. Measuring VAX 8800 performance with a histogram hardware monitor. In *Proc. 15^th Annual Symposium on Computer Architecture*, pages 176–185, Honolulu, Hawaii, 1988.

[390] Clark, D. W. and Emer, J. S. Performance of the VAX-11/780 translation buffer : Simulation and measurement. *ACM Trans. Computer Systems*, 3(1):31–62, 1985.

[391] Clark, D. W. and Levy, H. Measurement and analysis of instruction set use in the VAX-11/780. In *Proc. 9^th Annual Symposium on Computer Architecture*, pages 9–17, Austin, Texas, 1982.

[392] Clarke, F. H. *Methods of Dynamics and Nonsmooth Optimization.* SIAM Publications, 1989.

[393] Clarke, F. H. *Optimization and Nonsmooth Analysis.* SIAM Publications, 1990.

[394] Cline, A. K., Golub, G. H., and Platzman, G. W. Calculations of normal modes of oceans using a Lanczos method. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*, pages 409–426. Academic Press, 1976.

[395] Coates, C. L. Flow graph solutions of linear algebraic equations. *IEEE Trans. Circuit Theory*, CT-6:170–187, 1959.

[396] Cocke, J. Global common subexpression elimination. *SIGPLAN Notices*, 5:20–24, 1970.

[397] Cocke, J. and Schwartz, J. T. *Programming Languages and Their Compilers.* Courant Institute, 1970.

[398] Cody, W. J. Jr. and Waite, W. *Software Manual for the Elementary Functions.* Prentice-Hall, 1980.

[399] Coffman, E. G. and Denning, P. J. *Operating Systems Theory.* Prentice-Hall, 1973.

[400] Coleman, T. F. *Large Sparse Numerical Optimization*, volume 165 of *Lecture Notes in Computer Science.* Springer-Verlag, 1984.

[401] Coleman, T. F. and Conn, A. On the local convergence of quasi-Newton methods for the nonlinear programming problem. *SIAM J. Numer. Anal.*, 21:755–769, 1984.

[402] Coleman, T. F., Edenbrandt, A., and Gilbert, J. R. Predicting fill for sparse orthogonal factorization. *J. ACM*, 33:517–532, 1986.

[403] Coleman, T. F., Garbow, B., and Moré, J. J. Software for estimating sparse Jacobian matrices. *ACM Trans. Math. Software*, 10:329–347, 1984.

[404] Coleman, T. F., Garbow, B., and Moré, J. J. Software for estimating sparse Hessian matrices. *ACM Trans. Math. Software*, 11:363–378, 1985.

[405] Coleman, T. F. and Hulbert, L. A direct active set algorithm for large sparse quadratic programs with simple bounds. Tech. Report 88-926, Cornell Univ., Ithaca, NY, 1988.

[406] Coleman, T. F. and Li, Y., editors. *Large Scale Numerical Optimization.* SIAM Publications, 1990.

[407] Coleman, T. F. and Moré, J. J. Estimation of sparse Jacobian matrices and graph coloring problems. *SIAM J. Numer. Anal.*, 20:187–209, 1983.

[408] Coleman, T. F. and Moré, J. J. Estimation of sparse Hessian matrices and graph coloring problems. *SIAM J. Numer. Anal.*, 28:243–270, 1984.

[409] Coleman, T. F. and Pothen, A. The null space problem – I : Complexity. *SIAM J. Alg. and Discr. Methods*, 7:527–537, 1986.

[410] Coleman, T. F. and Pothen, A. The null space problem – II : Algorithms. *SIAM J. Alg. and Discr. Methods*, 8:544–563, 1987.

[411] Coleman, T. F. and Van Loan, C. *Handbook for Matrix Computations.* SIAM Publications, 1988.

[412] Collatz, L. *Numerische und Graphische Methoden, Handbuch der Physik, volume 2.* Springer-Verlag, 1955.

[413] Comer, D. The ubiquitous B-Tree. *ACM Computing Surveys*, 11(2):121–137, 1979.

[414] Companhia Telefônica Brasileira, Departamento Geral de Desenvolvimento de Transmissão. *Programação FORTRAN para Aplicações Técnicas e Científicas*, 1975. (Ref. TED-32-01-0005).

[415] Comstock, D. R. A note on multiplying boolean matrices – II. *Comm. ACM*, 7:13, 1964.

[416] Concus, P. and Golub, G. H. A generalized conjugate gradient method for non-symmetric systems of linear equations. Tech. Report STAN-CS-75-535, Computer Science Dept., Stanford Univ., 1975.

[417] Concus, P., Golub, G. H., and O'Leary, D. P. A generalized conjugate gradient method for the numeric solution of elliptic partial differential equations. Tech. Report STAN-CS-75-533, Computer Science Dept., Stanford Univ., 1975.

[418] Conn, A. R. *Penalty Function Methods.* Nonlinear Optimization 1981. Academic Press, 1982.

[419] Conn, A. R., Gould, N., and Toint, Ph. L. Testing a class of methods for solving minimization problems with simple bounds on the variables. Tech. Report 86-3, Dept. of Mathematics, FUNDP, Namur, 1986.

[420] Conn, A. R., Gould, N., and Toint, Ph. L. Global convergence of a class of trust region algorithms for optimization problems with simple bounds. Tech. Report, Dept. of Computer Sciences, Univ. of Waterloo, Canada, 1988.

[421] Conn, A. R., Gould, N., and Toint, Ph. L., editors. *Large Scale Optimization*, volume 45 of *Math. Programming, Series B*, pages 373–568. North Holland, 1989. (Special Issue).

[422] Conte, S. D. and Dames, R. T. An alternating direction method for solving the biharmonic equation. *Math. of Computation*, 12:198–205, 1958.

[423] Conte, S. D. and de Boor, C. *Elementary Numerical Analysis : An Algorithmic Approach.* McGraw-Hill, 3^{rd} edition, 1980.

[424] CONTROL DATA. *STAR-100 Computer System "Hardware Reference Manual"*, 1973. CONTROL DATA Corporation.

[425] Cook, S. A. The complexity of theorem-proving procedures. In *Proc. 3^{rd} ACM Symposium on Theory of Computing*, pages 151–158, 1971.

[426] Cooley, J. W. and Tukey, J. W. An algorithm for machine calculation of complex Fourier series. *Math. of Computation*, 19:297–301, 1965.

[427] Coppersmith, D. and Winograd, S. Matrix multiplication via arithmetic progression. In *Proc.* 19^{th} *Annual ACM Symposium of Theory of Computing*, pages 1–6, 1987.

[428] Cormen, T. H., Leiserson, C. E., and Rivest, R. L. *Introduction to Algorithms*. McGraw-Hill, 1990.

[429] Cottle, R. W. Major Cholesky. Manuscript, Dept. of Oper. Res., Stanford Univ., 1975.

[430] Couffignal, L. *Résolution Numérique des Systèmes d'Équations Linéaires*. Gauthier et Villars, 1956.

[431] Courant, R. *Methods of Mathematical Physics, volume 1*. Interscience, 1953.

[432] Courant, R. and Hilbert, D. *Methods of Mathematical Physics, volume 2*. Interscience, 1962.

[433] Cowell, W. and Thompson, C. Transforming FORTRAN DO loops to improve performance on vector architectures. *ACM Trans. Math. Software*, 12:324–353, 1986.

[434] CPLEX Optimization, Inc., Incline Village, Nevada. *Using the CPLEX Callable Library and CPLEX Mixed Integer Library*, 1993.

[435] Crane, H., Gibbs, N. E., Poole, W. G. Jr., and Stockmeyer, P. K. Algorithm 508 : Matrix bandwidth and profile reduction. *ACM Trans. Math. Software*, 2:375–377, 1976.

[436] Crank, J. and Nicholson, P. A practical method for numerical evaluation of solutions of partial differential equations of the heat conduction type. *Proc. Cambridge Philos. Soc.*, 43:50–67, 1947.

[437] Crawford, J. H. and Gelsinger, P. P. *Programming the 80386*. Sybex, Alameda, California, 1987.

[438] CRAY Research, Inc. *SSGETRF : Factors a Real Sparse General Matrix "Online Manual"*. CRAY Research, Inc., 1993.

[439] Crespi-Reghizzi, S. and Morpurgo, R. A language for treating graphs. *Comm. ACM*, 13:319–323, 1970.

[440] Crout, P. D. A short method for evaluating determinants and solving systems of linear equations with real or complex coefficients. *AIEE Trans. (supplement)*, 60:1235–1240, 1941.

[441] Curtis, A. R. and Chance, E. M. CHECK and CHEKMAT : Two chemical reaction kinetics programs. Tech. Report AERE-R-7345, HMSO, Harwell Laboratory, 1974.

[442] Curtis, A. R., Powell, M. J. D., and Reid, J. K. On the estimation of sparse Jacobian matrices. *J. Inst. Math. Appl.*, 13:117–119, 1974.

[443] Curtis, A. R. and Reid, J. K. FORTRAN subroutines for the solution of sparse sets of linear equations. Tech. Report R-6844, Atomic Energy Res. Establishment, Harwell, 1971.

[444] Curtis, A. R. and Reid, J. K. The solution of large sparse systems of linear equations. In *Proc. of IFIP*. Atomic Energy Res. Establishment, Harwell, 1971. (Tech. Report TP-450).

[445] Curtis, A. R. and Reid, J. K. The solution of large sparse unsymmetric systems of linear equations. *J. Inst. Math. Appl.*, 8:344–353, 1971.

[446] Curtis, A. R. and Reid, J. K. The solution of large sparse unsymmetric systems of linear equations. In Freiman, C. V., editor, *Information Processing 71, Proc. IFIP Congress*, pages 1240–1245, Ljubljana, 1972. North-Holland.

[447] Cuthill, E. H. Several strategies for reducing the bandwidth of matrices. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 157–166. Plenum Press, New York, 1972.

[448] Cuthill, E. H. and McKee, J. Reducing the bandwidth of sparse symmetric matrices. In *Proc.* 24^{th} *National Conference of the ACM*, pages 157–172. ACM Press, 1969.

[449] Cuthill, E. H. and Varga, R. S. A method of normalized block iteration. *J. ACM*, 6:236–244, 1959.

[450] Cvetkovic, D., Doob, M., and Sachs, H. *Spectra of Graphs*. Academic Press, 1980.

[451] da Cruz Neto, J. X. *Métodos Geodésicos na Programação Matemática*. PhD thesis, Depto. de Engenharia de Sistemas e Ciências da Computação, COPPE / Univ. Federal do Rio de Janeiro, 1995.

[452] da Cruz Neto, J. X. and Oliveira, P. R. Geodesic descent in linear and nonlinear programming. Tech. Report, Depto. de Engenharia de Sistemas e Ciências da Computação, COPPE / Univ. Federal do Rio de Janeiro, 1995.

[453] da Cruz Neto, J. X. and Oliveira, P. R. A unified view of primal methods through riemannian metrics. Tech. Report ES-363-95, Depto. de Engenharia de Sistemas e Ciências da Computação, COPPE / Univ. Federal do Rio de Janeiro, 1995.

[454] Dahl, D., Dijkstra, E. W., and Hoare, C. A. R. *Structured Programming*. Academic Press, 1972.

[455] Dahlhaus, E. and Karpinski, M. A fast parallel algorithm for computing all maximal cliques in a graph and the related problems. Tech. Report 8516-CS, Inst. fur Informatik der Univ. Bonn, 1987.

[456] Dahlquist, G. A numerical method for some ordinary differential equations with large Lipschitz constants. In *Proc. IFIP Congress*, Edinburgh, 1968.

[457] Dahlquist, G. and Björck, A. *Numerical Methods*. Prentice-Hall, 1974.

[458] Dantzig, G. B. Maximization of a linear function of variables subject to linear inequalities. In Koopmans, T. C., editor, *Activity Analysis of Production and Allocation*, pages 339–347. John Wiley & Sons, New York, 1951.

[459] Dantzig, G. B. *Linear Programming and Extensions*. Princeton University Press, 1962.

[460] Dantzig, G. B. Compact basis triangularization for the simplex method. In Graves, R. L. and Wolfe, P., editors, *Recent Advances in Mathematical Programming*, pages 125–132. McGraw-Hill, 1963.

[461] Dantzig, G. B. All shortest routes in a graph. In *Theory of Graphs International Symposium*, pages 91–92. Gordon and Breach, New York, 1967.

[462] Dantzig, G. B. Comments on Khachiyan's algorithm for linear programming. Tech. Report SOR-79-22, Dept. of Operations Res., Stanford Univ., 1979.

[463] Dantzig, G. B., Eisenstat, S. C., Magnante, T., Maier, S., McGrath, M., Nicholson, V., and Riedel, C. MPL : Mathematical Programming Language, "Specification Manual". Tech. Report STAN-CS-70-187, Stanford Univ., 1970.

[464] Dantzig, G. B., Harvey, R. P., McKnight, R. D., and Smith, S. S. Sparse matrix techniques in two mathematical programming codes. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, pages 85–99, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[465] Dantzig, G. B. and Orchard-Hays, W. The product form of inverse in the simplex method. *Math. of Computation*, 8:64–67, 1954.

[466] Dantzig, G. B. and Van Slyke, R. M. Generalized upper bounding techniques. *J. Computer Systems Sciences*, 1:213–226, 1967.

[467] Dantzig, G. B. and Wolfe, P. Decomposition principle for linear programs. *Operations Res.*, 8:101–111, 1960.

[468] Dantzig, G. B. and Wolfe, P. The decomposition algorithm for linear programs. *Econometrica*, 29:767–778, 1961.

[469] Datta, B. N. Parallel and large-scale matrix computations in control : Some ideas. *Lin. Alg. Appl.*, 121:243–264, 1989.

[470] Daubechies, I. *Ten Lectures on Wavelets.* SIAM Publications, 1992.

[471] Davenport, J. L. H., Siret, Y., and Tournier, E. *Computer Algebra : Systems and Algorithms for Algebraic Computations.* Academic Press, 1988.

[472] Davidon, W. C. Variable metric methods for minimization. Tech. Report ANL-5990, Argonne National Laboratory, 1959.

[473] Davidon, W. C. Conic approximations and collinear scalings for optimizers. *SIAM J. Numer. Anal.*, 17:268–281, 1980.

[474] Davis, G. Column LU factorization with pivoting on a hypercube multiprocessor. *SIAM J. Alg. and Discr. Methods*, 7, 1986.

[475] Davis, P. *Interpolation and Approximation.* Blaisdell Publishing Co., 1963.

[476] Davis, P. and Rabinowitz, P. *Methods of Numerical Integration.* Academic Press, 2^{nd} edition, 1984.

[477] Davis, T. A. PSOLVE : A concurrent algorithm for solving sparse systems of linear equations. Tech. Report 612, Center for Supercomputing Research and Development, Univ. of Illinois at Urbana-Champaign, 1986.

[478] Davis, T. A. Performance of an unsymmetric-pattern multifrontal method for sparse LU factorization. Tech. Report TR-92-014, Computer and Information Science Dept., Univ. of Florida, 1992.

[479] Davis, T. A. An unsymmetric pattern multifrontal method for sparse LU factorization. Tech. Report TR-93-018, Computer and Information Science Dept., Univ. of Florida, 1993.

[480] Davis, T. A. "User's Guide" for the unsymmetric-pattern multifrontal package (UMFPACK). Tech. Report TR-93-020, Computer and Information Sciences Dept., Univ. of Florida, 1993.

[481] Davis, T. A. A combined unifrontal/multifrontal method for unsymmetric sparse matrices. Tech. Report TR-94-005, Computer and Information Science Dept., Univ. of Florida, 1994. (Proc. of 5^{th} SIAM Conference on Applied Linear Algebra).

[482] Davis, T. A. User's guide for the unsymmetric-pattern multifrontal package (UMFPACK), version 1.1. Tech. Report TR-95-004, Computer and Information Science Dept., Univ. of Florida, 1995.

[483] Davis, T. A., Amestoy, P., and Duff, I. S. An approximate minimum degree ordering algorithm. Tech. Report TR-94-039, Computer and Information Science Dept., Univ. of Florida, 1994. (Revised July 1995).

[484] Davis, T. A. and Duff, I. S. Unsymmetric-pattern multifrontal methods for parallel sparse LU factorization. Tech. Report TR-91-023, Computer and Information Science Dept., Univ. of Florida, 1991.

[485] Davis, T. A. and Duff, I. S. An unsymmetric-pattern multifrontal method for sparse LU factorization. Tech. Report RAL-93-036, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, 1994.

[486] Davis, T. A. and Duff, I. S. An unsymmetric-pattern multifrontal method for sparse LU factorization. Tech. Report TR-94-038, Computer and Information Science Dept., Univ. of Florida, 1994.

[487] Davis, T. A. and Duff, I. S. A combined unifrontal/multifrontal method for unsymmetric sparse matrices. Tech. Report TR-95-020, Computer and Information Science Dept., Univ. of Florida, 1995.

[488] Davis, T. A. and Yew, P. C. A nondeterministic parallel algorithm for general unsymmetric sparse LU factorization. *SIAM J. Matrix Anal. and Appl.*, 11:383–402, 1990.

[489] Dayde, M. J. and Duff, I. S. Use of level-3 BLAS in LU factorization on the CRAY-2, the ETA-10P and the IBM 3090-200/VF. Tech. Report CSS-229, Computer Science and Systems Division, Harwell Laboratory, Oxon, England, 1988.

[490] Dayde, M. J. and Duff, I. S. Use of level-3 BLAS in LU factorization in a multiprocessing environment on three vector multiprocessors : The ALLIANT FX/8, the CRAY-2 and the IBM 3090/VF. Tech. Report TR-TA-90-30, CERFACS, 1990.

[491] Daydé, M. J. and Duff, I. S. A block implementation of level 3 BLAS for RISC processors. Tech. Report, CERFACS, 1995.

[492] de Boor, C. *A Practical Guide to Splines*. Springer-Verlag, 1978.

[493] de Buchet, J. How to take into account the low density of matrices to design a mathematical programming package : Relevant effects on optimization and inversion algorithms. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 211–217. Academic Press, 1971.

[494] de Carvalho, M. L. B. On the minimization of work needed to factor a symmetric positive definite matrix. Manuscript ORC 87-14, Dept. of Industrial Eng. and Oper. Research, Univ. of California, Berkeley, 1987.

[495] de Carvalho, M. L. B., Carceroni, R. L., and Júnior, W. M. Uma experiência de implementação de métodos de ordenação paralelos em máquina SIMD. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 189–201, 1993.

[496] de Carvalho, M. L. B. and Júnior, W. M. Simulação de redes neuronais em ambientes heterogêneos e paralelos. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 217–231, 1993.

[497] de Carvalho, M. L. B., Lima, M. A. de C., Corrêa, W. T., and Júnior, W. M. Uso da heterogeneidade para aceleração de ray tracing. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 174–188, 1993.

[498] DEC. Special Issue dedicated to VAX 8800. Digital Technical Journal, 4, 1987.

[499] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. An efficient parallel method for transient stability analysis. In *Proc. 10^{th} Power System Computation Conference (PSCC)*, pages 509–516, Graz, Austria, 1990.

[500] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. Parallel implementation of a power system simulation methodology using the conjugate gradient method. In *IEEE Transactions on Power System Computation Conference*, pages 509–519, 1991.

[501] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. Parallel implementation of a power system dynamic simulation methodology using the conjugate gradient method. *IEEE Trans. Power Systems*, PWRS-7:458–465, 1992.

[502] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. Algoritmos para a simulação da dinâmica de sistemas de energia elétrica em computadores paralelos. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 444–458, 1993.

[503] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. Esquema alternado entrelaçado implícito paralelo : Aplicação do método gradiente conjugado pré-condicionado as equações da rede elétrica. Relatório Interno, Programa de Engenharia Elétrica, COPPE/UFRJ, 1993.

[504] Decker, I. C., Falcão, D. M., and Kaszkurewicz, E. Esquema simultâneo implícito paralelo no tempo : Aplicação dos métodos gradiente biconjugado e bi-cgstab. Relatório Interno, Programa de Engenharia Elétrica, COPPE/UFRJ, 1993.

[505] Dembart, B. and Erisman, A. M. Hybrid sparse matrix methods. *IEEE Trans. Circuit Theory*, CT-20:641–649, 1973.

[506] Dembart, B. et al. Improved mathematical techniques for dynamic analysis, volume 2. EPRI Project 670-2.

[507] Dembart, B. and Neves, K.W. Sparse triangular factorization on vector computers. In *Exploring Applications of Parallel Processing*, pages 22–25, Palo Alto, 1977. Electric Power Research Institute. (Report EL-566-QR).

[508] Dembo, R. S. Large-scale nonlinear optimization. In Powell, M. J. D., editor, *Nonlinear Optimization 1981*, pages 361–372. Academic Press, 1982.

[509] Dembo, R. S. NLPNET : A code for nonlinear network optimization problems. Working Paper Series B-70, Yale Univ., New Haven, 1983.

[510] Dembo, R. S. Solving box-constrained quadratic programming problems on a vector processor. Tech. Report, Dept. of Computer Science, Univ. of Toronto, Canada, 1987.

[511] Dembo, R. S., Eisenstat, S. C., and Steihaug, T. Inexact Newton methods. *SIAM J. Numer. Anal.*, 19:400–408, 1982.

[512] Dembo, R. S. and Tulowitzki, U. On the minimization of quadratic functions subject to box constraints. Working Paper 71, School of Organization and Management, Yale Univ., New Haven, CT, 1983.

[513] Demidovich, B. P. and Maron, I. A. *Computational Mathematics*. Mir Publishers, 1976.

[514] Demmel, J. W., Gilbert, J. R., and Li, X. S. *SuperLU "User's Guide"*, 1995.

[515] Eisenstat, S. C. Demmel, J. W., Gilbert, J. R., Li, X. S., and Liu, J. W. H. A supernodal approach to sparse partial pivoting. Tech. Report CSL-95-03, XEROX Palo Alto Research Center, 1995.

[516] Denis-Papin, M. and Kaufmann, A. *Cours de Calcul Matriciel*. Albin Michel, 1953.

[517] Denning, P. J. Virtual memory. *ACM Computing Surveys*, 2:153–189, 1970.

[518] Dennis, J. E. Jr. and Moré, J. Quasi-Newton methods, motivation and theory. *SIAM Review*, 19:46–89, 1974.

[519] Dennis, J. E. Jr. and Schnabel, R. B. *Numerical Methods for Unconstrained Optimization and Nonlinear Equations*. Prentice-Hall, 1983.

[520] Dennis, J. E. Jr. and Schnabel, R. B. A view of unconstrained optimization. In Nemhauser, G. L., Rinnooy Kan, A., and Todd, M. J., editors, *Handbooks in Operations Research and Management Science, volume 1 : Optimization*, chapter 1, pages 1–72. North-Holland, 1989.

[521] Dennis, J. E. Jr. and Torczon, V. Direct search methods on parallel machines. *SIAM J. Optimization*, 1(4):448–474, 1991.

[522] Dennis, J. E. Jr. and Turner, K. Generalized conjugate directions. *Lin. Alg. Appl.*, 88:187–209, 1987.

[523] Deo, N. *Graph Theory with Applications to Engineering and Computer Science*. Prentice-Hall, 1974.

[524] Deo, N., Krishnamoorty, M. S., and Langston, M. A. Exact and approximate solutions for the gate matrix layout problem. *IEEE Trans. on Computer Aided Design*, 6:79–84, 1987.

[525] DeRosa, J., Glackemeyer, R., and Knight, T. Design and implementation of the VAX 8600 pipeline. *Computer*, 18(5):38–48, 1985.

[526] Dijkstra, E. W. A note on two problems in connection with graphs. *Numerical Mathematics*, 1(5):269–271, 1959.

[527] Dijkstra, E. W. GOTO statements considered harmful. *Comm. ACM*, 11:147–148, 1968.

[528] Dijkstra, E. W. *A Discipline of Programming.* Prentice-Hall, 1976.

[529] Dikin, I. I. Iterative solution of problems of linear and quadratic programming. In *Doklady Akademii Nauk SSSR 174*, pages 747–748, 1967. (Translated from Russian in Soviet Mathematics Doklady, 8:674–675).

[530] Dikin, I. I. On the convergence of an iterative process. *Upravlyaemye Sistemii*, 12:54–60, 1974. (In Russian).

[531] Director, S. W. A survey of decomposition techniques for analysis and design of electrical networks. In Himmelblau, D. M., editor, *Decomposition of Large Scale Problems*, pages 93–118. North-Holland, 1973.

[532] Ditzel, D. R. and McLellan, H. R. Branch folding in the CRISP microprocessor : Reducing the branch delay to zero. In *Proc.* 14^{th} *Symposium on Computer Architecture*, pages 2–7, Pittsburgh, 1987.

[533] Dixon, L. C. W. Global optima without convexity. Tech. Report, Numerical Optimization Centre, Hatfield Polytechnic, 1978.

[534] Dixon, L. C. W. The place of parallel computation in numerical optimization – I : The local problem. Tech. Report 118, Numerical Optimization Centre, The Hatfield Polytechnic, 1981.

[535] Dixon, L. C. W. and Szegö, G. P. *Towards Global Optimization*, volume 1. North-Holland, 1975.

[536] Dixon, L. C. W. and Szegö, G. P. *Towards Global Optimization, volume 2.* North-Holland, 1978.

[537] Dixon, P. B., Parmenter, B. R., Sutton, J., and Vincent, D. P. *ORANI : A Multisectoral Model of the Australian Economy.* North-Holland, 1982.

[538] Djidjev, H. N. and Gilbert, J. R. Separators in graphs with negative and multiple vertex weights. Tech. Report CSL-90-08, XEROX Palo Alto Research Center, 1990. (Revised at Tech. Report CSL-92-07).

[539] do Carmo, M. P. *Riemannian Geometry.* Birkhäuser Verlag, Boston, 1992.

[540] Dobbie, J. M. A survey of search theory. *Operations Res.*, 16:525–537, 1968.

[541] Dodson, D. S., Grimes, R. G., and Lewis, J. G. Algorithm 692 : Model implementation and test package for the sparse Basic Linear Algebra Subprograms. *ACM Trans. Math. Software*, 17(2):264–272, 1991.

[542] Dodson, D. S., Grimes, R. G., and Lewis, J. G. Sparse extensions to the FORTRAN Basic Linear Algebra Subprograms. *ACM Trans. Math. Software*, 17(2):253–263, 1991.

[543] Dodson, D. S. and Lewis, J. G. Issues relating to the extension of the Basic Linear Algebra subprograms. *ACM SIGNUM Newsletter*, 20(1):2–18, 1985.

[544] Dold, A. and Eckmann, B., editors. *Proc. of the Symposium on Constructive and Computational Methods for Differential Equations*. Springer-Verlag, 1974.

[545] Dommel, H. W. A method for solution of transient phenomena in multiphase systems. In *Power System Computation Conference*, Stockholm, 1966.

[546] Dommel, H. W. et al. Further developments in Newton's method for power system applications. Paper 70-CP-161, Bonneville Power Administration, 1970. (Presented at IEEE Winter Power Meeting, New York).

[547] Dommel, H. W. and Tinney, W. F. Optimal power flow solutions. *IEEE Trans. Power Apparatus and Systems*, PAS-88(10):1866–1876, 1969.

[548] Dongarra, J. J. A survey of high performance computers. In *COMPCON*, pages 8–11. IEEE, 1986.

[549] Dongarra, J. J., editor. *Experimental Parallel Computing Architectures*. North-Holland, 1987.

[550] Dongarra, J. J. Performance of various computers using standard linear equations software in a FORTRAN environment. Tech. Report CS-89-85, Univ. of Tennessee, 1990.

[551] Dongarra, J. J. NA-NET is up and running at Oak Ridge National Laboratory. *SIAM News*, 24(2):22, 1991.

[552] Dongarra, J. J., Du Croz, J., Duff, I. S., and Hammarling, S. A set of level 3 Basic Linear Algebra Subprograms. *ACM Trans. Math. Software*, 16:1–17, 1990.

[553] Dongarra, J. J., Du Croz, J., Hammarling, S., and Hanson, R. An extended set of FORTRAN Basic Linear Algebra Subroutines. *ACM Trans. Math. Software*, 14:1–32, 1988.

[554] Dongarra, J. J. and Duff, I. S. Performance of vector computers for direct and indirect addressing in FORTRAN. Tech. Report, Harwell Laboratory, 1986.

[555] Dongarra, J. J. and Duff, I. S. Advanced architecture computers. Tech. Report CS-89-90, Univ. of Tennessee, 1989.

[556] Dongarra, J. J., Duff, I. S., Sorensen, D. C., and van der Vorst, H. A. *Solving Linear Systems on Vector and Shared Memory Computers*. SIAM Publications, 1991.

[557] Dongarra, J. J. and Eisenstat, S. C. Squeezing the most out of an algorithm in CRAY FORTRAN. *ACM Trans. Math. Software*, 10(3):219–230, 1984.

[558] Dongarra, J. J. et al. *LINPACK "User's Guide"*. SIAM Publications, 1979.

[559] Dongarra, J. J. and Grosse. E. Distribution of mathematical software via electronic mail. *Comm. ACM*, 30(5):403–407, 1987.

[560] Dongarra, J. J., Gustavson, F. G., and Karp, A. H. Implementing linear algebra algorithms for dense matrices on a vector pipeline machine. *SIAM Review*, 26:91–112, 1984.

[561] Dongarra, J. J. and Hinds, A. R. Unrolling loops in FORTRAN. *Software Practice and Experience*, 9:219–229, 1979.

[562] Dongarra, J. J, Messina, P., Sorensen, D. C., and Voigt, R. G., editors. *Proc. 4^{th} SIAM Conference on Parallel Processing for Scientific Computing.* SIAM Publications, 1990.

[563] Dongarra, J. J. and Sorensen, D. C. Linear algebra on high-performance computers. In Schendel, U., editor, *Proc. of Parallel Computing '85*, pages 3–32. North-Holland, 1986.

[564] Dongarra, J. J. and Sorensen, D. C. A fully parallel algorithm for the symmetric eigenvalue problem. *SIAM J. Sci. and Stat. Comput.*, 8:s139–s154, 1987.

[565] Dongarra, J. J., Sorensen, D. C., Connolly, K., and Patterson, J. Programming methodology and performance issues for advanced computer architectures. *Parallel Computing*, 8:41–58, 1988.

[566] Dorn, W. S. and McCracken, D. D. *Numerical Methods with FORTRAN IV Case Studies.* John Wiley & Sons, 1972.

[567] Dorr, F. W. The direct solution of the discrete Poisson equation on a rectangle. *SIAM Review*, 12:248–263, 1970.

[568] Dorr, F. W. The direct solution of the discrete Poisson equation in $O(n^2)$ operations. *SIAM Review*, 17:412–415, 1975.

[569] Du Croz, J. J., Nugent, S. M., Reid, J. K., and Taylor, D. B. Algorithm 578 : Solution of real linear equations in a paged virtual store. *ACM Trans. Math. Software*, 7(4):537–551, 1981.

[570] Du Croz, J. J., Nugent, S. M., Reid, J. K., and Taylor, D. B. Solving large full sets of linear equations in a paged virtual store. *ACM Trans. Math. Software*, 7(4):527–536, 1981.

[571] Duff, I. S. Network analysis and graph theory, 1970. (Dissertation for Dipl. Adv. Math., Oxford Univ.).

[572] Duff, I. S. *Analysis of Sparse Systems.* PhD thesis, Oxford Univ., England, 1972. (Chapters: On a Factored Form of the Inverse for Sparse Matrices, Selecting a Maximal Transversal).

[573] Duff, I. S. On the number of nonzeros added when Gaussian elimination is performed on sparse random matrices. *Math. of Computation*, 28(125):219–230, 1974.

[574] Duff, I. S. On algorithms for obtaining a maximum transversal. Tech. Report CSS-49, Harwell Laboratory, 1976.

[575] Duff, I. S. MA28 : A set of FORTRAN subroutines for sparse unsymmetric linear equations. Tech. Report R-8730, HMSO, AERE Harwell Laboratory, 1977.

[576] Duff, I. S. A survey of sparse matrix research. *Proc. of the IEEE*, 65(4):500–535, 1977.

[577] Duff, I. S. Some current approaches to the solution of large sparse systems of linear equations. Tech. Report CSS-65, Harwell Laboratory, 1978.

[578] Duff, I. S. Practical comparisons of codes for the solution of sparse linear systems. In Duff, I. S. and Stewart, G. W., editors, *Sparse Matrix Proceedings 1978*, pages 107–134. SIAM Publications, 1979.

[579] Duff, I. S. Recent developments in the solution of large sparse linear equations. Tech. Report CSS-80, AERE, Harwell Laboratory, 1980.

[580] Duff, I. S. Recent developments in the solution of large sparse linear equations. In Glowinski, R. and Lions, J. L., editors, *Computing Methods in Applied Sciences and Engineering*, pages 407–426. North-Holland, 1980.

[581] Duff, I. S. Algorithm 575 : Permutations for a zero-free diagonal. *ACM Trans. Math. Software*, 7(3):387–390, 1981.

[582] Duff, I. S. Full matrix techniques in sparse Gaussian elimination. Tech. Report CSS-114, AERE, Harwell Laboratory, 1981.

[583] Duff, I. S. MA32 : A package for solving sparse unsymmetric systems using the frontal method. Tech. Report R-10079, HMSO, AERE Harwell Laboratory, 1981.

[584] Duff, I. S. ME28 : A sparse unsymmetric linear equation solver for complex equations. *ACM Trans. Math. Software*, 7(4):505–511, 1981.

[585] Duff, I. S. On algorithms for obtaining a maximum transversal. *ACM Trans. Math. Software*, 7(3):315–330, 1981.

[586] Duff, I. S. A sparse future. In Duff, I. S., editor, *Sparse Matrices and Their Uses*, pages 1–29. Academic Press, 1981.

[587] Duff, I. S., editor. *Sparse Matrices and Their Uses*. Academic Press, 1981.

[588] Duff, I. S. MA27 : A set of FORTRAN subroutines for sparse symmetric linear equations. Tech. Report R-10533, HMSO, AERE Harwell Laboratory, 1982.

[589] Duff, I. S. Research directions in sparse matrix computations. Tech. Report AERE-R-10547, AERE, Harwell Laboratory, 1982.

[590] Duff, I. S. The solution of sparse linear equations on the CRAY-1. *CRAY Channels*, 4(3), 1982.

[591] Duff, I. S. A survey of sparse matrix software. Tech. Report R-10512, Computer Science and Systems Division, AERE Harwell Laboratory, Oxfordshire, 1982.

[592] Duff, I. S. Enhancements to the MA32 package for solving sparse unsymmetric equations. Tech. Report R-11009, HMSO, London, 1983.

[593] Duff, I. S. Data structures, algorithms and software for sparse matrices. Tech. Report 84-1846, Harwell Laboratory, 1984.

[594] Duff, I. S. Design features of a frontal code for solving sparse unsymmetric linear systems out of core. *SIAM J. Sci. and Stat. Comput.*, 5(2):270–280, 1984.

[595] Duff, I. S. Direct methods for solving sparse systems of linear equations. *SIAM J. Sci. and Stat. Comput.*, 5(3):605–619, 1984.

[596] Duff, I. S. The solution of sparse linear equations on the CRAY-1. In Kowalik, J. S., editor, *Proceedings of the NATO Workshop on High Speed Computation, West Germany*, volume F-7 of *NATO ASI Series*, pages 293–309. Springer-Verlag, 1984.

[597] Duff, I. S. Data structures, algorithms and software for sparse matrices. In Evans, D. J., editor, *Sparsity and its Applications*, pages 1–29. Cambridge University Press, 1985.

[598] Duff, I. S., editor. *Vector and Parallel Processors in Computational Science : Proc. 2^{nd} International Conference on Vector and Parallel Processors in Computational Science*. Elsevier Science Publishing Co., 1985.

[599] Duff, I. S. The influence of vector and parallel processors on numerical analysis. Tech. Report AERE-R-12329, Computer Science and Systems Division, Harwell Laboratory, Oxon, England, 1986.

[600] Duff, I. S. Parallel implementation of multifrontal schemes. *Parallel Computing*, 3:193–204, 1986.

[601] Duff, I. S. The parallel solution of sparse linear equations. In Handler, W., Haupt, D., Jeltsch, R., Juling, W., and Lange, O., editors, *CONPAR '86*, volume 237 of *Lecture Notes in Computer Science*, pages 18–24. Springer-Verlag, 1986.

[602] Duff, I. S. The use of vector and parallel computers in the solution of large sparse linear equations. Tech. Report AERE-R-12393, Computer Science and Systems Division, Harwell Laboratory, Oxon, England, 1986.

[603] Duff, I. S. Multiprocessing a sparse matrix code on the ALLIANT FX/8. Tech. Report CSS-210, Computer Science and Systems Division, Harwell Laboratory, Oxon, England, 1987.

[604] Duff, I. S. Direct solvers. *Computer Physics Reports*, 11:21–50, 1989.

[605] Duff, I. S. Multiprocessing a sparse matrix code on the ALLIANT FX/8. *J. Comput. Appl. Math.*, 27:229–239, 1989.

[606] Duff, I. S., Erisman, A. M., Gear, C. W., and Reid, J. K. Some remarks on inverses of sparse matrices. Tech. Report CSS-171, AERE Harwell Laboratory, 1985. (Also available as Report 51, Mathematics and Computer Science Division, Argonne National Laboratory).

[607] Duff, I. S., Erisman, A. M., and Reid, J. K. A comparison of sparsity orderings for obtaining a pivotal sequence in Gaussian elimination. *J. Inst. Math. Appl.*, 14:281–291, 1974.

[608] Duff, I. S., Erisman, A. M., and Reid, J. K. Pivot selection and row ordering in Givens reduction on sparse matrices. *Computing*, 13:239–248, 1974.

[609] Duff, I. S., Erisman, A. M., and Reid, J. K. On George's nested dissection method. *SIAM J. Numer. Anal.*, 13:686–695, 1976.

[610] Duff, I. S., Erisman, A. M., and Reid, J. K. *Direct Methods for Sparse Matrices*. Clarendon Press, Oxford, 1986.

[611] Duff, I. S., Gould, N., Lescrenier, M., and Reid, J. K. The multifrontal method in a parallel environment. Tech. Report CSS-211, Computer Science and Systems Division, Harwell Laboratory, Oxon, England, 1987. (Published at Advances in Numerical Computation, Cox, M. and Hammarling, S., eds., Oxford University Press, 1990).

[612] Duff, I. S., Grimes, R. G., and Lewis, J. G. Sparse matrix test problems. *ACM Trans. Math. Software*, 15(1):1–14, 1989.

[613] Duff, I. S., Grimes, R. G., and Lewis, J. G. "User's Guide" for the Harwell-Boeing sparse matrix collection (Release I). Tech. Report RAL-92-086, Rutherford Appleton Laboratory, 1992.

[614] Duff, I. S., Grimes, R. G., Lewis, J. G., and Poole, B. Sparse matrix test problems. *ACM SIGNUM Newsletter*, 17:22, 1982.

[615] Duff, I. S. and Gustavson, F. G. Implementations of the Hopcroft and Karp maximum matching algorithm.

[616] Duff, I. S. and Johnsson, L. The effect of orderings on the parallelization of sparse code. Tech. Memorandum, Mathematics and Computer Science Division, Argonne National Laboratory, 1986.

[617] Duff, I. S. and Johnsson, L. Node orderings and concurrency in sparse problems : An experimental investigation. In *Proc. of International Conference on Vector and Parallel Computing, Loen, Norway*, pages 2–6, 1986.

[618] Duff, I. S. and Johnsson, L. S. Node orderings and concurrency in structurally-symmetric sparse problems. In Carey, G. F., editor, *Parallel Supercomputing: Methods, Algorithms, and Applications*, pages 177–189. John Wiley & Sons, 1989.

[619] Duff, I. S. and Johnsson, S. L. Node orderings and concurrency in structurally-symmetric sparse problems. In Garey, G. F., editor, *Parallel Supercomputing : Methods, Algorithms and Applications*, pages 177–189. John Wiley & Sons, 1988.

[620] Duff, I. S., Marrone, M., and Radicati, G. A proposal for user level sparse BLAS. Tech. Report RAL-92-087, Rutherford Appleton Laboratory, 1992.

[621] Duff, I. S. and Meurant, G. The effect of ordering on preconditioned conjugate gradients. *BIT*, 29, 1989.

[622] Duff, I. S. and Reid, J. K. On the reduction of sparse matrices to condensed forms by similarity transformations. *J. Inst. Math. Appl.*, 15:217–224, 1975.

[623] Duff, I. S. and Reid, J. K. A comparison of some methods for the solution of sparse overdetermined systems of linear equations. *J. Inst. Math. Appl.*, 17:267–280, 1976.

[624] Duff, I. S. and Reid, J. K. Algorithm 529 : Permutations to block tridiagonal form. *ACM Trans. Math. Software*, 4(2):189–192, 1978.

[625] Duff, I. S. and Reid, J. K. An implementation of Tarjan's algorithm for the block triangulation of a matrix. *ACM Trans. Math. Software*, 4(2):137–147, 1978.

[626] Duff, I. S. and Reid, J. K. Performance evaluation of codes for sparse matrix problems. In Fosdick, L. D., editor, *Performance Evaluation of Numerical Software*, pages 121–135. North-Holland, 1979.

[627] Duff, I. S. and Reid, J. K. Some design features of a sparse matrix code. *ACM Trans. Math. Software*, 5(1):18–35, 1979.

[628] Duff, I. S. and Reid, J. K. Experience of sparse matrix codes on the CRAY-1. *Comput. Phys. Comm.*, 76:293–302, 1982.

[629] Duff, I. S. and Reid, J. K. The multifrontal solution of indefinite sparse symmetric linear equations. *ACM Trans. Math. Software*, 9(3):302–325, 1983.

[630] Duff, I. S. and Reid, J. K. The multifrontal solution of unsymmetric sets of linear equations. *SIAM J. Sci. and Stat. Comput.*, 5(3):633–641, 1984.

[631] Duff, I. S. and Reid, J. K. MA48: A FORTRAN code for direct solution of sparse unsymmetric linear systems of equations. Tech. Report RAL-93-072, Rutherford Appleton Laboratory, Oxon, 1993.

[632] Duff, I. S. and Reid, J. K. The design of MA48, a code for the direct solution of sparse unsymmetric linear systems of equations. *ACM Trans. Math. Software*, 1995. (To be published).

[633] Duff, I. S., Reid, J. K., Munksgaard, N., and Nielsen, H. B. Direct solution of sets of linear equations whose matrix is sparse, symmetric and indefinite. *J. Inst. Math. Appl.*, 23:235–250, 1979.

[634] Duff, I. S., Reid, J. K., and Scott, J. A. The use of low profile reduction algorithms with a frontal code. *Int. J. Numer. Meth. Eng.*, 28:2555–2568, 1989.

[635] Duff, I. S., Reid, J. K., and Scott, J. A. The use of profile reduction algorithms with a frontal code. *Int. J. Numer. Meth. in Eng.*, 28:2555–2568, 1989.

[636] Duff, I. S. and Scott, J. A. MA42: A new frontal code for solving sparse unsymmetric systems. Tech. Report RAL-93-064, Rutherford Appleton Laboratory, 1993. (To be published in reduced form at ACM Trans. Math. Software).

[637] Duff, I. S. and Scott, J. A. The use of multiple fronts in gaussian elimination. In Lewis, J., editor, *Proc. 5^{th} SIAM Conference on Applied Linear Algebra*, pages 567–571. SIAM Publications, 1994.

[638] Duff, I. S. and Stewart, G. W., editors. *Sparse Matrix Proceedings 1978*. SIAM Publications, 1979.

[639] Duff, I. S. and Wiberg, T. Remarks on implementations of $O(n^{1/2}\tau)$ assignment algorithms. *ACM Trans. Math. Software*, 14(3):267–287, 1988.

[640] Dulmage, A. L. and Mendelsohn, N. S. On the inversion of sparse matrices. *Math. of Computation*, 16:494–496, 1962.

[641] Dulmage, A. L. and Mendelsohn, N. S. Two algorithms for bipartite graphs. *SIAM J. Appl. Math.*, 11:183–194, 1963.

[642] Dunn, J. Global and asymptotic convergence rate estimates for a class of projected gradient processes. *SIAM J. Control and Optim.*, 19:368–400, 1981.

[643] Dunn, J. On the convergence of projected gradient processes to singular critical points. *J. of Optim. Theory Appl.*, 55:203–216, 1987.

[644] Dupont, T. A factorization procedure for the solution of elliptic difference equations. *SIAM J. Numer. Anal.*, 5:735–782, 1968.

[645] Dupont, T., Kendall, R. P., and Rachford, H. H. Jr. An approximate factorization procedure for the solving self-adjoint elliptic difference equations. *SIAM J. Numer. Anal.*, 5:559–573, 1968.

[646] Durand, E. *Solutions Numériques des Équations Algébriques, tome II : Systèmes de Plusieurs Équations*. Masson & Cie, 1972.

[647] Dwyer, P. S. *Linear Computations*. John Wiley & Sons, 1951.

[648] Dwyer, P. S. and Macphail, M. S. Symbolic matrix derivatives. *Ann. Math. Stat.*, 19:517–534, 1948.

[649] Eckstein, J., Qi, R., Ragulin, V. I., and Zenios, S. A. Data parallel implementations of dense linear programming algorithms. Tech. Report TMC-230, Thinking Machines Corp., Cambridge, MA, 1992. (Also available as Decision Sciences Dept. Report 92-05-06, The Warton School, Univ. of Pennsylvania).

[650] Edelmann, H. Optimal strategies for the direct solution of systems of linear equations with sparse coefficient matrices. *Math. Mech.*, 45:T13–T18, 1965.

[651] Edelmann, H. Ordered triangular factorization of matrices. In *Power System Computation Conference*, Stockholm, 1966.

[652] Edelsbrunner, H. Algorithms in combinatorial geometry. In Brauer, W., Rozenberg, G., and Salomaa, A., editors, *EATCS Monographs on Theoretical Computer Science*. Springer-Verlag, 1987.

[653] Edenbrandt, A. G. *Combinatorial Problems in Matrix Computation*. PhD thesis, Cornell Univ., 1985.

[654] Edmonds, J. Paths, trees, and flowers. *Canadian J. Math.*, 17:449–467, 1965.

[655] Edmonds, J. Optimum branchings. *J. Res. Nat. Bur. Standards*, B71:233–240, 1967.

[656] Edmonds, J. and Karp, R. M. Theoretical improvements in algorithmic efficiency for network flow problems. *J. ACM*, 19:248–264, 1972.

[657] Efimov, N. V. and Rozendorn, E. R. *Linear Algebra and Multi-Dimensional Geometry*. Mir Publishers, 1975.

[658] Eisenhart, L. *Riemannian Geometry*. Princeton University Press, 1925.

[659] Eisenstat, S. C. Complexity bounds for Gaussian elimination. Tech. Report, Yale Univ.

[660] Eisenstat, S. C. An implementation of the minimum degree algorithm. Tech. Report, Yale Univ.

[661] Eisenstat, S. C. Efficient implementation of a class of preconditioned conjugate gradient methods. *SIAM J. Sci. and Stat. Comput.*, 2:1–4, 1981.

[662] Eisenstat, S. C., Elman, H. C., and Schultz, M. H. Variational iterative methods for nonsymmetric systems of linear equations. *SIAM J. Numer. Anal.*, 20:345–357, 1983.

[663] Eisenstat, S. C., George, A., Grimes, R., Kincaid, D., and Sherman, A. H. Some comparisons of software packages for large sparse linear systems. In Vichnevetsky, R. and Stepleman, editors, *Advances in Computer Methods for Partial Differential Equations III*, pages 98–106. Publ. IMACE, 1979.

[664] Eisenstat, S. C., Gursky, M. C., Schultz, M. H., and Sherman, A. H. Yale Sparse Matrix Package (YSMP) – II : The non-symmetric codes. Tech. Report 114, Dept. of Computer Science, Yale Univ., 1977.

[665] Eisenstat, S. C., Gursky, M. C., Schultz, M. H., and Sherman, A. H. Yale Sparse Matrix Package (YSMP) – I : The symmetric codes. *Int. J. Numer. Meth. in Eng.*, 18:1145–1151, 1982.

[666] Eisenstat, S. C., Heath, M., Henkel, C., and Romine, C. Modified cyclic algorithms for solving triangular systems on distributed-memory multiprocessors. *SIAM J. Sci. and Stat. Comput.*, 9:589–600, 1988.

[667] Eisenstat, S. C. and Liu, J. W. H. Exploiting structural symmetry in unsymmetric sparse symbolic factorization. *SIAM J. Matrix Anal. and Appl.*, 13(1):202–211, 1992.

[668] Eisenstat, S. C. and Liu, J. W. H. Exploiting structural symmetry in a sparse partial pivoting code. *SIAM J. Sci. and Stat. Comput.*, 14:253–257, 1993. (Presented at 4^th SIAM Conference on Applied Linear Algebra, Minneapolis, 1991).

[669] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Minimal storage band elimination. Tech. Report, Yale Univ.

[670] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Minimal storage sparse elimination. Tech. Report, Yale Univ.

[671] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Subroutines for the efficient implementation of sparse Gaussian elimination. Tech. Report, Yale Univ.

[672] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. The application of sparse matrix methods to the numerical solution of nonlinear elliptic partial differential equations. In Dold, A. and Eckmann, B., editors, *Proc. of the Symposium on Constructive and Computational Methods for Differential Equations*. Springer-Verlag, 1974.

[673] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. The application of sparse matrix methods to the numerical solution of nonlinear elliptic partial differential equations. In Dold, A. and Eckmann, B., editors, *Proc. of the Symposium on Constructive and Computational Methods for Differential Equations*, pages 131–153. Springer-Verlag, 1974.

[674] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Application of sparse matrix methods to partial differential equations. In Vichnevetsky, R., editor, *Proc. AICA International Symposium on Computer Methods for Partial Differential Equations, Bethlehem*, pages 40–45. Prentice-Hall, 1975.

[675] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Efficient implementation of sparse symmetric Gaussian elimination. In Vichnevetsky, R., editor, *Proc. AICA International Symposium on Computer Methods for Partial Differential Equations, Bethlehem*, pages 33–39. Prentice-Hall, 1975.

[676] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Applications of an element model for Gaussian elimination. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*, pages 85–96. Academic Press, 1976.

[677] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Considerations in the design of software for sparse Gaussian elimination. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, 1976.

[678] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Software for sparse Gaussian elimination with limited core storage. In Duff, I. S. and Stewart, G. W., editors, *Sparse Matrix Proceedings 1978*, pages 135–153. SIAM Publications, 1979.

[679] Eisenstat, S. C., Schultz, M. H., and Sherman, A. H. Algorithms and data structures for sparse symmetric Gaussian elimination. *SIAM J. Sci. and Stat. Comput.*, 2(2):225–237, 1981.

[680] Eisenstat, S. C. and Sherman, A. H. Subroutines for envelope solution of sparse linear systems. Tech. Report 35, Dept. of Computer Science, Yale Univ., New Haven, 1974.

[681] Elliot, D. L. A note on systems of linear equations. *SIAM Review*, 3:66–69, 1961.

[682] Elmaghraby, S. E. An algebra for the analysis of generalized activity networks. *Management Science*, 10:494–514, 1964.

[683] Elman, H. A stability analysis of incomplete LU factorization. *Math. of Computation*, 47:191–218, 1986.

[684] Enbody, R. J and Du, H. C. Dynamic hashing schemes. *ACM Computing Surveys*, 20(2):85–113, 1988.

[685] Enns, M. K., Tinney, W. F., and Alvarado, F. L. Sparse matrix inverse factors. *IEEE Trans. Power Systems*, PWRS-5:466–473, 1990.

[686] Erisman, A. M. Sparse matrix approach to frequency domain analysis of linear passive electrical networks. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 31–40. Plenum Press, New York, 1972.

[687] Erisman, A. M., Grimes, R. G., Lewis, J. G., and Poole, W. G. Jr. A structurally stable modification of Hellerman-Rarick's P^4 algorithm for reordering unsymmetric sparse matrices. *SIAM J. Numer. Anal.*, 22:369–385, 1985.

[688] Erisman, A. M., Grimes, R. G., Lewis, J. G., Poole, W. G. Jr., and Simon, H. D. Evaluation of orderings for unsymmetric sparse matrices. *SIAM J. Sci. and Stat. Comput.*, 7:600–624, 1986.

[689] Erisman, A. M., Neves, K. W., and Dwarakanath, M. H., editors. *Electric Power Problems : The Mathematical Challenge.* SIAM Publications, 1980.

[690] Erisman, A. M. and Spies, G. E. Exploiting problem characteristics in the sparse matrix approach to frequency domain analysis. *IEEE Trans. Circuit Theory*, CT-19:260–269, 1972.

[691] Erisman, A. M. and Tinney, W. F. On computing certain elements of the inverse of a sparse matrix. *Comm. ACM*, 18:177–179, 1975.

[692] Eskow, E. and Schnabel, R. B. Software for a new modified Cholesky factorization. *ACM Trans. Math. Software*, 17(3):306–312, 1991.

[693] Estrin, G., Bussel, B., Turn, R., and Bibb, J. Parallel processing on a restructurable computer system. *IEEE Trans. Electronic Computers*, EC-12:747–754, 1963.

[694] Estrin, G. and Turn, R. Automatic assignment of computations in a variable structure computer system. *IEEE Trans. Electronic Computers*, EC-12:755–773, 1963.

[695] Eufinger, J. Operations on directed graphs. *J. Reine Angew Math.*, 247:146–154, 1971.

[696] Evans, D. J. The extrapolated modified Aitken iteration method for solving elliptic difference equations. *Computing J.*, 6:193–201, 1963.

[697] Evans, D. J., editor. *Software for Numerical Mathematics.* Academic Press, 1974.

[698] Evans, D. J. On the numerical solution of sparse systems of finite element equations. In Whiteman, J., editor, *The Mathematics of Finite Elements & Applications – III, Mafelap 1978 Conference Proceedings*, pages 448–458. Academic Press, 1979.

[699] Evans, D. J., editor. *Sparsity and its Applications.* Cambridge University Press, 1985.

[700] Eve, J. On computing the transitive closure of a relation. Tech. Report STAN-CS-75-508, Computer Science Dept., Stanford Univ., 1975.

[701] Even, S. *Graph Algorithms.* Computer Science Press, 1979.

[702] Even, S. and Kariv, O. An $O(n^{5/2})$ algorithm for maximum matching in general graphs. Tech. Report, Weizmann Institute, Israel, 1975.

[703] Even, S. and Tarjan, R. E. Network flow and testing graph connectivity. *SIAM J. Comput.*, 4:507–518, 1975.

[704] Everstine, G. C. A comparison of three resequencing algorithms for the reduction of matrix profile and wavefront. *Int. J. Numer. Meth. Eng.*, 14:837–853, 1979.

[705] Faddeev, D. K. and Faddeeva, V. H. *Computational Methods of Linear Algebra.* Freeman & Co., 1963. (Translated from the Russian original).

[706] Faddeeva, V. H. *Computational Methods of Linear Algebra.* Dover Publications, 1959. (Translated from the 1950 Russian edition).

[707] Falkoff, A. D. Algorithms for parallel search memories. *J. ACM*, 9:488–501, 1962.

[708] Farkas, J. Theorie der einfachen Ungleichungen. *Journal für die reine und angewandte Mathematik*, 124:1–27, 1902.

[709] Faybusovich, L. Hamiltonian structure of dynamical systems which solve linear programming problems. *Physics*, D53:217–232, 1991.

[710] Federenko, R. P. A relaxation method for solving elliptic difference equations. *USSR Comp. Math. and Math. Phys.*, 4:1092, 1961. (Originally published at Zh. Vych. Mat., 1:922–927, 1961).

[711] Feingold, D. G. and Varga, R. S. Block diagonally dominant matrices and generalizations of the Gerschgorin circle. *Pacific J. Math.*, 12:1241–1250, 1963.

[712] Felippa, C. A. and Clough, R. W. The finite element method in solid mechanics. In Birkhoff, G. and Varga, R. S., editors, *Numerical Solution of Field Problems in Continuum Physics*, pages 210–252. American Math. Soc., Providence, 1970.

[713] Fellipa, C. A. Solution of linear equations with skyline-stored symmetric matrix. *Computer and Structures*, 5:13–29, 1975.

[714] Fenichel, R. R. and Yochelson, J. C. A LISP garbage-collector for virtual memory computer systems. *Comm. ACM*, 12:611–612, 1969.

[715] Fenves, S. J. STRESS : Structural Engineering System Solver, A computer programming system for structural engineering problems. Tech. Report T-63-2, MIT, 1963.

[716] Fenves, S. J. *Computer Methods in Civil Engineering.* Prentice-Hall, 1967.

[717] Fenves, S. J. and Branin, F. H. Jr. A network-topological formulation of structural analysis. *J. Amer. Soc. Civil Engrs., Structural Division*, 89:483–514, 1963.

[718] Fenves, S. J., Perrone, N., Robinson, A. R., and Schnobrich, W. C., editors. *Numerical and Computer Methods in Structural Mechanics.* Academic Press, 1973.

[719] Feo, J. An analysis of the computational and parallel complexity of the Livermore loops. *Parallel Computing*, 7:163–186, 1988.

[720] Feuer, A. R. and Gehani, N., editors. *Comparing and Assessing Programming Languages ADA, C, and PASCAL.* Prentice-Hall, 1984.

[721] Fiacco, A. V. and McCormick, G. P. *Nonlinear Programming : Sequential Unconstrained Minimization Techniques.* John Wiley & Sons, 1968. (Republished by SIAM Publications, 1990).

[722] Fiedler, M. Algebraic connectivity of graphs. *Czech. Math. J.*, 23:298–305, 1973.

[723] Fiedler, M. A property of eigenvectors of non-negative symmetric matrices and its application to graph theory. *Czech. Math. J.*, 25:619–633, 1975.

[724] Fiedler, M. Inversion of bigraphs and connection with the gauss elimination. In *Graphs, Hypergraphs, and Block Systems*, pages 57–68. Zielona Gora, Czechoslovakia, 1976.

[725] Fike, C. T. *Computer Evaluation of Mathematical Functions.* Prentice-Hall, 1968.

[726] Fischer, H. and Ritter, K. An asynchronous parallel Newton method. *Math. Programming*, 42(2):363–374, 1988.

[727] Fisher, J. A. Trace scheduling : A technique for global microcode compaction. *IEEE Trans. Comput.*, C-30(7):478–490, 1981.

[728] Fisher, J. A. Very long instruction word architectures and ELI-512. In *Proc.* 10^{th} *Symposium on Computer Architecture*, pages 140–150, Stockholm, 1983.

[729] Fletcher, R., editor. *Optimization.* Academic Press, 1969.

[730] Fletcher, R. *Practical Methods of Optimization, volume 1 : Unconstrained Optimization.* John Wiley & Sons, 1980.

[731] Fletcher, R. *Practical Methods of Optimization, volume 2 : Constrained Optimization.* John Wiley & Sons, 1981.

[732] Fletcher, R. and Powell, M. J. D. A rapidly convergent descent method for minimization. *Computing J.*, 6:163–168, 1965.

[733] Fletcher, R. and Powell, M. J. D. On the modification of LDL^T factorizations. *Math. of Computation*, 28(128):1067–1087, 1974.

[734] Floyd, R. W. Algorithm 96 : Ancestor. *Comm. ACM*, 5:344–345, 1962.

[735] Floyd, R. W. Algorithm 97 : Shortest Path. *Comm. ACM*, 5:345, 1962.

[736] Floyd, R. W. Algorithm 245 : Treesort 3. *Comm. ACM*, 7:701, 1964.

[737] Flynn, M. Very high speed computing systems. *Proc. of the IEEE*, 54:1901–1909, 1966.

[738] Ford, B. Parameterization of the environment for transportable numerical software. *ACM Trans. Math. Software*, 4(2):100–103, 1978.

[739] Ford, L. R. and Fulkerson, D. R. Maximal flow through a network. *Canadian J. Math.*, 8:399–404, 1956.

[740] Ford, L. R. and Fulkerson, D. R. *Flows in Networks.* Princeton Univ. Press, 1962.

[741] Forrest, J. J. H. and Goldfarb, D. Steepest-edge simplex algorithms for linear programming. *Math. Programming*, 57:341–374, 1992.

[742] Forrest, J. J. H. and Tomlin, J. A. Updating triangular factors of the basis to maintain sparsity in the product-form simplex method. *Math. Programming*, 2:263–278, 1972.

[743] Forrest, J. J. H. and Tomlin, J. A. Vector processing in simplex and interior methods for linear programming. Tech. Report RJ-6390-62372, IBM Thomas J. Watson Research Center, Yorktown Heights, 1988.

[744] Forrest, J. J. H. and Tomlin, J. A. Vector processing in simplex and interior methods for linear programming. *Annals of Oper. Res.*, 22:71–100, 1990.

[745] Forrest, J. J. H. and Tomlin, J. A. What makes a linear programming difficult ? (Presented at ORSA/TIMS Joint National Meeting, San Francisco), 1992.

[746] Forsgren, A. L. and Murray, W. Newton methods for large-scale linear equality-constrained minimization. Tech. Report SOL-90-6, Dept. of Oper. Research, Stanford Univ., 1990.

[747] Forsythe, G. E. Algorithm 16 : Crout with pivoting. *Comm. ACM*, 3:507–508, 1960.

[748] Forsythe, G. E. Today's computational methods of linear algebra. *SIAM Review*, 9:489–515, 1967.

[749] Forsythe, G. E., Malcolm, M. A., and Moler, C. B. *Computer Methods for Mathematical Computations.* Prentice-Hall, 1977.

[750] Forsythe, G. E. and Moler, C. B. *Computer Solution of Linear Algebraic Systems.* Prentice-Hall, 1967.

[751] Forsythe, G. E. and Strauss, E. G. On best conditioned matrices. *Proc. of the AMS*, 6:340–345, 1955.

[752] Forsythe, G. E. and Wasow, W. R. *Finite Difference Methods for Partial Differential Equations.* John Wiley & Sons, 1960.

[753] Fortet, R. *Algèbre des Tenseurs et des Matrices, Problèmes de Valeurs Propres.*

[754] Fosdick, L. D., editor. *Performance Evaluation of Numerical Software.* North-Holland, 1979.

[755] Fosdick, L. D., Jessup, E. R., Schauble, C. J. C., and Domik, G. *An Introduction to High-Performance Scientific Computing.* MIT Press, 1995.

[756] Fourer, R. and Mehrotra, S. Performance of an augmented system approach for solving least-squares problems in an interior point method. *COAL Newsletter*, 19:26–31, 1991.

[757] Fourer, R. and Mehrotra, S. Solving symmetric indefinite systems in an interior point method for linear programming. Tech. Report 92-01, Dept. of Industrial Eng. and Manag. Sciences, Northwestern Univ., Evanston, 1992.

[758] Fourier, J. B. J. Solution d'une question particulière du calcul des inégalités. *Noveau Bulletin des Sciences par la Société Philomathique de Paris*, pages 99–100, 1826.

[759] Fox, B. L. Accelerating LP algorithms. *Comm. ACM*, 12:384–385, 1969.

[760] Fox, G. C. et al. FORTRAN D Language specification. Tech. Report TR-90-141, Computer Science Dept., Rice Univ., 1990.

[761] Fox, G. C., Johnson, M. A., Lyzenga, G. A., Otto, G. A., Salomon, J. K., and Walker, D. W. *Solving Problems on Concurrent Processors*. Prentice-Hall, 1988.

[762] Fox, L., editor. *Numerical Solution of Ordinary and Partial Differential Equations*. Addison-Wesley, 1962.

[763] Fox, L. *An Introduction to Numerical Linear Algebra*. Oxford University Press, 1965.

[764] Franck, H. and Fisch, I. T. *Communications, Transmission and Transportation Networks*. Addison-Wesley, 1971.

[765] Frazer, R. A., Duncan, W. J., and Collar, A. R. *Elementary Matrices*. Cambridge, 1950.

[766] Freiman, C. V., editor. *Information Processing 71, Proc. IFIP Congress*, Ljubljana, 1972. North-Holland.

[767] Frisch, K. The logarithmic potential method of convex programming. Internal Memorandum, University Institute of Economics, Olso, 1989.

[768] Fröberg, C. E. *Introduction to Numerical Analysis*. Addison-Wesley, 2^{nd} edition, 1969.

[769] Fulkerson, D. R. and Wolfe, P. An algorithm for scaling matrices. *SIAM Review*, 4:142–146, 1962.

[770] Gabay, D. Minimizing a differentiable function over a differential manifold. *JOTA*, 37(2):177–218, 1982.

[771] Gabow, H. N. *Implementation of Algorithms for Maximum Matching on Nonbipartite Graphs*. PhD thesis, Dept. of Electrical Eng., Stanford Univ., 1973.

[772] Gabow, H. N. An efficient implementation of Edmond's algorithm for maximum matching on graphs. *J. ACM*, 23:221–234, 1976.

[773] Gabow, H. N., Galil, Z., Spencer, T., and Tarjan, R. E. Efficient algorithms for finding minimum spanning trees in undirected and directed graphs. *Combinatorica*, 6:109–122, 1986.

[774] Gabow, H. N. and Tarjan, R. E. A linear time algorithm for a special case of disjoint set union. In *Proc. 15^{th} Annual ACM Symposium on Theory of Computing*, pages 246–251, 1983.

[775] Gabow, H. N. and Tarjan, R. E. A linear time algorithm for a special case of disjoint set union. *J. Comput. Syst. Sci.*, 30:209–221, 1985.

[776] Gallagher, R. H. *Finite Element Analysis Fundamentals.* Prentice-Hall, 1975.

[777] Gallivan, K. A., Heath, M. T., Ng, E., Ortega, J., Peyton, B., Plemmons, R., Romine, C., Sameh, A., and Voigt, R. *Parallel Algorithms for Matrix Computations.* SIAM Publications, 1990.

[778] Gallivan, K. A., Jalby, W., Meier, U., and Sameh, A. H. Impact of hierarchical memory systems on linear algebra algorithm design. *Int. J. of Supercomputer Appl.*, 2:12–48, 1988.

[779] Gallivan, K. A., Plemmons, R. J., and Sameh, A. H. Parallel algorithms for dense linear algebra computations. *SIAM Review*, 32(1):54–135, 1990.

[780] Gannon, D. Restructuring nested loops on the ALLIANT CEDAR cluster : A case study of Gaussian elimination of banded matrices. Tech. Report 543, Center for Supercomputing Research and Development, Univ. of Illinois at Urbana-Champaign, 1986.

[781] Gantmacher, F. R., editor. *Matrizenrechnung – I.* Berlin, 1958.

[782] Gantmacher, F. R. *The Theory of Matrices, volume 2.* Chelsea, New York, 1959.

[783] Garabedian, P. R., editor. *Partial Differential Equations.* John Wiley & Sons, 1964.

[784] Garcia, C. B. and Zangwill, W. I. *Pathways to Solutions, Fixed Points, and Equilibria.* Prentice-Hall, 1981.

[785] Garey, M. R. and Johnson, D. S. Some simplified NP-complete problems. In *Proc. 6^{th} Annual ACM Symposium on Theory of Computing*, pages 47–63, 1974.

[786] Garey, M. R. and Johnson, D. S. Strong NP-completeness results : Motivation, examples and implications. *J. ACM*, 25:499–508, 1978.

[787] Garey, M. R. and Johnson, D. S. *Computers and Intractability : A Guide to the Theory of NP-Completeness.* Freeman & Co., 1979.

[788] Garfinkel, R. S. and Nemhauser, G. L. *Integer Programming.* John Wiley & Sons, 1972.

[789] Garner, R., Agarwal, A., Briggs, F., Brown, E., Hough, D., Joy, B., Kleiman, S., Munchnik, S., Namjoo, M., Patterson, D., Pendleton, J., and Tuck, R. Scalable Processor Architecture (SPARC). In *COMPCON*, pages 278–283, San Francisco, 1988. IEEE.

[790] Gass, S. I. *Linear Programming : Methods and Applications.* McGraw-Hill, 1958.

[791] Gauss, K. F. *The Theory of Combination of Observations Least Subject to Errors – Part One, Part Two, Supplement.* SIAM Publications, 1995. (Translated by Stewart, G. W.).

[792] Gavril, F. Algorithms for minimum coloring, maximum clique, minimum covering by cliques and maximum independent set of a chordal graph. *SIAM J. Comput.*, 1:180–187, 1972.

[793] Gavril, F. The intersection graphs of subtrees in trees are exactly the chordal graphs. *J. Combinatorial Theory B*, 16:47–56, 1974.

[794] Gay, D. M. Computing optimal locally constrained steps. *SIAM J. Sci. and Stat. Comput.*, 2:186–197, 1981.

[795] Gay, D. M. A trust region approach to linearly constrained optimization. In Griffiths, D. F., editor, *Numerical Analysis, Proc. Dundee 1983, volume 1066 of Lecture Notes in Mathematics*. Springer-Verlag, 1984.

[796] Gay, D. M. Electronic mail distribution of linear programming test problems. *Mathematical Programming Society Committee on Algorithms Newsletter*, 13, 1985.

[797] Gay, D. M. Sparse projections in Karmarkar's linear programming algorithm. Talk presented at ORSA/TIMS Joint National Meeting, Atlanta, AT&T BELL Labs., Murray Hill, 1985.

[798] Gay, D. M. Massive memory buys little speed for complete in-core sparse Cholesky factorizations on some scalar computers. *Lin. Alg. Appl.*, 152:291–314, 1991.

[799] Gear, C. W. The automatic integration of stiff differential equations. In *Proc. IFIP Congress*, Edinburgh, 1968.

[800] Gear, C. W. *Numerical Initial Value Problems in Ordinary Differential Equations.* Prentice-Hall, 1971.

[801] Gear, C. W. Simultaneous numerical solution of differential algebraic equations. *IEEE Trans. Circuit Theory*, CT-18:89–95, 1971.

[802] Gehani, N. *ADA : An Advanced Introduction.* Prentice-Hall, 1983.

[803] Geist, G. A. Solving finite element problems with parallel multifrontal schemes. In Heath, M. T., editor, *Hypercube Multiprocessors 1987*, pages 656–661. SIAM Publications, 1987.

[804] Geist, G. A., Benguelim, A., Dongarra, J., Jiang, J., Manchek, R., and Sunderam, V. *PVM 3.0 "User's Guide" and "Reference Manual"*. Oak Ridge National Laboratory, 1993.

[805] Geist, G. A. and Heath, M. T. Parallel Cholesky factorization on a hypercube multiprocessor. Tech. Report ORNL-6211, Oak Ridge National Laboratory, 1985.

[806] Geist, G. A. and Heath, M. T. Matrix factorization on a hypercube multiprocessor. In Heath, M. T., editor, *Hypercube Multiprocessors 1986*, pages 161–180. SIAM Publications, 1986.

[807] Geist, G. A. and Ng, E. A partitioning strategy for parallel sparse Cholesky factorization. Tech. Report ORNL-TM-10937, Oak Ridge National Laboratory, 1988.

[808] Geist, G. A. and Ng, E. Task scheduling for parallel sparse Cholesky factorization. *Int. J. of Parallel Programming*, 18(4):291–314, 1989.

[809] Gentleman, W. M. Least-squares computations by Givens transformations without square roots. *J. Inst. Math. Appl.*, 12:329–336, 1973.

[810] Gentleman, W. M. Error analysis of QR decompositions by Givens transformations. *Lin. Alg. Appl.*, 10:189–197, 1975.

[811] Gentleman, W. M. and George, A. Sparse matrix software. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, New York, 1976.

[812] George, A. *Computer Implementation of the Finite Element Method.* PhD thesis, Computer Science Dept., Stanford Univ., 1971. (Report STAN-CS-71-208).

[813] George, A. Block elimination on finite element systems of equations. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 101–114. Plenum Press, New York, 1972.

[814] George, A. Nested dissection of a regular finite element mesh. *SIAM J. Numer. Anal.*, 10:345–363, 1973.

[815] George, A. On block elimination for sparse linear systems. *SIAM J. Numer. Anal.*, 11:585–603, 1974.

[816] George, A. A negative result on sparse matrix splitting and Gaussian elimination. Report, ICASE, Langley, 1975.

[817] George, A. An efficient band-oriented scheme for solving n by n grid problems. In *Proc. 1972 FJCC*, pages 1317–1321. AFIPS Press, Montvale, New Jersey, 1977.

[818] George, A. Numerical experiments using dissection methods to solve n by n grid problems. *SIAM J. Numer. Anal.*, 14:161–179, 1977.

[819] George, A. Solution of linear systems of equations : Direct methods for finite element problems. In Barker, V. A., editor, *Course in Advanced Sparse Matrix Techniques, volume 572 of Lecture Notes in Mathematics*, pages 52–101. Springer-Verlag, 1977.

[820] George, A. An automatic one-way dissection algorithm for irregular finite element problems. In *Proc. 1977 Dundee Conference on Numerical Analysis, volume 630 of Lecture Notes in Mathematics*, pages 76–89. Springer-Verlag, 1978.

[821] George, A., Gilbert, J. R., and Liu, J. W. H., editors. *Graph Theory and Sparse Matrix Computation.* Springer-Verlag, 1993.

[822] George, A., Heath, M. T., and Liu, J. W. H. Parallel Cholesky factorization on a shared memory multiprocessor. *Lin. Alg. Appl.*, 77:165–187, 1986.

[823] George, A., Heath, M. T., Liu, J. W. H., and Ng, E. Solution of sparse positive definite systems on a shared memory multiprocessor. *Int. J. of Parallel Programming*, 15:309–325, 1986.

[824] George, A., Heath, M. T., Liu, J. W. H., and Ng, E. Sparse Cholesky factorization on a local memory multiprocessor. *SIAM J. Sci. and Stat. Comput.*, 9:327–340, 1988.

[825] George, A., Heath, M. T., Liu, J. W. H., and Ng, E. Solution of sparse positive definite systems on a hypercube. *J. Comput. Applied. Math*, 27:129–156, 1989.

[826] George, A., Heath, M. T., and Ng, E. Solution of sparse undetermined systems of linear equations. *SIAM J. Sci. and Stat. Comput.*, 5(4):988–997, 1984.

[827] George, A., Heath, M. T., Ng, E., and Liu, J. W. H. Symbolic Cholesky factorization on a local-memory multiprocessor. *Parallel Computing*, 5:85–95, 1987.

[828] George, A. and Liu, J. W. H. An automatic partitioning and solution scheme for solving large sparse positive definite systems of linear algebraic equations. Tech. Report CS-75-17, Dept. of Computer Science, Univ. Waterloo, Ontario, Canada, 1975.

[829] George, A. and Liu, J. W. H. Some results and notes on fill for sparse matrices. *SIAM J. Numer. Anal.*, 12(3):452–455, 1975.

[830] George, A. and Liu, J. W. H. Algorithms for matrix partitioning and the numerical solution of finite element systems. *SIAM J. Numer. Anal.*, 15:297–327, 1978.

[831] George, A. and Liu, J. W. H. An automated nested dissection algorithm for irregular finite element problems. *SIAM J. Numer. Anal.*, 15:1053–1069, 1978.

[832] George, A. and Liu, J. W. H. The design of a user interface for a sparse matrix package. *ACM Trans. Math. Software*, 5(2):139–162, 1979.

[833] George, A. and Liu, J. W. H. An implementation of a pseudoperipheral node finder. *ACM Trans. Math. Software*, 5(3):284–295, 1979.

[834] George, A. and Liu, J. W. H. A quotient graph model for symmetric factorization. In Duff, I. S. and Stewart, G. W., editors, *Sparse Matrix Proceedings 1978*. SIAM Publications, 1979.

[835] George, A. and Liu, J. W. H. A fast implementation of the minimum degree algorithm using quotient graphs. *ACM Trans. Math. Software*, 6(3):337–358, 1980.

[836] George, A. and Liu J. W. H. A minimal storage implementation of the minimum degree algorithm. *SIAM J. Numer. Anal.*, 17(2):282–299, 1980.

[837] George, A. and Liu, J. W. H. An optimal algorithm for symbolic factorization of symmetric matrices. *SIAM J. Comput.*, 9(3):583–593, 1980.

[838] George, A. and Liu, J. W. H. *Computer Solution of Large Positive Definite Systems*. Prentice-Hall, 1981.

[839] George, A. and Liu, J. W. H. The evolution of the minimum degree ordering algorithm. *SIAM Review*, 31(1):1–19, 1989.

[840] George, A., Liu, J. W. H., and Ng, E. Row ordering schemes for sparse Givens transformations – I : Bipartite graph model. *Lin. Alg. Appl.*, 61:55–81, 1984.

[841] George, A., Liu, J. W. H., and Ng, E. Communication reduction in parallel sparse Cholesky factorization. In *Proc.* 2^{nd} *Hypercube Conference*, Knoxville, 1986.

[842] George, A., Liu, J. W. H., and Ng, E. Row ordering schemes for sparse Givens transformations – II : Implicit graph model. *Lin. Alg. Appl.*, 75:203–223, 1986.

[843] George, A., Liu, J. W. H., and Ng, E. Communication results for parallel sparse Cholesky factorization on a hypercube. *Parallel Computing*, 10:287–298, 1989.

[844] George, A. and McIntyre, D. On the application of the minimum degree algorithm to finite element systems. *SIAM J. Numer. Anal.*, 15:90–112, 1978.

[845] George, A. and McIntyre, D. On the application of the minimum degree algorithm to finite element systems. *SIAM J. Numer. Anal.*, 15:90–111, 1978.

[846] George, A. and Ng, E. SPARSPAK : Waterloo sparse matrix package "User's Guide" for SPARSPAK-B. Research Report CS-84-37, Dept. of Computer Science, Univ. of Waterloo, 1984.

[847] George, A. and Ng, E. Waterloo sparse matrix package "User's Guide" for SPARSPAK-B. Tech. Report CS-84-37, Univ. Waterloo, Canada, 1984.

[848] George, A. and Ng, E. An implementation of Gaussian elimination with partial pivoting for sparse systems. *SIAM J. Sci. and Stat. Comput.*, 6(2):390–409, 1985.

[849] George, A. and Ng, E. Symbolic factorization for sparse Gaussian elimination with partial pivoting. *SIAM J. Sci. and Stat. Comput.*, 8(6):877–898, 1987.

[850] George, A. and Ng, E. On the complexity of sparse QR and LU factorization of finite-element matrices. *SIAM J. Sci. and Stat. Comput.*, 9:849–861, 1988.

[851] George, A. and Ng, E. Parallel sparse Gaussian elimination with partial pivoting. *Annals of Oper. Res.*, 22:219–240, 1990.

[852] George, A., Poole, W. G. Jr., and Voigt, R. G. Analysis of dissection algorithms for vector computers. *J. Comp. and Math. with Appl.*, 4:287–304, 1978.

[853] George, A., Poole, W. G. Jr., and Voigt, R. G. Incomplete nested dissection for solving n by n grid problems. *SIAM J. Numer. Anal.*, 15:662–673, 1978.

[854] George, A. and Rashwan, H. On symbolic factorization of partitioned sparse symmetric matrices. In Björck, A., Plemmons, R. J., and Schneider, H., editors, *Large Scale Matrix Problems*, pages 145–158. North-Holland, 1981.

[855] George, A. and Rashwan, H. Auxiliary storage methods for solving finite element systems. *SIAM J. Sci. and Stat. Comput.*, 6(4):882–910, 1985.

[856] George, J. A. and Heath, M. T. Solution of sparse linear least squares problems using Givens rotations. *Lin. Alg. Appl.*, 34:69–83, 1980.

[857] Gibbons, A. and Rytter, W. *Efficient Parallel Algorithms*. Cambridge University Press, 1988.

[858] Gibbons, P. B. and Muchnik, S. S. Efficient instruction scheduling for a pipelined processor. In *SIGPLAN '86 Symposium on Compiler Construction*, pages 11–16, Palo Alto, 1986. ACM.

[859] Gibbs, N. E. *The Bandwidth of Graphs*. PhD thesis, Purdue Univ., 1969.

[860] Gibbs, N. E. Algorithm 509 : A hybrid profile reduction algorithm. *ACM Trans. Math. Software*, 2:378–387, 1976.

[861] Gibbs, N. E., Poole, W. G. Jr., and Stockmeyer, P. K. An algorithm for reducing the bandwidth and profile of a sparse matrix. *SIAM J. Numer. Anal.*, 13:236–250, 1976.

[862] Gibbs, N. E., Poole, W. G. Jr., and Stockmeyer, P. K. A comparison of several bandwidth and profile reduction algorithms. *ACM Trans. Math. Software*, 2:322–330, 1976.

[863] Gilbert, J. R. *Graph Separator Theorems and Sparse Gaussian Elimination*. PhD thesis, Dept. of Computer Science, Stanford Univ., 1980.

[864] Gilbert, J. R. Predicting structure in sparse matrix computations. Tech. Report CS-86-750, Cornell Univ., Ithaca, 1986.

[865] Gilbert, J. R. Some nested dissection order is nearly optimal. Tech. Report 86-767, Dept. of Computer Science, Cornell Univ., 1986.

[866] Gilbert, J. R. An efficient parallel sparse partial pivoting algorithm. Tech. Report CMI-88-45052-1, Centre for Computer Science, Dept. of Science and Technology, Christian Michelsen Institute, Bergen, Norway, 1988.

[867] Gilbert, J. R. Some nested dissection order is nearly optimal. *Inform. Process. Lett.*, 26:325–328, 1988.

[868] Gilbert, J. R. Predicting structure in sparse matrix computations. *SIAM J. Matrix Anal. and Appl.*, 15(1):62–79, 1994.

[869] Gilbert, J. R. and Hafsteinsson, H. A parallel algorithm for finding fill in a sparse symmetric matrix. Tech. Report TR 86-789, Dept. of Computer Science, Cornell Univ., 1986.

[870] Gilbert, J. R. and Hafsteinsson, H. Parallel symbolic factorization of sparse linear systems. *Parallel Computing*, 14:151–162, 1990.

[871] Gilbert, J. R. and Heath, M. T. Computing a sparse basis for the null space. *SIAM J. Alg. and Discr. Methods*, 8:446–459, 1987.

[872] Gilbert, J. R., Lewis, J. G., and Schreiber, R. Parallel preordering for sparse matrix factorization. (In preparation), 1992.

[873] Gilbert, J. R. and Liu, J. W. H. Elimination structures for unsymmetric sparse LU factors. Tech. Report CS-90-11, Dept. of Computer Science, York Univ., North York, Ontario, 1990.

[874] Gilbert, J. R. and Liu, J. W. H. Elimination structures for unsymmetric sparse LU factors. *SIAM J. Alg. and Discr. Methods*, 14:334–352, 1993.

[875] Gilbert, J. R., Moler, C. B., and Schreiber, R. Sparse matrices in MATLAB : Design and implementation. Tech. Report CSL-91-04, XEROX Palo Alto Research Center, 1991.

[876] Gilbert, J. R., Moler, C. B., and Schreiber, R. Sparse matrices in MATLAB : Design and implementation. *SIAM J. Matrix Anal. and Appl.*, 13(1):333–356, 1992.

[877] Gilbert, J. R. and Ng, E. Predicting structure in nonsymmetric sparse matrix factorizations. Tech. Report CSL-92-08, XEROX Palo Alto Research Center, 1992. (Published at Graph Theory and Sparse Matrix Computations, George, A., Gilbert, J. R., Liu, J. W. H., eds., Springer-Verlag, 1993).

[878] Gilbert, J. R., Ng, E., and Peyton, B. W. Separators and structure prediction in sparse orthogonal factorization. Tech. Report CSL-93-15, XEROX Corporation, Palo Alto Research Center, 1993.

[879] Gilbert, J. R., Ng, E., and Peyton, B. W. An efficient algorithm to compute row and column counts for sparse Cholesky factorization. *SIAM J. Matrix Anal. and Appl.*, 15(4):1075–1091, 1994.

[880] Gilbert, J. R. and Peierls, T. Sparse partial pivoting in time proportional to arithmetic operations. *SIAM J. Sci. and Stat. Comput.*, 9(5):862–874, 1988.

[881] Gilbert, J. R. and Peierls, T. Sparse partial pivoting in time proportional to arithmetic operations. *SIAM J. Sci. and Stat. Comput.*, 9:862–874, 1988.

[882] Gilbert, J. R., Rose, D. J., and Edenbrandt, A. A separator theorem for chordal graphs. *SIAM J. Alg. and Discr. Meth.*, 5:306–313, 1984.

[883] Gilbert, J. R. and Schreiber, R. Nested dissection with partial pivoting. In *Sparse Matrix Symposium*, Fairfield Glade, Tennessee, 1982.

[884] Gilbert, J. R. and Schreiber, R. Highly parallel sparse Cholesky factorization. Tech. Report CSL-90-07, XEROX Palo Alto Research Center, 1990. (To be published at SIAM J. Sci. and Stat. Comput.).

[885] Gilbert, J. R. and Schreiber, R. Highly parallel sparse Cholesky factorization. *SIAM J. Sci. and Stat. Comput.*, 13(5):1151–1172, 1992.

[886] Gilbert, J. R. and Zmijewski, E. A parallel graph partitioning algorithm for a message-passing multiprocessor. *Int. J. of Parallel Programming*, 16:427–449, 1987.

[887] Gill, P. E. Recent developments in numerically stable methods for linear programming. *Bull. Inst. Math. Appl.*, 10:180–186, 1974.

[888] Gill, P. E., Golub, G. H., Murray, W., and Saunders, M. A. Methods for modifying matrix factorizations. *Math. of Computation*, 28(126):505–535, 1974.

[889] Gill, P. E. and Murray, W. A numerically stable form of the simplex algorithm. *Lin. Alg. Appl.*, 7:99–138, 1973.

[890] Gill, P. E. and Murray, W. Newton type methods for unconstrained and linearly constrained optimization. *Math. Programming*, 28:311–350, 1974.

[891] Gill, P. E. and Murray, W. The orthogonal factorization of a large sparse matrix. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, 1976.

[892] Gill, P. E. and Murray, W. The computation of Lagrange-multiplier estimates for constrained minimization. *Math. Programming*, 17:32–60, 1979.

[893] Gill, P. E., Murray, W., Ponceleón, D. B., and Saunders, M. A. Primal-dual methods in linear programming. Tech. Report SOL-91-3, Systems Optimization Laboratory, Stanford Univ., 1991.

[894] Gill, P. E., Murray, W., Ponceleón, D. B., and Saunders, M. A. Solving reduced KKT systems in barrier methods for linear and quadratic programming. Tech. Report SOL-91-7, Systems Optimization Laboratory, Stanford Univ., 1991.

[895] Gill, P. E., Murray, W., Ponceleón, D. B., and Saunders, M. A. Preconditioners for indefinite systems arising in optimization. *SIAM J. Matrix Anal. and Appl.*, 13(1):292–311, 1992.

[896] Gill, P. E., Murray, W., and Saunders, M. A. Methods for computing and modifying the LDV factors of a matrix. *Math. of Computation*, 29(132), 1975.

[897] Gill, P. E., Murray, W., and Saunders, M. A. Interior point algorithms for linear programming : A challenge to the simplex method. Tech. Report SOL-88-14, Systems Optimization Laboratory, Stanford Univ., 1988.

[898] Gill, P. E., Murray, W., and Saunders, M. A. A single phase dual barrier method for linear programming. Tech. Report SOL-88-10, Systems Optimization Laboratory, Stanford Univ., 1988.

[899] Gill, P. E., Murray, W., Saunders, M. A., Tomlin, J. A., and Wright, M. H. On projected Newton barrier methods for linear programming and an equivalence to Karmarkar's projective method. *Math. Programming*, 36:183–209, 1986.

[900] Gill, P. E., Murray, W., Saunders, M. A., and Wright, M. H. "User's Guide" for SOL/NPSOL : A FORTRAN package for nonlinear programming. Tech. Report SOL-83-12, Systems Optimization Laboratory, Stanford Univ., 1983.

[901] Gill, P. E., Murray, W., Saunders, M. A., and Wright, M. H. Sparse matrix methods in optimization. *SIAM J. Sci. and Stat. Comput.*, 5:562–589, 1984.

[902] Gill, P. E., Murray, W., Saunders, M. A., and Wright, M. H. Constrained nonlinear programming. In Nemhauser, G. L., Rinnooy Kan, A., and Todd, M. J., editors, *Handbooks in Operations Research and Management Science, volume 1 : Optimization*, chapter 3, pages 171–210. North-Holland, 1989.

[903] Gill, P. E., Murray, W., Saunders, M. A., and Wright, M. H. A practical anti-cycling procedure for linearly constrained optimization. *Math. Programming*, 45:437–474, 1989.

[904] Gill, P. E., Murray, W., and Wright, M. H. *Practical Optimization.* Academic Press, 1981.

[905] Gill, P. E., Murray, W., and Wright, M. H. *Numerical Linear Algebra and Optimization, volume 1.* Addison-Wesley, 1991.

[906] Gill, S. Parallel programming. *Computing J.*, 1:2–10, 1958.

[907] Gilmore, P. A. Structuring of parallel algorithms. *J. ACM*, 15:176–192, 1968.

[908] Givens, W. Numerical computation of the characteristic values of a real symmetric matrix. Tech. Report ORNL-1574, Oak Ridge National Laboratory, 1954.

[909] Glowinski, R. and Lichnewsky, A., editors. *Computing Methods in Applied Sciences and Engineering.* SIAM Publications, 1990.

[910] Glowinski, R. and Lions, J. L., editors. *Computing Methods in Applied Sciences and Engineering.* North-Holland, 1980.

[911] Gödel, K. Über formal unentscheidbare Sätze der principia mathematica und verwandten Systeme I. *Monatsch. Math. und Phys.*, 38:173–198, 1931.

[912] Golden, B. and Stewart, W. Empirical analysis of heuristics. In Lawler, E., Lenstra, J., Rinooy Kan, A., and Shimoys, D., editors, *The Travelling Salesman Problem.* John Wiley & Sons, 1985.

[913] Goldfarb, D. Factorized variable metric methods for unconstrained optimization. *Math. of Computation*, 30(136):796–811, 1976.

[914] Goldfarb, D. Using the steepest-edge simplex algorithm to solve sparse linear programs. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[915] Goldfarb, D. and Reid, J. K. FORTRAN subroutines for sparse in-core linear programming. Tech. Report, AERE.

[916] Goldfarb, D. and Reid, J. K. A practicable steepest-edge simplex algorithm. Tech. Report, AERE.

[917] Goldfarb, D. and Reid, J. K. On the Bartels-Golub decomposition for linear programming bases. Tech. Report CSS-18, Harwell, 1975.

[918] Goldfarb, D. and Todd, M. J. Linear programming. In Nemhauser, G. L., Rinnooy Kan, A., and Todd, M. J., editors, *Handbooks in Operations Research and Management Science, volume 1 : Optimization*, chapter 2, pages 73–170. North-Holland, 1989.

[919] Goldstein, A. A. *Constructive Real Analysis.* Harper & Row, 1967.

[920] Goldstine, H. H., editor. *The Computer : From Pascal to von Neumann.* Princeton University Press, 1972.

[921] Golub, G. H. Numerical methods for solving linear least squares problems. *Numer. Math.*, 7:206–216, 1965.

[922] Golub, G. H. and Kahan, W. Calculating the singular values and the pseudo inverse of a matrix. *SIAM J. Numer. Anal.*, 2:205–224, 1965.

[923] Golub, G. H., Klema, V., and Stewart, G. W. Rank degeneracy and least squares problems. Tech. Report TR-456, Dept. of Computer Science, Univ. of Maryland, 1976.

[924] Golub, G. H. and Meurant, G. A. *Résolution Numérique des Grands Systèmes Linéaires.* Eyrolles, Paris, 1983.

[925] Golub, G. H. and O'Leary, D. P. Some history of the conjugate gradient and Lanczos algorithms : 1948-1976. *SIAM Review*, 31(1):50–102, 1989.

[926] Golub, G. H. and Plemmons, R. J. Large-scale geodetic least-squares adjustment by dissection and orthogonal decomposition. In Björck, A., Plemmons, R. J., and Schneider, H., editors, *Large Scale Matrix Problems*, pages 3–28. North-Holland, 1981.

[927] Golub, G. H. and Van Loan, C. F. *Matrix Computations.* Johns Hopkins University Press, Baltimore, 2^{nd} edition, 1989.

[928] Golub, G. H. and Wilkinson, J. H. Note on the iterative refinement of least squares solution. *Numer. Math.*, 9:139–148, 1966.

[929] Golumbic, M. C. *Algorithmic Graph Theory and Perfect Graphs.* Academic Press, 1980.

[930] Gomes, A. and Betancourt, R. Implementation of the fast decoupled load-flow on a vector computer. *IEEE Trans. Power Systems*, PWRS-5(3):977–983, 1990.

[931] Gomes-Ruggiero, M., Martínez, J., and Moretti, A. Comparing algorithms for solving sparse nonlinear systems of equations. *SIAM J. Sci. and Stat. Comput.*, 13(2):459–483, 1992.

[932] Gomez, A. and Franquelo, L. G. An efficient ordering algorithm to improve sparse vector methods. *IEEE Trans. Power Systems*, PWRS-3(4):1538–1544, 1988.

[933] Gomez, A. and Franquelo, L. G. Node ordering algorithms for sparse vector method improvement. *IEEE Trans. Power Systems*, PWRS-3(1):73–79, 1988.

[934] Gondran, M. and Minoux, M. *Graphs and Algorithms.* John Wiley & Sons, 1984.

[935] Gondzio, J. Splitting dense columns of constraint matrix in interior point methods for large scale linear programming. (To be published at Optimization), 1991.

[936] Gondzio, J. and Tachat, D. The design and application of the IPMLO : A FORTRAN library for linear optimization with interior point methods. Tech. Report, LAMSADE, Univ. of Paris Dauphine, 1991.

[937] Gonnet, G. H. *Handbook of Algorithms and Data Structures.* Addison-Wesley, 1984.

[938] Gonzaga, C. C. Search directions for interior linear programming methods. Tech. Report UCB-ERL-M-87-44, Electronics Research Laboratory, Univ. California, Berkeley, 1987. (Published at Algorithmica, 6:153–181, 1991).

[939] Gonzaga, C. C. A simple representation of Karmarkar's algorithm. Tech. Report, Dept. of Systems Engineering and Computer Science, COPPE / Federal University of Rio de Janeiro, 1988.

[940] Gonzaga, C. C. An algorithm for solving linear programming problems in $O(n^3l)$ operations. In Meggido, N., editor, *Progress in Mathematical Programming : Interior Point and Related Methods*, chapter 1, pages 1–28. Springer-Verlag, 1989.

[941] Gonzaga, C. C. Path-following methods for linear programming. *SIAM Review*, 34(2):167–224, 1992.

[942] Goodenough, J. B. *A Study of High Level Language Features : Detailed Feature Analysis.* Softech Inc., Waltham, Massachusetts, 1976.

[943] Gotlieb, C. C. and Kumar, S. Semantic clustering of index terms. *J. ACM*, 15:493–513, 1968.

[944] Gradshteyn, I. S. and Ryzhik, I. M. *Table of Integrals Series and Products.* Academic Press, 4^{th} edition, 1965. (Translated by Alan Jeffrey from the 1963 Russian edition).

[945] Graham, R. L. and Hell, P. On the history of the minimum spanning tree problem. (Published at Annals of the History of Computing).

[946] Grandinetti, L. and Conforti, D. Numerical comparisons of nonlinear programming algorithms on serial and vector processors using automatic differentiation. *Math. Programming*, 42(2):375–390, 1988.

[947] Granville, S. Fluxo de potência ótimo : Algoritmo de programação quadrática sequencial e métodos de linearização/quadratização sucessivas. Relatório Técnico 066, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1989.

[948] Graves, R. L. and Wolfe, P., editors. *Recent Advances in Mathematical Programming.* McGraw-Hill, 1963.

[949] Green, D. R. Algorithm 319 : Triangular factors of modified matrices. *Comm. ACM*, 11:12, 1968.

[950] Greene, D. H. and Knuth, D. E. *Mathematics for the Analysis of Algorithms.* Progress in Computer Science. Birkhäuser Verlag, 1981. Coffman, E., Graham, R. and Kuck, D., eds.

[951] Gries, D., editor. *Programming Methodology.* Springer-Verlag, 1978.

[952] Gries, D. and Gehani, N. H. Some ideas on data types in high-level languages. *Comm. ACM*, 20(6), 1977.

[953] Griesmer, J. H., Jenks, R. D., and Yun, D. Y. Y. SCRATCHPAD "User's Manual". Report RA-70, IBM, Yorktown Heights, 1975.

[954] Griewank, A. and Corliss, G. F., editors. *Automatic Differentiation of Algorithms*. SIAM Publications, 1991.

[955] Grimes, R. G., Kincaid, D. R., and Young, D. M. ITPACK 2.0 "User's Guide". Tech. Report CNA-150, Univ. of Texas, Austin, 1979.

[956] Grimes, R. G., Lewis, J. G., and Simon, H. D. Experiences in solving large eigenvalue problems on the CRAY X-MP. Tech. Report ETA-TR-40, Engineering Technology Applications (ETA) Division, Boeing Computer Services, Seattle, Washington, 1986.

[957] Grimes, R. G. and Pierce, D. The implementation of three resequencing algorithms for MSC/NASTRAN. Tech. Report ETA-TR-65, ETA Division, Boeing Computer Services, Seattle, Washington, 1987.

[958] Grimes, R. G., Pierce, D. J., and Simon, H. D. A new algorithm for finding a pseudoperipheral node in a graph. *SIAM J. Matrix Anal. and Appl.*, 11(2):323–334, 1990.

[959] Griss, M. L. The algebraic solution of large sparse systems using REDUCE-2. *Proc. of the ACM*, 74:105–111, 1974.

[960] Gropp, W., Lusk, E., and Skjellum, A. *Using MPI, Portable Parallel Programming with the Message Passing Interface*. MIT Press.

[961] Gross, T. R. *Code Optimization of Pipeline Constraints*. PhD thesis, Computer Systems Lab., Stanford Univ., 1983.

[962] Grosse, E. Tensor spline approximation. In Björck, A., Plemmons, R. J., and Schneider, H., editors, *Large Scale Matrix Problems*, pages 29–42. North-Holland, 1981.

[963] Grosse, E. NETLIB News : Greetings. *SIAM News*, 23(6):14, 1990.

[964] Grosse, E. NETLIB News : Searching for files. *SIAM News*, 25(4):10, 1992.

[965] Grossman, R., editor. *Symbolic Computation : Applications to Scientific Computing*. SIAM Publications, 1989.

[966] Grötschel, M. and Korte, B., editors. *Mathematical Programming : The State of the Art*. Springer-Verlag, 1983.

[967] Grötschel, M., Lovász, L., and Schrijver, A. The ellipsoid method and its consequences in combinatorial optimization. *Combinatorica*, 1:169–197, 1981.

[968] Grötschel, M., Lovász, L., and Schrijver, A. *The Ellipsoid Method and Combinatorial Optimization*. Springer-Verlag, 1988.

[969] Grötschel, M., Lovász, L., and Schrijver, A. *Geometric Algorithms and Combinatorial Optimization*. Springer-Verlag, 1988.

[970] Guardabassi, G. A note on minimal essential sets. *IEEE Trans. Circuit Theory*, CT-15:86, 1968.

[971] Gupta, A. and Kumar, V. Optimally scalable parallel sparse Cholesky factorization. In *Proc. 7^{th} SIAM Conference on Parallel Processing for Scientific Computing*, pages 442–447, 1995.

[972] Gupta, K. K. Solution of eigenvalue problems by Sturm sequence method. *Int. J. Numer. Meth. Eng.*, 4:379–404, 1972.

[973] Gustafson, J. L. Reevaluating Amdahl's law. *Comm. ACM*, 31:532–533, 1988.

[974] Gustafson, J. L., Montry, G. R., and Benner, R. E. Development of parallel methods for a 1024-processor hypercube. *SIAM J. Sci. and Stat. Comput.*, 9(4), 1988.

[975] Gustavson, F. G. Some algorithms for sparse elimination.

[976] Gustavson, F. G. Some basic techniques for solving sparse systems of linear equations. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 41–52. Plenum Press, New York, 1972.

[977] Gustavson, F. G. An efficient algorithm to perform sparse matrix multiplication. In *Argonne Conference on Sparse Matrix Computations*. Argonne National Laboratory, 1976. (Report RC-6176, IBM T. J. Watson Research Center).

[978] Gustavson, F. G. Finding the block lower triangular form of a sparse matrix. In Bunch, J. R.andRose, D. J., editor, *Sparse Matrix Computations*, pages 275–289. Academic Press, 1976.

[979] Gustavson, F. G. Permuting matrices stored in sparse format. *IBM Tech. Discl. Bull.*, 16:357–359, 1976. (Disclosure 8-72-001).

[980] Gustavson, F. G. Remark on Algorithm 408 : A sparse matrix package (part I). *ACM Trans. Math. Software*, 4(3):295–295, 1978.

[981] Gustavson, F. G. Two fast algorithms for sparse matrices : Multiplication and permuted transposition. *ACM Trans. Math. Software*, 4(3):250–269, 1978.

[982] Gustavson, F. G. An efficient 3-D parallel algorithm for matrix multiplication. Talk presented at SIAM Symposium on Discrete Algorithms, IBM Thomas J. Watson Research Center, 1995.

[983] Gustavson, F. G. and Agarwal, R. C. Vector and parallel algorithms for cholesky factorization on IBM 3090. In *Proc. of the Supercomputing 89*, pages 225–233, Reno, NV, 1989. ACM Press.

[984] Gustavson, F. G. and Agarwal, R. C. Vector and parallel algorithms for Cholesky factorization on IBM 3090. In *Proc. Supercomputing '89*, 1989.

[985] Gustavson, F. G., Agarwal, R. C., Alpern, B., Carter, L., Klepacki, D. J., Lawrence, R., and Zubair, M. High-performance parallel implementations of the NAS kernel benchmarks on the IBM SP2. *IBM Systems Journal*, 34(2), 1995.

[986] Gustavson, F. G., Agarwal, R. C., Cooley, J. W., Shearer, J. B., Slishman, G., and Tuckerman, B. New scalar and vector elementary functions for the IBM system/370. *IBM J. of Research and Development*, 30(2):126–144, 1986.

[987] Gustavson, F. G., Agarwal, R. C., Palkar, P., and Zubair, M. A performance analysis of the subroutines in the ESSL/LAPACK call convention interface (cci). Tech. Report, IBM Thomas J. Watson Research Center, Yorktown Heights, 1994.

[988] Gustavson, F. G., Agarwal, R. C., and Zubair, M. A high performance algorithm using pre-processing for the sparse matrix-vector multiplication. In *Proc. of Supercomputing '92*, pages 32–41, Minnesota, 1992. IEEE.

[989] Gustavson, F. G., Agarwal, R. C., and Zubair, M. Exploiting functional parallelism of power2 to design high-performance numerical algorithms. *IBM J. of Research and Development*, 38(5):563–576, 1994. (Special Issue on POWER2 and PowerPC Architecture and Implementation).

[990] Gustavson, F. G., Agarwal, R. C., and Zubair, M. A high-performance matrix-multiplication algorithm on a distributed-memory parallel computer, using overlapped communication. *IBM J. of Research and Development*, 38(6), 1994.

[991] Gustavson, F. G., Agarwal, R. C., and Zubair, M. A high performance parallel algorithm for 1-D FFT. In *Proc. of Supercomputing '91*. IEEE Computer Society Press, 1994.

[992] Gustavson, F. G., Agarwal, R. C., and Zubair, M. Improving performance of linear algebra algorithms for dense matrices, using algorithmic prefetch. *IBM J. of Research and Development*, 38(3), 1994.

[993] Gustavson, F. G., Brawn, B. S., and Mankin, E. S. Sorting in a paging environment. *Comm. ACM*, 13(8):483, 1970.

[994] Gustavson, F. G. and Hachtel, G. D. Program implementation of a network design program based on the sparse tableau adjoint method. In *Proc.* 16^{th} *Midwest Symposium on Circuit Theory, part 1*, 1973.

[995] Gustavson, F. G., Liniger, W. M., and Willoughby, R. A. Symbolic generation of an optimal Crout algorithm for sparse systems of linear equations. *J. ACM*, 17(1):87–109, 1970. (Originally as Tech. Report RC-1852, IBM Research Center, Yorktown Heights, New York, June 27, 1967. Presented at Sparse Matrix Proceedings, IBM Thomas Watson Research Center, pp. 1–9, September 1968).

[996] Gustavson, F. G. and Willoughby, R. A. Sparse matrices : Some techniques and applications. *Proc. IEEE*, 1972.

[997] Gustavson, F. G. and Yun, D. Y. Y. Arithmetic complexity of unordered sparse polynomials. In Jenks, R., editor, *Proc. 1976 ACM Symposium on Symbolic and Algebraic Computation*, pages 149–153, Yorktown Heights, New York, 1976.

[998] Gustavson, F. G. and Brent, R. P. Yun, D. Y. Y. Fast solution of Toeplitz systems of equations and computation of Pade approximants. *Journal of Algorithms*, 1(3):259–295, 1980.

[999] Haber, S. Numerical evaluation of multiple integrals. *SIAM Review*, 12:481–526, 1970.

[1000] Haberman, R. *Mathematical Models*. Prentice-Hall, 1977.

[1001] Hachtel, G. D. Vector and matrix variability type in sparse matrix algorithms. In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and their Applications*, pages 53–66. Plenum Press, 1972.

[1002] Hachtel, G. D. Extended applications of the sparse tableau approach : Finite elements and least squares. In Spillers, W., editor, *Basic Questions in Design Theory*. North-Holland, 1974. (Originally in Tech. Report from Elec. Sci. Eng. and Computer Science Dept., UCLA).

[1003] Hachtel, G. D. The sparse tableau approach to finite element assembly. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*, pages 349–363. Academic Press, 1976.

[1004] Hachtel, G. D., Brayton, R. K., and Gustavson, F. G. The sparse tableau approach to network analysis and design. *IEEE Trans. Circuit Theory*, CT-18(1):101–113, 1971.

[1005] Hachtel, G. D., Gustavson, F. G., Brayton, R. K., and Grapes, T. E. A sparse matrix approach to network analysis. In *Proc. Cornell Conference on Computerized Electronics*. Cornell Univ., 1969.

[1006] Hachtel, G. D. and Rohrer, R. A. Techniques for the optimal design and synthesis of switching circuits. *Proc. of the IEEE*, 55:1864–1867, 1967. (Special Edition on Computer Aided Design).

[1007] Hadfield, S. M. *On the LU Factorization of Sequences of Identically Structured Sparse Matrices within a Distributed Memory Environment*. PhD thesis, Computer and Information Sciences Dept., Univ. of Florida, 1994. (TR-94-019).

[1008] Hadfield, S. M. and Davis, T. A. Analysis of potential parallel implementations of the unsymmetric-pattern multifrontal method for sparse LU factorization. Tech. Report TR-92-017, Computer and Information Science Dept., Univ. of Florida, 1992.

[1009] Hadfield, S. M. and Davis, T. A. Lost pivot recovery for an unsymmetric-pattern multifrontal method. Tech. Report TR-94-029, Computer and Information Science Dept., Univ. of Florida, 1994. (To be published at SIAM J. Matrix Anal. and Appl.).

[1010] Hadfield, S. M. and Davis, T. A. A parallel unsymmetric-pattern multifrontal method. Tech. Report TR-94-028, Computer and Information Science Dept., Univ. of Florida, 1994. (To be published at SIAM J. Sci. and Stat. Comput.).

[1011] Hadfield, S. M. and Davis, T. A. Potential and achievable parallelism in the unsymmetric-pattern multifrontal LU factorization method for sparse matrices. Tech. Report TR-94-006, Computer and Information Science Dept., Univ. of Florida, 1994. (Presented at Proc. 5^{th} SIAM Conference on Applied Linear Algebra, Snowbird, Utah).

[1012] Hadley, G. *Linear Programming*. Addison-Wesley, 1962.

[1013] Hageman, L. and Young, D. M. *Applied Iterative Methods*. Academic Press, 1981.

[1014] Hager, W. *Applied Numerical Linear Algebra*. Prentice-Hall, 1988.

[1015] Haimovich, M. The simplex algorithm is very good ! : On the expected number of pivot steps and related properties of random linear programs. Manuscript, Columbia Univ.

[1016] Hairer, E., Norsett, S. P., and Warnner, G. *Solving Ordinary Differential Equations, volume 1 : Non-Stiff Problems*. Springer-Verlag, 1987.

[1017] Hairer, E., Norsett, S. P., and Warnner, G. *Solving Ordinary Differential Equations, volume 2 : Stiff Problems*. Springer-Verlag, 1987.

[1018] Hall, A. D. The ALTRAN system for rational function manipulation : A survey. *Comm. ACM*, 14:517–522, 1971.

[1019] Hall, A. S. and Woodhead, R. W. *Frame Analysis*. John Wiley & Sons, 1961.

[1020] Hall, M. An algorithm for distinct representatives. *Amer. Math. Monthly*, 63:716–717, 1956.

[1021] Hall, P. On representatives of subsets. *J. London Math. Soc.*, 10(37):26–30, 1935.

[1022] Hamacher, V. C., Vranesic, Z. G., and Zaky, S. G., editors. *Computer Organization.* McGraw-Hill, 2^{nd} edition, 1984.

[1023] Hamming, R. W. *Numerical Methods for Scientists and Engineers.* McGraw-Hill, 1962.

[1024] Hamming, R. W. *Introduction to Applied Numerical Analysis.* McGraw-Hill, 1971.

[1025] Hamming, R. W. *Coding and Information Theory.* Prentice-Hall, 1986.

[1026] Han, S. P. Superlinearly convergent variable metric algorithms for general nonlinear programming problems. *Math. Programming*, 11:263–282, 1976.

[1027] Hansen, P. C. Detection of near-singularity in Cholesky and LDL^T factorizations. *J. of Comput. and Appl. Math.*, 19:293–299, 1987.

[1028] Harary, F. A graph theoretic method for the complete reduction of a matrix with a view toward finding its eigenvalues. *J. Mathematical Phys.*, 38:104–111, 1959.

[1029] Harary, F. On the consistency of precedence matrices. *J. ACM*, 7:255–259, 1959.

[1030] Harary, F. The determinant of the adjacency matrix of a graph. *SIAM Review*, 4:202–210, 1962.

[1031] Harary, F. A graph theoretic approach to matrix inversion by partitioning. *Numer. Math.*, 4:128–135, 1963.

[1032] Harary, F., editor. *Graph Theory and Theoretical Physics.* Academic Press, 1967.

[1033] Harary, F. Graphs and matrices. *SIAM Review*, 9:83–90, 1967.

[1034] Harary, F. *Graph Theory.* Addison-Wesley, 1969.

[1035] Harary, F. Sparse digraphs : Classification and algorithms. Tech. Report, Univ. Michigan, Ann Arbor, 1970.

[1036] Harary, F. Sparse matrices and graph theory. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 139–150. Academic Press, 1971.

[1037] Harary, F., Karp, R. M., and Tutte, W. T. A criterion for planarity of the square of a graph. *J. Combinatorial Theory*, 2:395–405, 1967.

[1038] Harary, F., Norman, R. Z., and Cartwright, D. *Structural Models : An Introduction to the Theory of Directed Graphs.* John Wiley & Sons, 1965.

[1039] Hardy and Wright. *The Theory of Numbers.* Oxford University Press, 4^{th} edition, 1962.

[1040] Hare, D. R., Johnson, C. R., Olesky, D. D., and van den Driessche, P. Inherited matrix entries : LU factorization. *SIAM J. Matrix Anal. and Appl.*, 10:94–104, 1989.

[1041] Hare, D. R., Johnson, C. R., Olesky, D. D., and van den Driessche, P. Sparsity analysis of the QR factorization. *SIAM J. Matrix Anal. and Appl.*, 14:655–669, 1993.

[1042] Harris, P. M. J. Pivot selection methods of the DEVEX LP code. *Math. Programming*, 5:1–28, 1973.

[1043] Hart, J. F. et al. *Computer Approximations.* John Wiley & Sons, 1968.

[1044] Hartree, D. R. *Numerical Analysis.* Clarendon, Oxford University Press, 1958.

[1045] Hastings, C. Jr. *Approximations for Digital Computers.* Princeton University Press, 1955.

[1046] Hauck, E. A. and Dent, B. A. BURROUGHS B6500/B7500 stack mechanism. In *Proc. AFIPS SJCC*, pages 245–251, 1968.

[1047] Haymond, R. E., Jarvis, J. P., and Shier, D. F. Algorithm 613 : Minimum spanning trees for moderate integer weights. *ACM Trans. Math. Software*, 10(1):108–111, 1984.

[1048] Heap, B. R. Random matrices and graphs. *Numer. Math.*, 8:114–122, 1966.

[1049] Hearn, A. C. *REDUCE "User's Manual" version 3.1.* The RAND Corporation, Santa Monica, 1984.

[1050] Heath, M. T. Some extensions of an algorithm for sparse linear least squares problems. *SIAM J. Sci. and Stat. Comput.*, 3:223–237, 1982.

[1051] Heath, M. T. *Sparse Matrix Software Catalog, Sparse Matrix Symposium 1982.* Oak Ridge National Laboratory, 1982. (Promoted by Union Carbide Corporation, Nuclear Division).

[1052] Heath, M. T. Numerical methods for large sparse linear least squares problems. *SIAM J. Sci. and Stat. Comput.*, 5(3):497–513, 1984.

[1053] Heath, M. T., editor. *Hypercube Multiprocessors 1986.* SIAM Publications, 1986.

[1054] Heath, M. T., editor. *Hypercube Multiprocessors 1987.* SIAM Publications, 1987.

[1055] Heath, M. T., Ng, E., and Peyton, B. W. Parallel algorithms for sparse linear systems. *SIAM Review*, 33(3):420–460, 1991.

[1056] Heath, M. T. and Romine, C. Parallel solution of triangular systems on distributed-memory multiprocessors. *SIAM J. Sci. and Stat. Comput.*, 9:558–588, 1988.

[1057] Heath, M. T. and Sorensen, D. C. A pipelined Givens method for computing the QR factorization of a sparse matrix. *Lin. Alg. Appl.*, 77:189–203, 1986.

[1058] Hebden, M. An algorithm for minimization using exact second derivatives. Tech. Report TP-515, Atomic Energy Research Establishment, Harwell, England, 1973.

[1059] Heller, D. A survey of parallel algorithms in numerical linear algebra. *SIAM Review*, 20:740–777, 1978.

[1060] Hellerman, E. and Rarick, D. Reinversion with the preassigned pivot procedure. *Math. Programming*, 1:195–216, 1971.

[1061] Hellerman, E. and Rarick, D. The partitioned preassigned pivot procedure (P^4). In Rose, D. J. and Willoughby, R. A., editors, *Sparse Matrices and Their Applications*, pages 67–76. Plenum Press, New York, 1972.

[1062] Henderson, H. V. and Searle, S. R. On deriving the inverse of a sum of matrices. *SIAM Review*, 23(1):53–60, 1981.

[1063] Henessny, J. L. and Patterson, D. A. *Computer Architecture a Quantitative Approach*. Morgan Kaufmann Publishers, 1990.

[1064] Hennessy, J. L. VLSI processor architecture. *IEEE Trans. Comput.*, C-33(11):1221–1246, 1984.

[1065] Hennessy, J. L. VLSI RISC processors. *VLSI Systems Design*, 6(10):22–32, 1985.

[1066] Hennessy, J. L. and Gross, T. R. Postpass code optimization of pipeline constraints. *ACM Trans. Programming Languages and Systems*, 5(3):422–448, 1983.

[1067] Hennessy, J. L., Jouppi, N., Basket, F., and Gill, J. MIPS : A VLSI processor architecture. In *Proc. CMU Conference on VLSI Systems and Computations*, Rockville, 1981. Computer Science Press.

[1068] Henrici, P. K. *Discrete Variable Methods for Ordinary Differential Equations*. John Wiley & Sons, 1962.

[1069] Henrici, P. K. *Elements of Numerical Analysis*. John Wiley & Sons, 1964.

[1070] Hershdorfer, A. M., Raab, A. R., and Sturman, G. M. On the efficient inversion of large structured matrices. In *Proc. Engineering Mechanics Division Specialty Conference*, pages 651–666, Washington, 1966. ASCE.

[1071] Hershkowitz, M. and Noble, S. B. Finding the inverse and connections of a type of large matrix. *Naval Res. Logistics Quart.*, 12:119–132, 1965.

[1072] Hertog, D. and Roos, C. A survey of search directions in interior point methods for linear programming. Tech. Report 89-65, Faculty of Technical Mathematics and Informatics, Technische Univ. Delft, Holland, 1989.

[1073] Herz, J. C. *Cours de Calcul Numérique*. IBM.

[1074] Hestenes, M. R. and Stiefel, E. Methods of conjugate gradients for solving linear system. *J. Res. Nat. Bur. Standards*, B-49:409–436, 1952.

[1075] Hester, J. H. and Hirschberg, D. S. Self-organizing linear search. *ACM Computing Surveys*, 17(3):295–311, 1985.

[1076] Higham, N. J. Algorithm 674: FORTRAN codes for estimating the one-norm of a real or complex matrix. *ACM Trans. Math. Software*, 14(4):381–396, 1988.

[1077] Higham, N. J. Exploiting fast matrix multiplication within the level 3 BLAS. Tech. Report 89-984, Dept. of Computer Science, Cornell Univ., 1989. (To be published at ACM Trans. Math. Software).

[1078] Higham, N. J. Is fast matrix multiplication of practical use ? *SIAM News*, pages 12–14, November 1990.

[1079] Higham, N. J. *Handbook of Writing for the Mathematical Sciences*. SIAM Publications, 1993.

[1080] Higham, N. J. *Accuracy and Stability of Numerical Algorithms*. SIAM Publications, 1996. (To be published).

[1081] Higman, B. *A Comparative Study of Programming Languages*. MacDonald, American Elsevier, 1967.

[1082] Hildebrand, F. B. *Methods of Applied Mathematics*. Prentice-Hall, 1952.

[1083] Hildebrand, F. B. *Introduction to Numerical Analysis.* McGraw-Hill, 2^{nd} edition, 1974. (First edition, 1956).

[1084] Hill, M. D. *Aspects of Cache Memory and Instruction Buffer Performance.* PhD thesis, Berkeley Computer Science Division, Univ. California, Berkeley, 1987. (Report UCB-CSD-87-381).

[1085] Hillis, W. D., editor. *The Connection Machine.* MIT Press, 1985.

[1086] Himmelblau, D. M. *Applied Nonlinear Programming.* McGraw-Hill, 1972.

[1087] Himmelblau, D. M. *Decomposition of Large-Scale Problems.* North-Holland, 1973.

[1088] Himmelblau, D. M., editor. *Proc. NATO Conference at Cambridge, 1972.* North-Holland, 1973.

[1089] Hiriart-Hurruty and Lemaréchal, C. *Convex Analysis and Minimization Algorithms – II.* Springer-Verlag, 1993.

[1090] Ho, J. K., Lee, T. C., and Sundarraj, R. P. Decomposition of linear programs using parallel computation. *Math. Programming*, 42(2):391–406, 1988.

[1091] Hoaglin, D. C. An analysis of the loop optimization scores in Knuth's 'empirical study of FORTRAN programs'. *Software Practice and Experience*, 3:161–169, 1972.

[1092] Hoare, C. A. R. Quicksort. *Computer Journal*, 5(1):13–15, 1962.

[1093] Hoare, C. A. R. CASE expressions. *ALGOL Bulletin*, 18.3.7:20–22, 1964.

[1094] Hoare, C. A. R. A note on the FOR statement. *BIT*, 12:334–341, 1972.

[1095] Hoare, C. A. R. Communicating sequential processes. *Comm. ACM*, 21(8):666–677, 1978.

[1096] Hobson, E. W. *A Treatise on Plane and Advanced Trigonometry.* Dover Publications, 7^{th} edition, 1957. (First edition by Cambridge University Press, 1891).

[1097] Hock, W. and Schittkowski, K. *Test Examples for Nonlinear Programming Codes*, volume 187 of *Lecture Notes in Economics and Mathematical Systems.* Springer-Verlag, 1981.

[1098] Hockney, R. W. A fast direct solution of Poisson's equation using Fourier analysis. *J. ACM*, 12:95–113, 1965.

[1099] Hockney, R. W. *The Science of Computer Benchmarking.* SIAM Publications, 1995.

[1100] Hockney, R. W. and Curington, I. J. $f_{1/2}$: A parameter to characterize memory and communication bottlenecks. *Parallel Computing*, 10:277–286, 1989.

[1101] Hockney, R. W. and Jesshope, C. *Parallel Computers – II : Architectures, Programming & Algorithms.* Adam Hilger, 1988.

[1102] Hoffman, A. J., Martin, M. S., and Rose, D. J. Complexity bounds for regular finite difference and finite element grids. *SIAM J. Numer. Anal.*, 10:364–369, 1973.

[1103] Hoffman, A. J. and McCormick, S. T. A fast algorithm that makes matrices optimally sparse. In Pulleyblank, W. R., editor, *Progress in Combinatorial Optimization*, pages 185–196. Academic Press, 1984.

[1104] Hoffman, K. and Kunze, R. *Linear Algebra.* Prentice-Hall, 1971.

[1105] Hofstadter, D. R. *Gödel, Escher, Bach : An Eternal Golden Braid.* Penguin Books, 1980.

[1106] Hofstadter, D. R. *Metamagical Themas : Questing for the Essence of Mind and Pattern.* Penguin Books, 1986.

[1107] Holloman, D. R. Forward and backward chaining of data areas. *IBM Tech. Discl. Bull.*, 13:1956–1960, 1970.

[1108] Hood, P. Frontal solution program for unsymmetric matrices. *Int. J. Numer. Meth. in Eng.*, 10:379–400, 1976.

[1109] Hopcroft, J. E. and Karp, R. M. An $n^{5/2}$ algorithm for maximum matchings in bipartite graphs. *SIAM J. Comput.*, 2:225–231, 1973.

[1110] Hopcroft, J. E. and Kerr, L. R. On minimizing the number of multiplications necessary for matrix multiplication. *SIAM J. Appl. Math.*, 20:30–36, 1971.

[1111] Hopcroft, J. E. and Tarjan, R. Efficient algorithms for graph manipulation. *Comm. ACM*, 16:372–378, 1973.

[1112] Hopcroft, J. E. and Ullmann, J. D. Set merging algorithms. *SIAM J. Comput.*, 2:294–303, 1973.

[1113] Hopper, M. J. Harwell subroutine library : A catalogue of subroutines. Tech. Report AERE-R-9185, Harwell Laboratory, 1989. (9^{th} Edition).

[1114] Horowitz, E. and Sahni, S. *Fundamentals of Data Structures.* Computer Science Press, 1976.

[1115] Horowitz, E. and Sahni, S. *Fundamentals of Computer Algorithms.* Computer Science Press, Inc., Maryland, 1978.

[1116] Hoskins, J. *IBM RISC System/6000 : A Business Perspective.* John Wiley & Sons, 2^{nd} edition, 1992.

[1117] Householder, A. S. KWIC index for matrices in numerical analysis, volume 1 primary authors A–J, volume 2 primary authors K–Z. Report ORNL-4418, Oak Ridge National Laboratory.

[1118] Householder, A. S. KWIC index for the numerical treatment of nonlinear equations. Report ORNL-4595, Oak Ridge National Laboratory.

[1119] Householder, A. S. *Principles of Numerical Analysis.* McGraw-Hill, 1953.

[1120] Householder, A. S. A survey of some closed methods for inverting matrices. *SIAM J. Appl. Math.*, 5:155–169, 1957.

[1121] Householder, A. S. Unitary triangularization of a nonsymmetric matrix. *J. ACM*, 5:339–342, 1958.

[1122] Householder, A. S. Matrix inversion. In *International Dictionary of Applied Mathematics.* Van Nostrand, Princeton, 1960.

[1123] Householder, A. S. *The Theory of Matrices in Numerical Analysis.* Blaisdell Publishing Co., 1964.

[1124] Householder, A. S. *The Numerical Treatment of a Single Nonlinear Equation.* McGraw-Hill, 1970.

[1125] Housos, E. C., Huang, C. C., and Liu, J-M. Parallel algorithms for the AT&T KORBX systems. *AT&T Technical Journal*, 68(3):37–47, 1989.

[1126] Housos, E. C. and Irisarri, G. D. A sparse variable metric optimization method applied to the solution of power systems problems. *IEEE Trans. Power Apparatus and Systems*, PAS-101:195–202, 1982.

[1127] Howell, J. A. and Gregory, R. T. An algorithm for solving linear algebraic equations using residue arithmetic – I. *BIT*, 9(3):200–224, 1969.

[1128] Howell, J. A. and Gregory, R. T. An algorithm for solving linear algebraic equations using residue arithmetic – II. *BIT*, 9(3):324–337, 1969.

[1129] Howell, J. A. and Gregory, R. T. Solving linear equations using residue arithmetic, algorithm II. *BIT*, 10(1):27–37, 1970.

[1130] Howell, T. D. Partitioning using *PAQ*. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[1131] Hsieh, H. Y. Fill-in comparisons between Gauss-Jordan and Gaussian eliminations. *IEEE Trans. Circuits and Systems*, CAS-21:230–233, 1974.

[1132] Hsieh, H. Y. Pivoting-order computation method for large random sparse systems. *IEEE Trans. Circuits and Systems*, CAS-21:225–230, 1974.

[1133] Hsieh, H. Y. and Ghausi, M. S. On sparse matrices and optimal pivoting algorithms. Tech. Report TR-22-1249, IBM.

[1134] Hsieh, H. Y. and Ghausi, M. S. On optimal pivoting algorithms in sparse matrices. *IEEE Trans. Circuit Theory*, CT-19:93–96, 1972.

[1135] Hsieh, H. Y. and Ghausi, M. S. A probabilistic approach to optimal pivoting and prediction of fill-in for random sparse matrices. *IEEE Trans. Circuit Theory*, CT-19:329–336, 1972.

[1136] Hsu, T. H. An algorithm for finding a minimal equivalent graph of a digraph. *J. ACM*, 22:11–16, 1975.

[1137] Hu, T. C. Revised matrix algorithms for shortest paths. *SIAM J. Appl. Math.*, 15:207–218, 1967.

[1138] Hu, T. C. A decomposition algorithm for the shortest paths in a network. *Operations Res.*, 16:91–102, 1968.

[1139] Huang, J. and Wing, O. On minimum completion time and optimal scheduling of parallel triangulation of a sparse matrix. In *IEEE Power Engineering Society Summer Meeting*, Los Angeles, 1978. Institute of Electrical and Electronics Engineers, Inc. (IEEE Abstract A78-567-0).

[1140] Huang, J. W. and Wing, O. Optimal parallel triangulation of a sparse matrix. *IEEE Trans. Circuits and Systems*, CAS-26(9):726–732, 1979.

[1141] Huber, P. J. *Robust Statistics.* John Wiley & Sons, 1981.

[1142] Hull, T. E. The numerical integration of ordinary differential equations. In *Proc. IFIP Congress*, Edinburgh, 1968.

[1143] Humes, C. Jr. and Humes, A. F. *Programação Linear : Um Primeiro Curso.* Sociedade Brasileira de Matemática Aplicada e Computacional, Rio de Janeiro, 1986.

[1144] Hunt, P. M. The electronic digital computer in aircraft structural analysis, The programming of the Argyris matrix formulation of structural theory for an electronic digital computer – I : A description of a matrix interpretive scheme and its application to a particular example. *Aircraft Engineering*, 28:70–76, 1956.

[1145] Hwang, K. Advanced parallel processing with supercomputer architectures. *Proc. of the IEEE*, 75:1348–1379, 1987.

[1146] Hwang, K. and Briggs, F. A. *Computer Architecture and Parallel Processing.* McGraw-Hill, New York, 1985.

[1147] Hwu, W. M. and Patt, Y. HPSm : A high performance restricted data flow architecture having minimum functionality. In *Proc. 13^{th} Symposium on Computer Architecture*, pages 297–307, Tokyo, 1986.

[1148] IBM. *PL/I "Language Specifications".* (Form C-28-6571).

[1149] IBM. *PL/I "Reference Manual".* (Form C-28-8201).

[1150] IBM. *System/360 Matrix Language (MATLAN).* (Application Description IBM H-20-0479, Program Description IBM H-20-0564, Operations Manual IBM H-20-0559, System Manual IBM H-20-0261).

[1151] IBM. *FORTRAN General "Information Manual"*, 1961. (Document F-28-8074-1).

[1152] IBM. Special Issue on New Techniques in the Mathematics of Numerical Computation. IBM J. of Research and Development, 16, 1972.

[1153] IBM. *IBM System/360 and System/370, IBM 1130 and IBM 1800 Mathematics Subroutine Library "User's Guide"*, 1976. (Program Product 5736-XM7, IBM Catalogue SH-12-5300-1).

[1154] IBM. *Engineering and Scientific Subroutine Library (ESSL) "Guide and Reference"*, 1988. (Release 3, Order SC-23-0184).

[1155] IBM. The IBM RISC System/6000 Processor, Collection of Papers. IBM J. of Research and Development, 34(1), 1990.

[1156] IBM. *Optimization Subroutine Library (OSL) "Guide and Reference", Version 2, Release 2*, 1994. (Order No. SC-23-0526-01).

[1157] IEEE. Special Issue on Computer-Aided-Design. IEEE Trans. on Circuit Theory, CT-18, 1971.

[1158] IEEE. Standard for binary floating point arithmetic. *SIGPLAN Notices*, 22(2):9–25, 1985.

[1159] IEEE Committee Report. Parallel processing in power systems computation. *IEEE Trans. Power Systems*, PWRS-7:629–638, 1992.

[1160] Iliffe, J. K. and Jodeit, J. G. A dynamic memory allocation scheme. *Computing J.*, 5:200–209, 1962.

[1161] IMA. *Sparse Matrices and their Uses : Proc. 1980 IMA Numerical Analysis Group Conference.* Academic Press, 1981.

[1162] IMSL. *Library "Reference Manual"*. Houston, 8^{th} edition, 1980.

[1163] INTEL. *i860 64-Bit Microprocessor "Data Sheet"*, 1989.

[1164] INTEL. *i860 64-Bit Programmer's "Reference Manual"*, 1989.

[1165] INTEL. *iPSC i860 FORTRAN Compiler "User's Guide"*, 1992.

[1166] Irisarri, G. D. and Sasson, A. M. An automatic contingency selection method for on-line security analysis. *IEEE Trans. Power Apparatus and Systems*, PAS-100:1838–1844, 1981.

[1167] Irons, B. M. A frontal solution program for finite element analysis. *Int. J. Numer. Meth. in Eng.*, 2:5–32, 1970.

[1168] Irons, B. M. and Kan, D. K. Y. Equation-solving algorithms for the finite-element method. In Fenves, S. J., Perrone, N., Robinson, A. R., and Schnobrich, W. C., editors, *Numerical and Computer Methods in Structural Mechanics*, pages 497–511. Academic Press, 1973.

[1169] Isaacson, E. and Keller, H. B. *Analysis of Numerical Methods.* John Wiley & Sons, 1966.

[1170] Iverson, K. E. *APL : A Programming Language.* John Wiley & Sons, 1962.

[1171] Jacobs, D. A. H., editor. *The State of the Art in Numerical Analysis.* Academic Press, 1977.

[1172] Jaeger, A. and Wenke, K., editors. *Lineare Wirtschaftsalgebra.* Teubner, Berlin, 1969.

[1173] Jarre, F. *The Method of Analytic Centers for Smooth Convex Programs.* Grottenthaler Verlag, Bamberg, 1989.

[1174] Jennings, A. A compact storage scheme for the solution of symmetric linear simultaneous equations. *Computing J.*, 9:281–285, 1966.

[1175] Jennings, A. A direct method for computing latent roots and vectors of a symmetric matrix. *Proc. Cambridge Philos. Soc.*, 63:755–765, 1967.

[1176] Jennings, A. A sparse matrix scheme for the computer analysis of structures. *Int. J. of Comp. Math.*, 2:1–21, 1968.

[1177] Jennings, A., editor. *Matrix Computation for Engineers and Scientists.* John Wiley & Sons, 1977.

[1178] Jennings, A. and Malik, G. M. Partial elimination. *J. Inst. Math. Appl.*, 20:307–316, 1977.

[1179] Jennings, A. and Tuff, A. D. A direct method for the solution of large sparse symmetric simultaneous equations. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 97–104. Academic Press, 1971.

[1180] Jensen, H. G. Designing self supporting transmission towers with the digital computer. In *PICA Conference Proceedings*, Pittsburgh, 1967.

[1181] Jensen, H. G. Efficient matrix techniques applied to transmission tower design. *Proc. IEEE*, 55:1997–2000, 1967.

[1182] Jensen, H. G. and Parks, G. A. Efficient solutions for linear matrix equations. *J. of the Structural Division, American Soc. of Civil Eng.*, 97(1):49–64, 1970.

[1183] Jensen, K. and Wirth, N., editors. *PASCAL : User Manual and Report.* Springer-Verlag, 2^{nd} edition, 1975.

[1184] Jensen, P. S. and Loden, W. A. Supplementary study on the sensitivity of optimized structures. Tech. Report LMSC-D-777859, Lockheed Palo Alto Research Laboratory, 1980.

[1185] Jess, J. A. G. and Kees, H. G. M. A data structure for parallel LU decomposition. *IEEE Trans. Comput.*, C-31(3):231–239, 1982.

[1186] Jewell, J. G. Ordering systems of equations. *SIAM J. Appl. Math.*, 9:55–71, 1961.

[1187] Jodeit, J. G. Storage organization in programming systems. *Comm. ACM*, 11:741–746, 1968.

[1188] Johnson, D. B. Efficient algorithms for shortest paths in sparse networks. *J. ACM*, 24:1–13, 1977.

[1189] Johnson, D. M., Dulmage, A. L., and Mendelsohn, N. S. Connectivity and reducibility of graphs. *Cand. J. Math.*, 14:529–539, 1963.

[1190] Johnson, S. C. LINT : A *C* program checker. In *UNIX Programmer Manual.* BELL Labs., 7^{th} edition, 1979.

[1191] Johnson, S. C. and Kernighan, B. W. The programming language *B*. Tech. Report 8, Computer Science Dept., BELL Labs., Inc., 1973.

[1192] Johnson, S. C. and Ritchie, D. M. Portability of *C* programs and the UNIX system. *BELL System Tech. Journal*, 57:2021–2048, 1978.

[1193] Jones, M. T. and Patrick, M. L. The use of Lanczos's method to solve the large generalized symmetric definite eigenvalue problem. Tech. Report 89-67, Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, Hampton, 1989.

[1194] Jones, M. T. and Patrick, M. L. Factoring symmetric indefinite matrices in high-performance architectures. Tech. Report 90-8, Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, Hampton, 1990.

[1195] Jones, M. T. and Patrick, M. L. Bunch-Kaufman factorization for real symmetric indefinite banded matrices. *SIAM J. Matrix Anal. and Appl.*, 14:553–559, 1993.

[1196] Jones, M. T. and Patrick, M. L. Factoring symmetric indefinite matrices on high performance architectures. *SIAM J. Matrix Anal. and Appl.*, 15(1):273–283, 1994.

[1197] Jones, M. T. and Plassmann, P. E. Algorithm 740 : FORTRAN subroutines to compute improved incomplete Cholesky factorizations. *ACM Trans. Math. Software*, 21(1):18–19, 1995.

[1198] Jones, M. T. and Plassmann, P. E. An improved incomplete Cholesky factorization. *ACM Trans. Math. Software*, 21(1):5–17, 1995.

[1199] Jouppi, N. P. and Wall, D. W. Available instruction-level parallelism for superscalar and superpipelined machines. In *Proc. 3^{rd} Conference on Architectural Support for Programming Languages and Operating Systems*, pages 272–282, Boston, 1989. IEEE/ACM.

[1200] Joyce, D. A survey of extrapolation processes in numerical analysis. *SIAM Review*, 13:435–490, 1971.

[1201] Júdice, J. and Pires, F. Direct methods for convex quadratic programs subject to box constraints. Tech. Report ANL-MCS-P77-0589, Argonne National Laboratory, Argonne, Illinois, 1989.

[1202] Jung, H. W., Marsten, R. E., and Saltzman, M. J. The column Cholesky method for numerical factorization in interior point algorithms. Tech. Report 596, Dept. of Mathematical Sciences, Clemson Univ., Clemson, 1991.

[1203] Jung, H. W., Marsten, R. E., and Saltzman, M. J. Numerical factorization methods for interior point algorithms. *ORSA J. Computing*, 6(1), 1994.

[1204] Jung, H. W. and Saltzman, M. J. The multifrontal method for numerical factorization in interior point algorithms. Tech. Report 597, Dept. of Mathematical Sciences, Clemson Univ., Clemson, 1991.

[1205] Justino Filho, M. R. Solução multifrontal de sistemas de equações algébricas lineares simétricas esparsas. Seminário de Doutorado do Programa de Engenharia Civil, COPPE/UFRJ, 1990.

[1206] Justino Filho, M. R. and Ebecken, N. F. F. Decomposição de domínio automática de malhas do método de elementos finitos no hipercubo INTEL iPSC/860. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 432–443, 1993.

[1207] Kahan, W. Numerical linear algebra. *Canadian Math. Bull.*, 9:757–801, 1966.

[1208] Kahan, W. and Parlett, B. N. How far should you go with the Lanczos process ? In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*, pages 131–144. Academic Press, 1976.

[1209] Kahaner, D., Moler, C. B., and Nash, S. *Numerical Methods and Software*. Prentice-Hall, 1989.

[1210] Kahaner, D. K. Benchmarks for 'real' programs. *SIAM News*, November 1988.

[1211] Kane, G. *MIPS RS2000 RISC Architecture*. Prentice Hall, 1986.

[1212] Kane, G. *MIPS RISC Architecture*. Prentice Hall, 1988.

[1213] Kantorovich, L. V. Mathematical methods of organizing and planning production. *Management Science*, 6:366–422, 1959. (Russian original by Publication House of the Leningrad State University, 1939).

[1214] Kantorovich, L. V. and Krylov, V. I. *Approximate Methods of Higher Analysis*. Noordhoff, Groningen, 1958. (Translated from the Russian original).

[1215] Kaplan, W. *Advanced Calculus*. Addison-Wesley, 1953.

[1216] Karmarkar, N. A new polynomial time algorithm for linear programming. *Combinatorica*, 4:373–395, 1984.

[1217] Karmarkar, N. A new polynomial time algorithm for linear programming. In *Proc. 16^{th} Annual ACM Symposium on the Theory of Computing*, pages 302–311, 1984.

[1218] Karmarkar, N. Rieamannian geometry underlying interior-point methods for linear programming. *Contemporary Mathematics*, 114:51–75, 1990.

[1219] Karmarkar, N., Lagarias, J. C., Slutsman, L., and Wang, P. Power series variants of Karmarkar-type algorithms. *AT&T Technical Journal*, 68(3):20–36, 1989.

[1220] Karmarkar, N. and Ramakrishnan, K. Implementation and computational results of the Karmarkar algorithm for linear programming using an iterative method for computing projections. Tech. Report, AT&T, BELL Labs., New Jersey, 1988.

[1221] Karmarkar, N., Resende, M. G. C., and Ramakrishnan, K. A interior point algorithm to solve computationally difficult set covering problems. Manuscript, AT&T BELL Labs., Murray Hill, 1989.

[1222] Karmarkar, N. and Sinha, L. P. Application of Karmarkar's algorithm to overseas telecommunications facilities planning. (Presented at 12^{th} International Symposium on Mathematical Programming, Boston), 1985.

[1223] Karp, A. H. Programming for parallelism. *IEEE Computer*, 20:43–57, 1987.

[1224] Karp, A. H. and Babb, R. A comparison of 12 parallel FORTRAN dialects. *IEEE Software*, pages 52–67, 1988.

[1225] Karp, R. M. Some bounds on the storage requirements of sequential machines and Turing machines. *J. ACM*, 14:478–489, 1967.

[1226] Karp, R. M. Reducibility among combinatorial problems. In Miller, R. E., editor, *Complexity of Computer Computations*, pages 85–103. Plenum Press, 1972.

[1227] Karp, R. M. On the complexity of combinatorial problems. *Networks*, 5:45–68, 1975.

[1228] Karp, R. M. Combinatorics, complexity, and randomness. *Comm. ACM*, 29:98–109, 1986.

[1229] Karp, R. M. and Miller, R. E. Properties of a model for parallel computation : Determinancy, termination, queueing. *SIAM J. Appl. Math.*, 14, 1966.

[1230] Karp, R. M. and Miller, R. E. Parallel program schemata. *J. Comput. System. Sci.*, 3:147–195, 1969.

[1231] Karp, R. M., Miller, R. E., and Winograd, S. The organization of computations for uniform recurrence equations. *J. ACM*, 14:563–590, 1967.

[1232] Karp, R. M. and Papadimitriou, C. H. On linear characterizations of combinatorial optimization problems. *SIAM J. Comput.*, 11:620–632, 1982.

[1233] Karush, W. Minima of functions of several variables with inequalities as side constraints. Master's thesis, Dept. of Mathematics, Univ. of Chicago, 1939.

[1234] Karypis, G., Gupta, A., and Kumar, V. A parallel formulation of interior point algorithms. In *Proc. Supercomputing '94*, pages 204–213. IEEE Computer Society Press, 1994.

[1235] Kaskurewickz, E. and Bhaya, A. Sistemas dinâmicos de grande porte : Estabilidade. In *I Escola Brasileira de Otimização*, pages 80–93, Rio de Janeiro, 1989.

[1236] Kaszkurewicz, E., Bhaya, A., and Siljak, D. D. On the convergence of parallel asynchronous block-iterative computations. In *Linear Algebra and Its Applications*, pages 139–160. Elsevier Science Publishing Co., 1990.

[1237] Kaufman, L. Application of dense Householder transformations to a sparse matrix. *ACM Trans. Math. Software*, 5:442–450, 1979.

[1238] Kaufman, L. Usage of the sparse matrix programs in the PORT library. Tech. Report 105, AT&T BELL Labs., Murray Hill, 1982.

[1239] Kaufman, L. The generalized Householder transformation and sparse matrices. *Lin. Alg. Appl.*, 90:221–234, 1987.

[1240] Kaufman, L. Computing the MDM^T decomposition. Tech. Report 11274-91-1011-20, BELL Labs., 1991.

[1241] Keller, R. M. Look-ahead processors. *ACM Computing Surveys*, 7(4):177–195, 1975.

[1242] Kendrick, D. and Meeraus, A. GAMS : An introduction, 1984. Development Research Dept., World Bank.

[1243] Kennington, J. L. A survey of linear cost multicommodity network flows. *Operations Res.*, 26:209–236, 1978.

[1244] Kernigham, B. W. and McIlroy, M. D. *UNIX Programmer's Manual.* BELL Labs., Murray Hill, 1990. (7^{th} edition).

[1245] Kernigham, B. W. and Ritchie, D. M. *The C Programming Language.* Prentice-Hall, 1978.

[1246] Kernighan, B. W. and Lin, S. An efficient heuristic procedure for partitioning graphs. *BELL System Tech. Journal*, 49:291–307, 1970.

[1247] Kernighan, B. W. and Plauger, P. J. *The Elements of Programming Style.* McGraw-Hill, 1974.

[1248] Kernighan, B. W. and Plauger, P. J. *Software Tools.* Addison-Wesley, 1976.

[1249] Kevorkian, A. K. and Snoek, J. Decomposition in large scale systems : Theory and applications in solving large sets of nonlinear simultaneous equations. In Himmelblau, D. M., editor, *Proc. NATO Conference at Cambridge, 1972*, pages 491–515. North-Holland, 1973.

[1250] Kevorkian, A. K. and Snoek, J. Decomposition in large scale systems : Theory and applications of structural analysis in partitioning, disjointing and constructing hierarchical systems. In Himmelblau, D. M., editor, *Proc. NATO Conference at Cambridge, 1972*, pages 467–489. North-Holland, 1973.

[1251] Key, J. E. Computer program for solution of large sparse unsymmetric systems of linear equations. *Int. J. Numer. Meth. Eng.*, 6:497–509, 1973.

[1252] Khachiyan, L. G. A polynomial algorithm for linear programming. *Soviet Math. Doklady*, 20:191–194, 1979. (Russian original in Doklady Akademiia Nauk SSSR, 244:1093–1096).

[1253] Khachiyan, L. G. Polynomial algorithms in linear programming. *USSR Computational Mathematics and Math. Phys.*, 20:53–72, 1980. (Russian original in Zhurnal Vychisditel'noi Matematiki i Matematicheskoi Fiziki, 20:51–68).

[1254] Khachiyan, L. G. and Todd, M. J. On the complexity of approximating the maximal inscribed ellipsoid for a polytope. Tech. Report 893, School of Operations Research and Industrial Engineering, Cornell Univ., Ithaca, 1990.

[1255] Kincaid, D. R., Respess, J. R., Young, D. M., and Grimes, R. G. ITPACK 2C : A FORTRAN package for solving large sparse linear systems by adaptive accelerated iterative methods. *ACM Trans. Math. Software*, 8(3):302–322, 1982.

[1256] King, I. P. An automatic reordering scheme for simultaneous equations derived from network problems. *Int. J. Numer. Meth. in Eng.*, 2:523–533, 1970.

[1257] Kirkpatrick, S., Gelatt, C. D. Jr., and Vecchi, P. Optimization by simulated annealing. *Science*, 220(4598):671–680, 1983.

[1258] Klee, V. Combinatorial optimization : What is the state of the art ? *Math. Oper. Res.*, 5:1–26, 1980.

[1259] Klee, V. and Minty, G. J. How good is the simplex algorithm ? In Shisha, O., editor, *Inequalities – III*, pages 159–175. Academic Press, 1972.

[1260] Klein, F. et al., editors. *Famous Problems and other Monographs.* Chelsea Publishing, 2^{nd} edition, 1962.

[1261] Klyuyev, V. V. and Kokovkin-Shcherbak, N. I. On the minimization of the number of arithmetic operations for the solution of linear algebraic systems. Tech. Report CS-24, Computer Science Dept., Stanford Univ., 1965.

[1262] Knowlton, K. C. A fast storage allocator. *Comm. ACM*, 8:623–625, 1965.

[1263] Knuth, D. E. An empirical study of FORTRAN programs. *Software Practice and Experience*, 1(2):105–133, 1971.

[1264] Knuth, D. E. *Mathematical Analysis of Algorithms.* Information Processing, 1971.

[1265] Knuth, D. E. *The Art of Computer Programming, volume 1 : Fundamental Algorithms.* Addison-Wesley, 2^{nd} edition, 1973.

[1266] Knuth, D. E. *The Art of Computer Programming, volume 3 : Sorting and Searching.* Addison-Wesley, 1973.

[1267] Knuth, D. E. Structured programming with GOTO statements. *ACM Computing Surveys*, 6:261, 1974.

[1268] Knuth, D. E. A generalization of Dijkstra's algorithm. *Inform. Process. Lett.*, 6:1–5, 1977.

[1269] Kogge, P. *The Architecture of Pipelined Computers.* McGraw-Hill, 1981.

[1270] Kojima, M., Megiddo N., Nooma, T., and Yoshise, A. *A Unified Approach to Interior Point Algorithms for Linear Complementarity Problems*, volume 538 of *Lecture Notes in Computer Science.* Springer-Verlag, 1991.

[1271] Kolmogorov, A. Three approaches to the quantitative definition of information. *Problems Inform. Transmission*, 1:1–7, 1965.

[1272] König, D. Graphen und matrizen. *Mat. Fiz. Lapok*, 38:116–119, 1931.

[1273] König, D. *Theorie der Endlichen and Unendlichen Graphen.* Chelsea, New York, 1950.

[1274] Korganoff, A. *Méthodes de Calcul Numérique – I.* Dunod, 1960.

[1275] Korth, H. F. and Silberchatz, A. *Database System Concepts.* McGraw-Hill, 1986.

[1276] Kosko, E. Matrix inversion by partitioning. *Aero. Quart.*, 8:157–184, 1957.

[1277] Kotov, V. E. and Maringani, A. S. On transformations of sequential programs into asynchronous parallel programs. In *IFIP Congress*, Edinburgh, 1968.

[1278] Kranich E. Interior point methods for mathematical programming : A bibliography. Tech. Report 171, Institute of Economy and Operations Research, Fern Univ. Hagen, P.O. Box 940, D-5800 Hagen 1, West Germany, 1991.

[1279] Kratzer, S. G. Massively parallel sparse matrix computations. Tech. Report SRC-TR-90-008, Supercomputer Research Center, Bowie, 1990.

[1280] Krogh, F. T. and van Snyder, W. Algorithm 669 : A new representation of Patterson's quadrature formulae. *ACM Trans. Math. Software*, 17(4):457–461, 1991.

[1281] Kron, G. *Tensor Analysis of Networks.* John Wiley & Sons, 1939.

[1282] Kron, G. A set of principles to interconnect the solutions of physical systems. *J. Appl. Phys.*, 24:965–980, 1953.

[1283] Kron, G. Solving highly complex elastic structures in easy stages. *J. Appl. Mech.*, 22:235–244, 1955.

[1284] Kron, G. Tearing and interconnecting as a form of transformation. *Quart. Appl. Math.*, 13:147–159, 1955.

[1285] Kron, G. *Diakoptics.* MacDonald, London, 1963.

[1286] Kruskal, J. B. On the shortest spanning subtree of a graph and the traveling salesman problem. *Proc. of the AMS*, 2:48–50, 1956.

[1287] Kublanovskaja, V. N., Savinov, G. V., and Smirnova, T. N. On the solution of problems with sparse matrices. *Zap. Naum. Sem. Leningrad, Otdel. Mat. Inst. Steklov. (LOMI)*, 35:75–94, 1973. (In Russian).

[1288] Kuch, D. J. ILLIAC IV software and application programming. *IEEE Trans. Comput.*, C-17:758–770, 1968.

[1289] Kuck, D. *The Structure of Computers and Computations, Volume 1.* John Wiley & Sons, 1978.

[1290] Kuh, E. S. and Rohrer, R. A. The state-variable approach to network analysis. *Proc. of the IEEE*, 53:672–686, 1965.

[1291] Kuhn, H. W. The Hungarian method of solving the assignment problem. *Naval Res. Logistics Quart.*, 2:83–97, 1955.

[1292] Kuhn, H. W. Variants of the Hungarian method for assignment problems. *Naval Res. Logistics Quart.*, 3:253–258, 1957.

[1293] Kuhn, H. W. and Quandt, R. E. An experimental study of the simplex method. In Metropolis et al., editors, *Proc. Symposia in Applied Mathematics, volume 15, AMS.* 1963.

[1294] Kuhn, H. W. and Tucker, A. W. Nonlinear programming. In *Proc. 2^{nd} Berkeley Symposium on Mathematical Statistics and Probabilistics*, pages 481–492, Berkeley, 1951. University of California Press.

[1295] Kundur, P., Rogers, G. J., Wong, D. Y., Wang, L., and Lauby, M. G. A comprehensive computer program package for small signal stability analysis of power systems. *IEEE Trans. Power Systems*, PWRS-5:1076–1083, 1990.

[1296] Kung, H. T. and Leiserson, C. E. Systolic arrays for VLSI. In Duff, I. and Stewart, G., editors, *Sparse Matrix Proceedings 1978*, pages 256–282. SIAM Publications, 1979.

[1297] Kung, S. and Gal-Ezar, R. Linear or sparse array for eigenvalue and singular value decompositions ? In *Proc. USC Workshop on VLSI and Modern Signal Processing*, pages 89–98, Los Angeles, 1982.

[1298] Kung, S., Gal-Ezar, R., Arun, K., and Bhaskarrao, D. Wavefront array processor : Architecture, language and application. *IEEE Trans. Comput*, C-31:1054–1066, 1982.

[1299] Kunkel, S. R. and Smith, J. E. Optimal pipelining in supercomputers. In *Proc. 13^{th} Symposium on Computer Architecture*, pages 404–414, Tokyo, 1986.

[1300] Kuntzmann, J. *Méthodes Numériques : Interpolation, Dérivées.* Dunod, 1959.

[1301] Kuo, F. F. Network analysis by digital computer. *Proc. IEEE*, 54:820–829, 1966.

[1302] Kuo, F. F. and Kaiser, J. F., editors. *System Analysis by Digital Computer.* John Wiley & Sons, 1966.

[1303] Kuo, F. F. and Magnuson, W. G., editors. *Computer Oriented Circuit Design.* Prentice Hall, 1969.

[1304] Kwong, S. W. and Wood, D. *Proc. 4^{th} International Symposium on Programming*, volume 83 of *Lecture Notes in Computer Science*, chapter Concurrent Operations in Large Ordered Indexes, pages 208–221. Springer-Verlag, 1980.

[1305] Laflin, S. and Brefner, M. A. Algorithm 380 : In-Situ transposition of a rectangular matrix. *Comm. ACM*, 13(5):324–326, 1970.

[1306] Lagarias, J. C. The nonlinear geometry of linear programming – III : Projective Legendre transform coordinates and Hilbert geometry. *Trans. of the American Math. Soc.*, 320:193–225, 1990.

[1307] Lagergren, J. Efficient parallel algorithms for tree-decomposition and related problems. In *Proc. 31^{st} Annual Symposium on Foundations of Computer Science*, pages 173–182. IEEE, 1990.

[1308] LAHEY. F77L-EM/32 FORTRAN-90 Reference Manual, LAHEY computer systems, inc.

[1309] LAHEY. F77L-EM/32 FORTRAN version 5.1 Reference Manual, LAHEY computer systems, inc.

[1310] Lam, B. Methods for solving large sparse indefinite systems of linear equations. Tech. Report 53, Australian National Univ., Computer Centre, 1976.

[1311] Lam, M. Software pipelining : An effective scheduling technique for VLIW machines. In *SIGPLAN Conference on Programming Language Design and Implementation*, pages 318–328, Atlanta, 1988. ACM.

[1312] Lamport, L. The parallel execution of DO loops. *Comm. ACM*, 17:83–93, 1974.

[1313] Lance, G. N. *Numerical Methods for High Speed Computers.* Iliffe, London, 1960.

[1314] Lanczos, C. An iteration method for the solution of the eigenvalue problem of linear differential and integral operators. *J. Res. Nat. Bur. Standards*, 45:255–281, 1950.

[1315] Lanczos, C. *Applied Analysis.* Van Nostrand, Prentice-Hall, 1956.

[1316] Lanczos, C. *Discourse on Fourier Series.* Oliver and Boyd, 1966.

[1317] Land, A. H. and Powell, S. *FORTRAN Codes for Mathematical Programming.* John Wiley & Sons, 1973.

[1318] Larcombe, M. H. E. A list processing approach to the solution of large sparse sets of matrix equations and the factorization of the overall matrix. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 25–40. Academic Press, 1971.

[1319] Larrazabal, M. R. Implementación eficiente de algoritmos de puntos interiores para programación lineal. Master's thesis, Univ. Simón Bolívar, 1991.

[1320] Lasdon, L. S. *Optimization Theory for Large Systems.* Macmillan Publishing Co., 1970.

[1321] Laski, J. G. Segmentation and virtual address topology : An essay in virtual research. *Computing J.*, 11:35–40, 1968.

[1322] Law, K. H. and Fenves, S. J. Sparse matrices, graph theory and reanalysis. In *Proc. 1^{st} International Conference on Computing in Civil Engineering*, pages 234–249. ASCE, 1981.

[1323] Law, K. H. and Fenves, S. J. A node-addition model for symbolic factorization. *ACM Trans. Math. Software*, 12(1):37–50, 1986.

[1324] Lawler, E. L., editor. *Combinatorial Optimization : Networks and Matroids.* Rinehart and Winston, New York, 1976.

[1325] Lawler, E. L., Lenstra, J. K., Rinnooy Kan, A. H. G., and Shimoys, D. B., editors. *The Traveling Salesman Problem : A Guided Tour of Combinatorial Optimization.* John Wiley & Sons, 1985.

[1326] Lawson, C. L. and Hanson, R. J. *Solving Least Squares Problems.* Prentice-Hall, 1974. (Reedited by SIAM Publications na série Classics in Applied Mathematics, volume 15, 1995).

[1327] Lawson, C. L., Hanson, R. J., Kincaid, D. R., and Krogh, F. T. Algorithm 539 : Basic Linear Algebra Subprograms for FORTRAN usage. *ACM Trans. Math. Software*, 5(3):324–325, 1979.

[1328] Lawson, C. L., Hanson, R. J., Kincaid, D. R., and Krogh, F. T. Basic Linear Algebra Subprograms for FORTRAN usage. *ACM Trans. Math. Software*, 5(3):308–323, 1979.

[1329] Leavenworth, B. Control structures in programming languages : The GOTO controversy. *SIGPLAN Notices*, 7(11):53–91, 1972.

[1330] Ledet, W. P. and Himmelblau, D. M. Decomposition procedures for the solving of large scale systems. *Advances Chem. Eng.*, 8:185–254, 1970.

[1331] Ledgard, H. F. and Marcotty, M. A genealogy of control structures. *Comm. ACM*, 18(11):629–639, 1975.

[1332] Lee, H. An implementation of Gaussian elimination for sparse systems of linear equations. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[1333] Leighton, F. T. *Introduction to Parallel Architectures : Arrays, Trees, Hypercubes.* Morgan Kaufmann Publishers, 1992.

[1334] Leiserson, C. and Lewis, J. G. Orderings for parallel sparse symmetric factorization. In Rodrigue, G., editor, *Parallel Processing for Scientific Computing*, pages 27–32. SIAM Publications, 1989.

[1335] Lemaréchal, C. Nondifferentiable optimization. In Nemhauser, G. L., Rinnooy Kan, A., and Todd, M. J., editors, *Handbooks in Operations Research and Management Science, volume 1 : Optimization*, chapter 7, pages 529–572. North-Holland, 1989.

[1336] Lemke, C. E. The dual method of solving the linear programming problem. *Naval Res. Logistics Quart.*, 1:36–47, 1954.

[1337] Leontief, W. W. *Input-Output Economics.* Oxford University Press, New York, 1966.

[1338] Leuze, M. Independent set orderings for parallel matrix factorization by Gaussian elimination. *Parallel Computing*, 10:177–191, 1989.

[1339] Levenberg, K. A method for the solution of certain problems in least-squares. *Quart. J. of Appl. Math.*, 12:164–168, 1944.

[1340] Levesque, J. and Williamson, J. *A Guidebook to FORTRAN on Supercomputers.* Academic Press, 1989.

[1341] Levi-Civita, T. *The Absolute Differential Calculus : Calculus of Tensors.* Dover Publications, 1926.

[1342] Levine, J. L. Symbolic expansion of algebraic expressions. *Comm. ACM*, 13(3):191–192, 1970.

[1343] Levkovitz, R., Andersen, J. A., and Mitra, G. The interior point method for LP on parallel computers. In Kall, P., editor, *System Modelling and Optimization, Proc. 15^{th} IFIP Conference, Univ. Zurich, 1991, Volume 180 of Lecture Notes in Control and Information Sciences*, pages 241–250. Springer Verlag, 1992.

[1344] Levy, H. M. and Eckhouse, R. H. Jr. *Computer Programming and Architecture : The VAX.* Digital Press, Bedford, 2^{nd} edition, 1989.

[1345] Levy, J. V. Buses : The skeleton of computer architectures. In Bell, C. G., Mudge, J. C., and McNamara, J. E., editors, *Computer Engineering : A DEC View of Hardware Systems Design.* Digital Press, Bedford, 1978.

[1346] Levy, R. Restructuring of the structural stiffness matrix to improve computational efficiency. *Jet Propulsion Lab. Tech. Review*, 1:61–70, 1971.

[1347] Lewis, J. G. Algorithms for sparse matrix eigenvalue problems. Tech. Report STAN-CS-77-595, Dept. of Computer Science, Stanford Univ., 1977.

[1348] Lewis, J. G. Implementation of the Gibbs-Poole-Stockmeyer and Gibbs-King algorithms. *ACM Trans. Math. Software*, 8:180–189, 190–194, 1982.

[1349] Lewis, J. G. Numerical experiments with SPARSPAK. *ACM SIGNUM Newsletter*, 18(3):12–22, 1983.

[1350] Lewis, J. G., editor. *Proc.* 5^{th} *SIAM Conference on Applied Linear Algebra.* SIAM Publications, 1994.

[1351] Lewis, J. G. and Grimes, R. G. Practical Lanczos algorithms for solving structural engineering eigenvalue problems. In Duff, I. S., editor, *Sparse Matrices and Their Uses*, pages 349–355. Academic Press, 1981.

[1352] Lewis, J. G., Peyton, B. W., and Pothen, A. A fast algorithm for reordering sparse matrices for parallel factorization. *SIAM J. Sci. and Stat. Comput.*, 10:1156–1173, 1989.

[1353] Lewis, J. G. and Poole, W. G. Jr. Ordering algorithms applied to sparse matrices in electric power problems. In Erisman, A. M., Neves, K. W., and Dwarakanath, M. H., editors, *Electric Power Problems : The Mathematical Challenge*, pages 115–124. SIAM Publications, 1980.

[1354] Lewis, J. G. and Simon, H. D. Numerical experience with the spectral transformation Lanczos method. Tech. Report MM-TR-16, ETA Division, Boeing Computer Services, Seattle, Washington, 1984.

[1355] Lewis, J. G. and Simon, H. D. The impact of hardware gather/scatter on sparse Gaussian elimination. *SIAM J. Sci. and Stat. Comput.*, 9(2):304–311, 1988.

[1356] Li, G. and Coleman, T. F. A parallel triangular solver for a hypercube multiprocessor. Tech. Report 86-787, Dept. of Computer Science, Cornell Univ., Ithaca, 1986.

[1357] Li, G. and Coleman, T. F. A parallel triangular solver for a distributed-memory multiprocessor. *SIAM J. Sci and Stat. Comp.*, 9:485–502, 1988.

[1358] Li, G. and Coleman, T. F. A new method for solving triangular systems on distributed-memory message-passing multiprocessor. *SIAM J. Sci and Stat. Comp.*, 10:382–396, 1989.

[1359] Liebl, P. and Sedlacek, J. Transformation of square matrices into quasi-triangular form by means of graph theory. *Apl. Mat.*, 11:1–9, 1966.

[1360] Lima, L. T. G. Estudo comparativo dos métodos iterativos de cálculo de autovalores aplicado ao problema da estabilidade a pequenas perturbações de sistemas elétricos de potência. Master's thesis, COPPE/UFRJ, 1991.

[1361] Lima, L. T. G., Bezerra, L. H., Tomei, C., and Martins, N. New methods for fast small-signal stability assessment of large scale power systems. Technical report, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1995. (Accepted for presentation at 1995 IEEE Winter Power Meeting).

[1362] Lima, L. T. G., Martins, N., and Pinto, H. J. C. P. Mixed real/complex factorization. Paper 92-WM-288-1-PWRS, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1992. (Presented at IEEE Winter Power Meeting).

[1363] Lin, S. and van Ness, J. E. Parallel solution of sparse algebraic equations. In *Power Industry Computer Applications (PICA)*, pages 380–386, Phoenix, 1993.

[1364] Lin, Y. and Pang, J. Iterative methods for large convex quadratic programs : A survey. *SIAM J. Control and Optim.*, 25:383–411, 1987.

[1365] Liniger, W. M. A criterion for A-stability of linear multistep integration formulae. *Computing*, 3:280–285, 1968.

[1366] Liniger, W. M. and Willoughby, R. A. Efficient numerical integration of stiff systems of differential equations. *SIAM J. Numer. Anal.*, 7:47–66, 1970. (Originally in Tech. Report RC-1970, IBM Research Center, Yorktown Heights, New York, 1967).

[1367] Lions, J. Some results concerning the reduction of binary matrices. *J. ACM*, 18:424–430, 1971.

[1368] Lipson, J. D. Symbolic methods for the computer solution of linear equations with applications to flowgraphs. In Tobey, R. G., editor, *Proc. 1968 Summer Institute on Symbolic Mathematical Computation, IBM Boston Programming Center*, pages 233–300. Cambridge, Massachusetts, 1968.

[1369] Liptay, J. S. Structural aspects of the System/360 Model 85 – II: The cache. *IBM Systems Journal*, 7(1):15–21, 1968.

[1370] Lipton, R. J., Rose, D. J., and Tarjan, R. E. Generalized nested dissection. *SIAM J. Numer. Anal.*, 16:346–358, 1979.

[1371] Lipton, R. J. and Tarjan, R. E. A separator theorem for planar graphs. *SIAM J. Appl. Math.*, 36:177–199, 1979.

[1372] Little, J. D. C., Murty, K. G., Sweeney, D. W., and Karel, C. An algorithm for the traveling salesman problem. *Operations Res.*, 11:972–989, 1963.

[1373] Liu, J. W. H. On reducing the profile of sparse symmetric matrices. Tech. Report CS-76-07, Dept. of Computer Science, Univ. of Waterloo, Canada, 1976.

[1374] Liu, J. W. H. Modification of the minimum-degree algorithm by multiple elimination. *ACM Trans. Math. Software*, 11(2):141–153, 1985.

[1375] Liu, J. W. H. A compact row storage scheme for Cholesky factors using elimination trees. *ACM Trans. Math. Software*, 12(2):127–148, 1986.

[1376] Liu, J. W. H. Computational models and task scheduling for parallel sparse Cholesky factorization. *Parallel Computing*, 3:327–342, 1986.

[1377] Liu, J. W. H. On the storage required in the out-of-core multifrontal method for sparse factorization. *ACM Trans. Math. Software*, 12(3):249–264, 1986.

[1378] Liu, J. W. H. An adaptive general sparse out-of-core Cholesky factorization scheme. *SIAM J. Sci. and Stat. Comput.*, 8(4):585–599, 1987.

[1379] Liu, J. W. H. A collection of routines for an implementation of the multifrontal method. Tech. Report CS-87-10, Dept. of Computer Science, York Univ., North York, Ontario, 1987.

[1380] Liu, J. W. H. A note on sparse factorization in a paging environment. *SIAM J. Sci. and Stat. Comput.*, 8(6):1085–1888, 1987.

[1381] Liu, J. W. H. On threshold pivoting in the multifrontal method for sparse indefinite systems. *ACM Trans. Math. Software*, 13(3):250–261, 1987.

[1382] Liu, J. W. H. A partial pivoting strategy for sparse symmetric matrix decomposition. *ACM Trans. Math. Software*, 13(2):173–182, 1987.

[1383] Liu, J. W. H. Equivalent sparse matrix reordering by elimination tree rotations. *SIAM J. Sci and. Stat. Comput.*, 9(3):424–444, 1988.

[1384] Liu, J. W. H. A graph partitioning algorithm by node separators. *ACM Trans. Math. Software*, 15(3):198–219, 1989.

[1385] Liu, J. W. H. The minimum degree ordering with constraints. *SIAM J. Sci. and Stat. Comput.*, 10(6):1136–1145, 1989.

[1386] Liu, J. W. H. The multifrontal method and paging in sparse Cholesky factorization. *ACM Trans. Math. Software*, 15(4):310–325, 1989.

[1387] Liu, J. W. H. Reordering sparse matrices for parallel elimination. *Parallel Comput.*, 11:73–91, 1989.

[1388] Liu, J. W. H. The multifrontal method for sparse matrix solution : Theory and practice. Tech. Report CS-90-04, Dept. of Computer Science, York Univ., North York, Ontario, 1990.

[1389] Liu, J. W. H. The role of elimination trees in sparse factorizations. *SIAM J. Matrix Anal. and Appl.*, 11(1):134–172, 1990.

[1390] Liu, J. W. H. A generalized envelope method for sparse factorization by rows. *ACM Trans. Math. Software*, 17(1):112–129, 1991.

[1391] Liu, J. W. H. The multifrontal method for sparse matrix solution : Theory and practice. *SIAM Review*, 34(1):82–109, 1992.

[1392] Liu, J. W. H. and Mirzaian, A. A linear reordering algorithm for parallel pivoting of chordal graphs. *SIAM J. Discr. Math.*, 2:100–107, 1989.

[1393] Liu, J. W. H. and Ng, E. A supernodal symbolic Cholesky factorization on a local-memory multiprocessor. (In preparation), 1990.

[1394] Liu, J. W. H., Ng, E., and Peyton, B. W. On finding supernodes for sparse matrix computations. Tech. Report ORNL-TM-11563, Oak Ridge National Laboratory, 1990.

[1395] Liu, J. W. H., Ng, E., and Peyton, B. W. On finding supernodes for sparse matrix computations. *SIAM J. Matrix Anal. and Appl.*, 14(1):242–252, 1993.

[1396] Liu, J. W. H. and Sherman, A. H. Comparative analysis of the Cuthill-McKee and the reverse Cuthill-McKee ordering algorithms for sparse matrices. *SIAM J. Numer. Anal.*, 13:198–213, 1975.

[1397] Livesley, R. K. The analysis of large structural systems. *Computing J.*, 3:34–39, 1960.

[1398] Llewellyn, J. and Sharda, R. Linear programming software for personal computers : 1990 Survey. *OR/MS Today*, pages 35–47, October 1990.

[1399] Lootsma, F. A. *Numerical Methods for Nonlinear Optimization.* Academic Press, 1972.

[1400] Lootsma, F. A. State of the art in parallel nonlinear optimization. *Parallel Computing*, 6:133–156, 1988.

[1401] Lorin, H. *Sorting and Sorting Systems.* Addison-Wesley, 1975.

[1402] Loute, E. and Vial, J. P. A parallelisable block Cholesky factorization for staircase linear programming problems. Tech. Report, Faculte des Sciences Economiques et Sociales, Departement d'Economie Comerciale et Industrielle, Univ. de Geneve, 1992.

[1403] Lovász, L. *An Algorithmic Theory of Number, Graphs and Convexity.* SIAM Publications, 1986.

[1404] Lovász, L. and Plummer, M. D., editors. *Matching Theory.* North-Holland, 1986.

[1405] Lucas, R. *Solving Planar Systems of Equations on Distributed-Memory Multiprocessors.* PhD thesis, Dept. of Electrical Eng., Stanford Univ., 1987.

[1406] Lucas, R., Blank, W., and Tieman, J. A parallel solution method for large sparse systems of equations. *IEEE Trans. Computer Aided Design*, CAD-6:981–991, 1987.

[1407] Lueker, G. S. and Booth, K. S. Linear algorithms to recognize interval graphs and test for the consecutive ones property. In *Proc.* 7^{th} *Annual ACM Symposium on Theory of Computing*, pages 255–265, 1975.

[1408] Luenberger, D. G. The gradient projection method along geodesic. *Management Science*, 18(11):620–631, 1972.

[1409] Luenberger, D. G. *Introduction to Linear and Nonlinear Programming.* Addison-Wesley, 1984.

[1410] Luk, F. T. *Sparse and Parallel Matrix Computations.* PhD thesis, Dept. of Computer Science, Stanford Univ., 1978. (Report STAN-CS-78-685).

[1411] Luke, Y. *Mathematical Functions and Their Approximations.* Academic Press, 1975.

[1412] Lum, V. Y., Yuen, S. T., and Dodd, M. Key-to-address transformation techniques : A fundamental performance study on large existing formatted files. *Comm. ACM*, 14:228–239, 1971.

[1413] Lund, J. and Bowers, K. L. *Sinc Methods for Quadrature and Differential Equations.* SIAM Publications, 1992.

[1414] Lustig, I. J. An analysis of an available set of linear programming test problems. Tech. Report SOL-87-11, Systems Optimization Laboratory, Dept. of Operations Research, Stanford Univ., 1987. (Reduced version in Comput. Oper. Res., 16(2):173–184, 1989).

[1415] Lustig, I. J. Feasibility issues in a primal-dual interior point method for linear programming. *Math. Programming*, 49:145–162, 1990.

[1416] Lustig, I. J. The influence of computer language on computational comparisons : An example from network optimization. *ORSA J. Computing*, 2(2):152–161, 1990.

[1417] Lustig, I. J. and Li, G. An implementation of a parallel primal-dual interior point method for block structured linear programs. *Computational Optimization and Applications*, 1:141–161, 1992.

[1418] Lustig, I. J., Marsten, R. E., and Shanno, D. F. The primal-dual interior point method on the CRAY supercomputer. In Coleman, T. F. and Li, Y., editors, *Large-Scale Numerical Optimization*, pages 70–80. SIAM Publications, 1990. (Presented at Cornell University Workshop, October 1989).

[1419] Lustig, I. J., Marsten, R. E., and Shanno, D. F. Computational experience with a primal-dual interior point method for linear programming. *Lin. Alg. Appl.*, 152:191–222, 1991.

[1420] Lustig, I. J., Marsten, R. E., and Shanno, D. F. Interior point vs. simplex method : Beyond NETLIB. *COAL Newsletter*, 19:41–44, 1991.

[1421] Lustig, I. J., Marsten, R. E., and Shanno, D. F. Computational experience with globally convergent primal-dual predictor-corrector algorithm for linear programming. Tech. Report SOR-92-10, School of Eng. and Applied Science, Dept. of Civil Eng. and Oper. Research, Princeton Univ., 1992.

[1422] Lustig, I. J., Marsten, R. E., and Shanno, D. F. The interaction of algorithms and architectures for interior point methods. In Pardalos, P. M., editor, *Advances in Optimization and Parallel Computing*, pages 190–205. North-Holland, 1992.

[1423] Lustig, I. J., Marsten, R. E., and Shanno, D. F. On implementing Mehrotra's predictor-corrector interior point method for linear programming. *SIAM J. Optimization*, 2:435–449, 1992.

[1424] Lustig, I. J., Marsten, R. E., and Shanno, D. F. Interior point methods for linear programming : Computational state of the art. *ORSA J. Computing*, 6(1):1–14, 1994.

[1425] Lustig, I. J., Marsten, R. E., and Shanno, D. F. The last word on interior point methods for linear programming : For Now. *ORSA J. Computing*, 6(1):35–36, 1994.

[1426] Lustig, I. J., Mulvey, J. M., and Carpenter, T. J. Formulating stochastic programs for interior point methods. Tech. Report SOR-89-16, School of Eng. and Applied Science, Dept. of Civil Eng. and Oper. Research, Princeton Univ., 1990.

[1427] Lustig, I. J. and Rothberg, E. Gigaflops in linear programming. Tech. Report, CPLEX Optimization, Inc., 1995.

[1428] Machado, P. A., Azevedo, G. P., and Monticelli, A. J. A mixed pivoting approach to the factorization of indefinite matrices in power system state estimation. *IEEE Trans. Power Systems*, PWRS-6(2):676–682, 1991.

[1429] MacNeal, R. H. *NASTRAN "Theoretical Manual"*. NASA, 1970. (Contract NAS-5-10049, sect 11.3).

[1430] MacNeal, R. H. and McCormick, C. W. The NASTRAN computer program for structural analysis. *Soc. Automotive Eng. Trans.*

[1431] Maculan Filho, N. Programmation linéaire en nombres entiers. Tech. Report 486, Départment D'Informatique et de Recherche Opérationnelle, Univ. de Montréal, 1983. (First part).

[1432] Maculan Filho, N. The steiner problem in graphs. *Annals of Discr. Math.*, 31:185–222, 1987.

[1433] Maculan Filho, N. and Pereira, M. V. F. *Programação Linear*. Editora Atlas, 1980.

[1434] MacVeigh, D. J. Effect of data representation on efficiency of sparse matrix operations. Master's thesis, Dept. of Computer Science, North Carolina State Univ., Chapel Hill, 1975.

[1435] Magenheimer, D. J., Peters, L., Pettis, K. W., and Zuras, D. Integer multiplication and division on the HP Precision Architecture. *IEEE Trans. Comput.*, C-37(8):980–990, 1988.

[1436] Manber, U. *Introduction to Algorithms : A Creative Approach*. Addison-Wesley, 1989.

[1437] Mandelbrot, B. B. *Fractals : Form, Chance, and Dimension*. Freeman & Co., 1977.

[1438] Mandelbrot, B. B. *The Fractal Geometry of Nature*. Freeman & Co., 1982.

[1439] Mangasarian, O. L. *Nonlinear Programming*. SIAM Publications, 1994. (First Edition, 1969).

[1440] Mangasarian, O. L. and Meyer, R. R., editors. *Parallel Methods in Mathematical Programming*, volume 42(2) of *Math. Programming, Series B*, pages 203–470. North Holland, 1988. (Special Issue).

[1441] Manteuffel, T. A. Shifted incomplete Cholesky factorization. In Duff, I. S. and Stewart, G. W., editors, *Sparse Matrix Proceedings 1978*. SIAM Publications, 1979.

[1442] Manteuffel, T. A. An incomplete factorization technique for positive definite linear systems. *Math. of Computation*, 34:473–497, 1980.

[1443] Marimont, R. B. A new method of checking the consistency of precedence matrices. *J. ACM*, 6:164–171, 1959.

[1444] Marimont, R. B. Application of graphs and boolean matrices to computer programming. *SIAM Review*, 2:259–268, 1960.

[1445] Markowitz, H. M. The elimination form of the inverse and its application to linear programming. *Management Science*, 3(3):255–269, 1957. (Originally at The RAND Corporation, Research Memorandum RM-1452, 1955).

[1446] Marquardt, D. An algorithm for least-squares estimation of nonlinear parameters. *SIAM J. Appl. Math.*, 11:431–441, 1963.

[1447] Marro, L. Méthodes de réduction de la largeur de bande et du profil efficace des matrices creuses, 1980. Thèse de 3ème cycle, Univ. de Nice.

[1448] Marro, L. A linear time implementation of profile reduction algorithms for sparse matrices. *SIAM J. Sci. and Stat. Comput.*, 7:1212–1231, 1986.

[1449] Marshall, H. Jr. *The Theory of Groups*. MacMillan, New York, 1959.

[1450] Marsten, R. E. The design of the XMP linear programming library. *ACM Trans. Math. Software*, 7:481–497, 1981.

[1451] Marsten, R. E. *"User's Manual" for the Research Version of OB1*. School of Ind. and Systems Eng., Georgia Institute of Technology, Atlanta, 1990.

[1452] Marsten, R. E., Saltzman, M. J., Shanno, D. F., Ballintijn, J. F., and Pierce, G. S. Implementation of a dual affine interior point algorithm for linear programming. *ORSA J. Computing*, 1:287–297, 1989.

[1453] Martelli, A. and Montanari, U. An application of heuristically guided search to elimination processes. In *Proc. International Computing Symposium*, pages 58–72, Venice, 1972. CINI Foundation.

[1454] Martin, D. and Estrin, G. Models of computations and systems evaluation of vertex probabilities in graph models of computations. *J. ACM*, 14:281–299, 1967.

[1455] Martin, R. S., Peters, G., and Wilkinson, J. H. The QR algorithm for real Hessenberg matrices. *Numer. Math.*, 14:219–231, 1970.

[1456] Martin, R. S. and Wilkinson, J. H. Symmetric decomposition of positive definite band matrices. *Numer. Math.*, 7:355–361, 1965.

[1457] Martin, R. S. and Wilkinson, J. H. Similarity reduction of a general matrix to Hessenberg form. *Numer. Math.*, 12:349–368, 1968.

[1458] Martinez, J. M. An algorithm for solving sparse nonlinear least squares problems. *Computing*, 39:307–325, 1987.

[1459] Martins, N. Efficient eigenvalue and frequency response methods applied to power system small-signal stability studies. *IEEE Trans. Power Systems*, PWRS-1(1):217–226, 1986.

[1460] Martins, N. and Lima, L. T. G. Eigenvalue and frequency domain analysis of small-signal electromechanical stability problems. Paper 90-TH-0292-3-PWR, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1989. (Presented at 1990 IEEE Symposium on Application of Eigenanalysis and Frequency Domain Methods for System Dynamic Performance, pages 17–33).

[1461] Martins, N. and Lima, L. T. G. Determination of suitable locations for power system stabilizers and static VAr compensators for damping electromechanical oscillations. *IEEE Trans. Power Systems*, PWRS-5:1455–1469, 1990.

[1462] Martins, N., Pinto, H. J. C. P., and Lima, L. T. G. Efficient methods for finding transfer function zeros of power systems. In *Proc. 1991 IEEE Power Industry Computer Application Conference*, pages 320–328, 1991.

[1463] Mascarenhas, W. Predicting structure in eigenvector computation. (To be published at Lin. Alg. and Appl.).

[1464] MATHLAB Group, Cambridge, Massachusetts. *MACSYMA Reference Manual, Project MAC, M.I.T.*, 1974.

[1465] MathWorks. *Pro-MATLAB "User's Guide"*. MathWorks, Inc., South Natick, 1990.

[1466] Mattson, R. L., Gecsei, J., Slutz, D. R., and Traiger, I. L. Evaluation techniques for storage hierarchies. *IBM Systems Journal*, 9:78–117, 1970.

[1467] Maurer, W. D. An improved hash code for scatter storage. *Comm. ACM*, 11:35–38, 1968.

[1468] Maurer, W. D. *Programming, Introduction to Computer Languages and Techniques*. Holden-Day, San Francisco, 1968.

[1469] Mayoh, B. H. A graph technique for inverting certain matrices. *Math. of Computation*, 19:644–646, 1965.

[1470] McCalla, T. R. *Introduction to Numerical Methods and FORTRAN Programming.* John Wiley & Sons, 1967.

[1471] McCormick, J. M. and Salvadori, M. G. *Numerical Methods in FORTRAN.* Prentice-Hall, 1964. (Published by Editora Polígono, 1971).

[1472] McCormick, S. F., editor. *Multigrid Methods.* SIAM Publications, 1987.

[1473] McCormick, S. F., editor. *Multilevel Adaptive Methods for Partial Differential Equations.* SIAM Publications, 1989.

[1474] McCormick, S. T. *A Combinatorial Approach to Some Sparse Matrix Problems.* PhD thesis, Stanford Univ., 1983.

[1475] McCormick, S. T. Making sparse matrices sparser. (To be published at Math. Programming), 1990.

[1476] McCormick, S. T. and Chang, S. F. Making AA^T sparser for interior point algorithms : Complexity and heuristics. (In preparation), 1990.

[1477] McCracken, D. D. *A Guide to FORTRAN IV Programming.* John Wiley & Sons, 2^{nd} edition, 1972.

[1478] McFarling, S. Program optimization for instruction caches. In *Proc. 3^{rd} International Conference on Architectural Support for Programming Languages and Operating Systems*, Boston, 1989.

[1479] McFarling, S. and Hennessy, J. Reducing the cost of branches. In *Proc. 13^{th} Symposium on Computer Architecture*, pages 396–307, Tokyo, 1986.

[1480] McKeeman, W. M. Crout with equilibration and iteration. *Comm. ACM*, 5:553–555, 1962.

[1481] McKellar, A. C. and Coffman, E. G. Organizing matrices and matrix operations for a paged memory system. *Comm. ACM*, 12:153–165, 1969.

[1482] McNamee, J. M. A sparse matrix package – part I. *Comm. ACM*, 14(4):265–273, 1971.

[1483] McNamee, J. M. A sparse matrix package – part II : Special Cases. *ACM Trans. Math. Software*, 9(3):344–345, 1983.

[1484] McShane, K. A., Monma, C. L., and Shanno, D. F. Implementation of a primal-dual interior point method for linear programming. *ORSA J. Computing*, 1:70–83, 1989.

[1485] Mead, C. and Conway, L., editors. *Introduction to VLSI Systems.* Addison-Wesley, 1980.

[1486] Meeraus, A. General Algebraic Modeling System (GAMS) : “User’s Guide”, version 1.0, 1982. Development Research Dept., World Bank.

[1487] Megiddo, N. Pathways to the optimal set in linear programming. In Megiddo, N., editor, *Progress in Mathematical Programming : Interior-Point and Related Methods*, pages 131–158. Springer-Verlag, 1989.

[1488] Mehlhorn, K. *Data Structures and Algorithms, volume 2 : NP Completeness and Graph Algorithms.* EATCS Monographs on Theoretical Computer Science. Springer-Verlag, 1984. Brauer, W., Rozenberg, G. and Salomaa, A., eds.

[1489] Mehlhorn, K. *Data Structures and Algorithms, volume 3 : Multi-Dimensional Searching and Computational Geometry.* EATCS Monographs on Theoretical Computer Science. Springer-Verlag, 1984. Brauer, W., Rozenberg, G. and Salomaa, A., eds.

[1490] Mehrotra, S. Implementation of affine scaling methods : Approximate solutions of systems of linear equations using preconditioned conjugate gradient methods. *ORSA J. Computing*, 4:103–118, 1992.

[1491] Mehrotra, S. On the implementation of a primal-dual interior point method. *SIAM J. Optimization*, 2(4):575–601, 1992.

[1492] Melhem, R. Parallel solution of linear systems with striped sparse matrices. *Parallel Computing*, 6:165–184, 1988.

[1493] Mesirov, J. P., editor. *Very Large Scale Computation in the* 21^{th} *Century.* SIAM Publications, 1991.

[1494] Messina, P. C. and Sterling, T. A., editors. *System Software and Tools for High Performance Computing Environments.* SIAM Publications, 1993.

[1495] Messina, P. C., Sterling, T. A., and Smith, P. H. *Enabling Technologies for PetaFlops Computing.* MIT Press, 1995.

[1496] Metacalfe, R. M. and Boggs, D. R. ETHERNET : Distributed packet switching for local computer networks. *Comm. ACM*, 19(7):395–404, 1976.

[1497] METAWARE. High C/C^{++} “User's Guide”.

[1498] Metcalf, M. *FORTRAN Optimization.* Academic Press, 1982.

[1499] Meurant, G. The evolution of scientific computing on parallel computers. Presented at I Escola de Computação Científica de Alto Desempenho, LNCC, Rio de Janeiro, 1992.

[1500] Meyer, W. S. and Albertson, V. D. Improved loss formula computation by optimally ordered elimination techniques. *IEEE Trans. Power Apparatus and Systems*, PAS-90(1):62–69, 1971.

[1501] Meyer, Y. *Wavelets : Algorithms & Applications.* SIAM Publications, 1993.

[1502] Meyers, G. J. The evaluation of expressions in a storage-to-storage architecture. *Computer Architecture News*, 7(3):20–23, 1978.

[1503] Meyers, G. J. *Advances in Computer Architecture.* John Wiley & Sons, 2^{nd} edition, 1982.

[1504] Miller, E. R., Pippenger, N., Rosemberg, A. L., and Snyder, L. Optimal 2-3 trees. *SIAM J. Comput.*, 8(1):42–59, 1979.

[1505] Miller, J. J. H. Topics in numerical analysis – II. In *Proc. Royal Irish Academy Conference on Numerical Analysis, London, 1974.* Academic Press, 1975.

[1506] Milne, W. E. *Numerical Calculus.* Princeton University Press, 1949.

[1507] Milne, W. E. *Numerical Solutions of Differential Equations.* John Wiley & Sons, 1953.

[1508] Minieka, E. *Optimization Algorithms for Networks and Graphs.* Marcel Dekker, New York, 1978.

[1509] Minoux, M. *Mathematical Programming, Theory and Algorithms.* John Wiley & Sons, 1986.

[1510] Minty, G. J. On the axiomatic foundations of the theories of directed linear graphs, electrical networks and network-programming. *J. Math. Mech.*, 15:485–520, 1966.

[1511] Miranker, W. L. A survey of parallelism in numerical analysis. *SIAM Review*, 13:524–547, 1971.

[1512] Mitchell, J. E. and Todd, M. J. Solving combinatorial optimization problems using Karmarkar's algorithm. *Math. Programming*, 56:245–284, 1992.

[1513] Moler, C. B. Iterative refinement in floating point. *J. ACM*, 14:316–321, 1967.

[1514] Moler, C. B. State of the art in matrix computations. *SIGNUM Newsletter*, 4(1):22–28, 1969.

[1515] Moler, C. B. Matrix computations with FORTRAN and paging. *Comm. ACM*, 15:268–272, 1972.

[1516] Moler, C. B. Matrix computation on distributed memory multiprocessor. In Heath, M. T., editor, *Hypercube Multiprocessors 1986*, pages 181–195. SIAM Publications, 1986.

[1517] Moler, C. B. A closer look at Amdahl's law. Tech. Report TN-02-687, INTEL, 1987.

[1518] Moon, J. W. and Moser, L. On cliques in graphs. *Israel J. Math.*, 3:23–28, 1965.

[1519] Moore, B., Padegs, A., Smith, R., and Bucholz, W. Concepts of the System/370 vector architecture. In *Proc.* 14^{th} *Symposium on Computer Architecture*, pages 282–292, Pittsburgh, 1987. ACM/IEEE.

[1520] Moré, J. and Sorensen, D. Computing a trust region step. *SIAM J. Sci. and Stat. Comput.*, 4(3):553–572, 1983.

[1521] Moré, J. J. Recent developments in algorithms and software for trust region methods. In Bachem, A., Grötschel, M., and Korte, B., editors, *Mathematical Programming : The State of the Art, Bonn 1982*. Springer-Verlag, 1983.

[1522] Moré, J. J. Trust regions and projected gradients. Tech. Report ANL-MCS-TM-107, Argonne National Laboratory, Argonne, Illinois, 1988.

[1523] Moré, J. J., Garbow, B., and Hillstrom, K. E. "User's Guide" to MINPACK-1. Tech. Report ANL-80-74, Argonne National Laboratory, Illinois, 1980.

[1524] Moré, J. J. and Sorensen, D. Newton's method. In Golub, G. H., editor, *Studies in Numerical Analysis, MAA Studies in Mathematics*, volume 24. The Mathematical Association of America, 1984.

[1525] Moré, J. J. and Toraldo, G. Algorithms for bound constrained quadratic programming problems. *Numer. Math.*, 55:377–400, 1989.

[1526] Moré, J. J. and Toraldo, G. On the solution of large quadratic programming problems with bound constraints. Tech. Report ANL-MCS-P-77-0589, Argonne National Laboratory, Argonne, Illinois, 1989.

[1527] Moré, J. J. and Wright, S. J. *Optimization Software Guide.* SIAM Publications, 1993.

[1528] Morozowski Filho, M. *Matrizes Esparsas em Redes de Potência.* LTC/FEESC, Rio de Janeiro, 1981.

[1529] Morris, R. Scatter storage techniques. *Comm. ACM*, 11(1):38–44, 1968.

[1530] Morrison, J. E. User program performance in virtual storage systems. *IBM Systems Journal*, 12:216–237, 1973.

[1531] Morse, S., Ravenal, B., Mazor, S., and Pohlman, W. INTEL microprocessors : 8008 to 8086. *Computer*, 13(10), 1980.

[1532] Moses, J. Symbolic integration : The stormy decade. *Comm. ACM*, 14:548–560, 1971.

[1533] MOTOROLA. *MC88100 RISC Microprocessor "User's Manual"*, 1988.

[1534] Muchnick, S. S. Optimizing compilers for SPARC. *SUN Technology*, 1(3):64–77, 1988.

[1535] Muller, D. E. A method for solving algebraic equations using an automatic computer. *Math. Tables Aids Comput.*, 10:208–215, 1956.

[1536] Mulvey, J. M. and Ruszczynski, A. A diagonal quadratic approximation method for large scale linear programs. Tech. Report SOR-90-08, School of Eng. and Applied Science, Dept. of Civil Eng. and Oper. Research, Princeton Univ., 1990.

[1537] Munkres, J. Algorithms for the assignment and transportation problems. *SIAM J. Appl. Math.*, 5:32–38, 1957.

[1538] Munksgaard, N. FORTRAN subroutines for direct solution of sets of sparse and symmetric linear equations. Tech. Report 77-05, Numerical Institute Lyngby, Denmark, 1977.

[1539] Munksgaard, N. Solving sparse symmetric sets of linear equations by preconditioned conjugate gradients. *ACM Trans. Math. Software*, 6(2):206–219, 1980.

[1540] Munro, I. Efficient determination of the transitive closure of a directed graph. *Information Processing Letters*, 1:56–58, 1971.

[1541] Munro, I. *Some Results in the Study of Algorithms.* PhD thesis, Dept. of Computer Science, Univ. Toronto, Ontario, 1971.

[1542] Murray, W. *Numerical Methods for Unconstrained Optimization.* Academic Press, 1972.

[1543] Murray, W. Methods for linear programming. (Talk presented at NATO Advanced Workshop on Algorithms and Model Formulations in Mathematical Programming, Bergen, Norway), 1987.

[1544] Murtagh, B. A. *Advanced Linear Programming.* McGraw-Hill, 1981.

[1545] Murtagh, B. A. and Saunders, M. A. Large-scale linearly constrained optimization. *Math. Programming*, 14:41–72, 1978.

[1546] Murtagh, B. A. and Saunders, M. A. A projected Lagrangian algorithm and its implementation for sparse nonlinear constraints. *Math. Programming Study*, 16:84–117, 1982.

[1547] Murtagh, B. A. and Saunders, M. A. MINOS 5.1 "User's Guide". Tech. Report SOL-83-20, Systems Optimization Laboratory, Dept. of Operations Research, Stanford Univ., 1987.

[1548] Murty, K. G. *Linear and Combinatorial Programming.* John Wiley & Sons, 1976.

[1549] Murty, K. G. Computational complexity of parametric linear programming. *Math. Programming*, 19:213–219, 1980.

[1550] Murty, K. G. *Linear Programming.* John Wiley & Sons, 1983.

[1551] NAG. *FORTRAN Library Manual.* Oxford, 1980. (Mark 8).

[1552] NAG. *FORTRAN PC50 Library Handbook*, 1983. (Release 1).

[1553] Nagel, E. and Newman, J. R. *Gödel's Proof.* New York Univ. Press, 1958.

[1554] Nagel, L. W. SPICE-2 : A computer program to simulate semiconductor circuits. Memorandum ERL-M520, Electronics Research Laboratory, Univ. Berkeley, 1975.

[1555] Naik, V. and Patrick, M. L. Data traffic reduction schemes for sparse Cholesky factorization. Tech. Report 88-14, Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, Hampton, 1988.

[1556] Naik, V. and Patrick, M. L. Data traffic reduction schemes for Cholesky factorization on asynchronous multiprocessor systems. Tech. Report 89-40, Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, Hampton, 1989.

[1557] Nakajima, K. A graph theoretical approach to parallel triangulation of a sparse asymmetric matrix. In *Proc. 1984 Conference on Information Science and Systems*, 1984.

[1558] Nakhla, M., Singhal, K., and Vlach, J. An optimal pivoting order for the solution of sparse systems of equations. *IEEE Trans. Circuits and Systems*, CAS-21:222–225, 1974.

[1559] Naor, J., Naor, M., and Schaffer, A. J. Fast parallel algorithms for chordal graphs. *SIAM J. Comput.*, 18:327–349, 1989.

[1560] Nash, S. G. and Sofer, A. A general purpose parallel algorithm for unconstrained optimization. *SIAM J. Optimization*, 1(4):530–547, 1991.

[1561] Natarajan, B. K. Sparse approximate solutions to linear systems. *SIAM J. Comput.*, 24(2):227–234, 1995.

[1562] Nathan, A. and Even, R. K. The inversion of sparse matrices by a strategy derived from their graphs. *Computing J.*, 10:190–194, 1967.

[1563] Natori, M. and Nodera, T., editors. *Sparsity and Supercomputer : Advances in Numerical Methods for Large Sparse Sets of Linear Equations 4*, 1988.

[1564] Natori, M. and Nodera, T., editors. *Parallel Processing for Scientific Computing : Advances in Numerical Methods for Large Sparse Sets of Linear Equations 6*, 1990.

[1565] Natori, M. and Nodera, T., editors. *Parallel Processing for Scientific Computing : Advances in Numerical Methods for Large Sparse Sets of Linear Equations 8*, 1992.

[1566] Naur, P. Revised report on the algorithmic language ALGOL 60. *Comm. ACM*, 6:1–17, 1963.

[1567] Nazareth, J. L. *The Newton-Cauchy Framework : A Unified Approach to Unconstrained Nonlinear Minimization*. Springer-Verlag, 1994.

[1568] Neiss, F., editor. *Determinanten und Matrizen*. Springer-Verlag, 5^{th} edition, 1959.

[1569] Nemhauser, G. L., RinooyKan, A., and Todd, M. J., editors. *Handbooks in Operations Research and Management Sciences, volume 1 : Optimization*. North-Holland, 1989.

[1570] Nemhauser, G. L. and Wosley, L. A. *Integer and Combinatorial Optimization*. John Wiley & Sons, 1988.

[1571] Nemhauser, G. L. and Wosley, L. A. Integer programming. In Nemhauser, G. L., Rinnooy Kan, A., and Todd, M. J., editors, *Handbooks in Operations Research and Management Science, volume 1 : Optimization*, chapter 6, pages 447–527. North-Holland, 1989.

[1572] Nesterov, Y. E. and Nemirovsky, A. S. A general approach to polynomial-time algorithms design for convex programming. Report, Central Economical and Mathematical Institute, USSR Academy of Sciences, Moscow, 1988.

[1573] Nesterov, Y. E. and Nemirovsky, A. S. Self-concordant functions and polynomial time methods in convex programming, 1989.

[1574] Nesterov, Y. E. and Nemirovsky, A. S. Acceleration and parallelization of the path-following interior method for a linearly constrained convex quadratic problem. *SIAM J. Optimization*, 1(4):548–564, 1991.

[1575] Nesterov, Y. E. and Nemirovsky, A. S. *Interior Point Polynomial Methods in Convex Programming : Theory and Algorithms*. SIAM Publishing, 1993.

[1576] Ng, E. A two-level one-way dissection scheme for finite element problems. In *Proc. 9^{th} Manitoba Conference on Numerical Mathematics and Computing*, pages 26–29, 1979.

[1577] Ng, E. A scheme for handling rank-deficiency in the solution of sparse linear least squares problems. *SIAM J. Sci. and Stat. Comput.*, 12(5):1173–1183, 1991.

[1578] Ng, E. Supernodal symbolic Cholesky factorization on a local-memory multiprocessor. *Parallel Computing*, 19:153–162, 1993.

[1579] Ng, E. A comparison of some direct methods for solving sparse nonsymmetric linear systems. In *Proc. 5^{th} SIAM Conf. on Applied Linear Algebra*, Snowbird, Utah, 1994.

[1580] Ng, E. and Peyton, B. W. A supernodal Cholesky factorization algorithm for shared-memory multiprocessors. Tech. Report ORNL-TM-11814, Oak Ridge National Laboratory, 1991.

[1581] Ng, E. and Peyton, B. W. Block sparse cholesky algorithms on advanced uniprocessor computers. *SIAM J. Sci. and Stat. Comput.*, 14:1034–1056, 1993.

[1582] Nicholls, J. E. *The Design and Structure of Programming Languages.* Addison-Wesley, 1975.

[1583] Nicol, D. M. and Saltz, J. H. An analysis of scatter decomposition. *IEEE Trans. Comput.*, C-29(11):1337–1345, 1980.

[1584] Nicolau, A. and Fisher, J. A. Measuring the parallelism available for very long instruction word architectures. *IEEE Trans. Comput.*, C-33(11):968–976, 1984.

[1585] Nie, N. H. et al. SPSS : Statistical Package for the Social Sciences.

[1586] Niederreiter, H. *Random Number Generation and Quasi-Monte Carlo Methods.* SIAM Publications, 1992.

[1587] Noble, B. *Numerical Methods, volume 1.* Oliver and Boyd, London, 1964.

[1588] Noble, B. *Numerical Methods, volume 2.* Oliver and Boyd, London, 1964.

[1589] Nocedal, J. and Overton, M. Projected Hessian updating algorithms for nonlinear constrained optimization. *SIAM J. Numer. Anal.*, 22:821–850, 1985.

[1590] Norin, R. S. and Pottle, C. Precompilation of a state-space network analysis algorithm. In *Proc. Cornell Conference on Computerized Electronics*, pages 83–91, Ithaca, 1969. Cornell Univ.

[1591] Norin, R. S. and Pottle, C. Effective ordering of sparse matrices arising from nonlinear electrical networks. *IEEE Trans. Circuit Theory*, CT-18:139–145, 1971.

[1592] Norman, R. Z. and Rabin, M. O. An algorithm for the minimum cover of a graph. *Proc. Amer. Math. Soc.*, 10:315–319, 1959.

[1593] Norris, C. H. and Wilbur, J. B. *Elementary Structural Analysis.* McGraw-Hill, 2^{nd} edition, 1960.

[1594] Nucera, R. and Gilles, M. A blocked sparse matrix formulation for the solution of equality-constrained state estimation, 1990. (Presented at IEEE Winter Power Meeting).

[1595] Nuding, E. and Kahlert-Warmbold, I. A computer-orientated representation of matrices. *Computing*, 6:1–8, 1971.

[1596] O'Brien, G. G., Hyman, M. A., and Kaplan, S. A study of the numerical solution of partial differential equations. *J. Math. and Phys.*, 29:223–251, 1951.

[1597] O'Byrne, B. An investigation of the performance of some sparse matrix storage and processing algorithms in computers with paged memory. Master's thesis, Dept. Computer Science, Univ. of Newcastle, 1975.

[1598] Oettlie, W., Prager, W., and Wilkinson, J. H. Admissible solutions of linear systems with not sharply defined coefficients. *SIAM J. Numer. Anal.*, 2:291–299, 1965.

[1599] Ogbuobiri, E. C. Dynamic storage and retrieval in sparsity programming. *IEEE Trans. Power Apparatus and Systems*, PAS-89(1):150–155, 1970.

[1600] Ogbuobiri, E. C. Sparsity techniques in power-system grid-expansion planning. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 219–230. Academic Press, 1971.

[1601] Ogbuobiri, E. C., Tinney, W. F., and Walker, J. W. Sparsity-directed decomposition for Gaussian elimination on matrices. *IEEE Trans. Power Apparatus and Systems*, PAS-89(1):141–150, 1970.

[1602] Ogielski, A. T. and Aiello, W. Sparse matrix computations on a parallel processor array. *SIAM J. Sci. and Stat. Comput.*, 14(3):519–530, 1993.

[1603] Oh-Eigeartaigh, M., Lenstra, J. K., and Rinnooy Kan, A. H. G., editors. *Combinatorial Optimization : Annotated Bibliographies.* John Wiley & Sons, 1985.

[1604] O'Leary, D. P. A generalized conjugate gradient algorithm for solving a class of quadratic programming problems. *Lin. Alg. and Appl.*, 34:371–399, 1980.

[1605] O'Leary, D. P. On bounds for scaled projections and pseudo-inverses. *Lin. Alg. Appl.*, 132:115–117, 1990.

[1606] Oliveira, F. S. G. ENTERPRISE : Uma arquitetura LISP. Master's thesis, 1991.

[1607] Oohori, T. and Ohuchi, A. Symbolic generation of an optimal Karmarkar's algorithm for sparse linear programs. In Sebastian, H. J. and Tammer, K., editors, *System Modelling and Optimization : Proc.* 14^{th} *IFIP Conference, Leipzig, 1989*, volume 143 of *Lecture Notes in Control and Information Science*, pages 194–203. Springer-Verlag, 1990.

[1608] Orchard-Hays, W. Evolution of linear programming computing techniques. *Management Science*, 4:183–190, 1958.

[1609] Orchard-Hays, W. *Advanced Linear-Programming Computing Techniques.* McGraw-Hill, 1968.

[1610] Orden, A. Matrix inversion and related topics by direct methods. In *Mathematical Methods for Digital Computers, volume 1.* John Wiley & Sons, 1960.

[1611] Ore, O. *Theory of Graphs*, volume 38. American Mathematical Society Colloquium Publications, 1962.

[1612] Ortega, J. M. *Numerical Analysis : A Second Course.* Academic Press, 1972.

[1613] Ortega, J. M. The ijk forms of factorization methods – I : Vector computers. *Parallel Computing*, 7:135–147, 1988.

[1614] Ortega, J. M. *Introduction to Parallel and Vector Solution of Linear Systems.* Plenum Press, New York, 1988.

[1615] Ortega, J. M. *Matrix Theory : A Second Course.* Plenum Press, 1988.

[1616] Ortega, J. M. and Poole, W. *An Introduction to Numerical Methods for Differential Equations.* Pitman, Marshfield, 1981.

[1617] Ortega, J. M. and Rheinboldt, W. C. *Iterative Solution of Nonlinear Equations in Several Variables.* Academic Press, 1970.

[1618] Ortega, J. M. and Rheinboldt, W. C., editors. *Numerical Solution of Nonlinear Problems : Studies in Numerical Analysis 2, Proc. Symposium sponsored by Office of Naval Research, Fall SIAM Meeting, Penna, 1968.* SIAM Publishing, 1970.

[1619] Ortega, J. M. and Romine, C. H. The ijk forms of factorization methods – II : Parallel systems. *Parallel Computing*, 7:149–162, 1988.

[1620] Ortega, J. M. and Voigt, R. G. Solution of partial differential equations on vector and parallel computers. *SIAM Review*, 27:149–240, 1985.

[1621] Ortega, J. M., Voigt, R. G., and Romine, C. H. A bibliography on parallel and vector numerical algorithms. Tech. Report ORNL-TM-10998, Oak Ridge National Laboratory, 1989. (Also published at Parallel Algorithms for Matrix Computations, SIAM Publications, 1990).

[1622] Osborne, E. E. On pre-conditioning of matrices. *J. ACM*, 7:338–345, 1960.

[1623] Osborne, M. R. A new method for the integration of stiff systems of ordinary differential equations. In *Proc. IFIP Congress*, Edinburgh, 1968.

[1624] Osterby, O. and Zlatev, Z. *Direct Methods for Sparse Matrices*, volume 157 of *Lecture Notes in Computer Science*. Springer-Verlag, 1983.

[1625] Ostlund, N. WATERLOOP V2/64 : A highly parallel machine for numerical computation. *Comput. Phys. Comm.*, 37:109–117, 1985.

[1626] Ostrouchov, G. Symbolic Givens reduction and row-ordering in large sparse least squares problems. *SIAM J. Sci. and Stat. Comput.*, 8:248–264, 1987.

[1627] Ostrowski, A. M. On the convergence of the Rayleigh quotient iteration for the computation of the characteristic roots and vectors. *Arch. Rational Mech. Anal.*, 3:341–347, 1959.

[1628] Ostrowski, A. M. *Solution of Equations and Systems of Equations.* Academic Press, 2^{nd} edition, 1966.

[1629] Overton, M. L. Large-scale optimization of eigenvalues. *SIAM J. Optimization*, 2:88–120, 1992.

[1630] Pachl, J. K. Finding pseudoperipheral nodes in graphs. *J. Comput. System Sci.*, 29:48–53, 1984.

[1631] Pacitti, T. *FORTRAN-Monitor, Princípios.* Livros Técnicos e Científicos Editora, 1968.

[1632] Pacitti, T. and Atkinson, C. P. *Programação e Métodos Computacionais, volume 2.* Livros Técnicos e Científicos Editora, 1977. (2^a edição).

[1633] Padilha, A. Metodologia para solução de equações algébricas esparsas em computadores vetoriais. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 595–600, 1993.

[1634] Padilha, A. and Morelato, A. Cálculo de matrizes de fatores inversos para multiprocessamento de equações de redes elétricas. In *IX Congresso Brasileiro de Automática*, pages 598–603, Vitória, 1992.

[1635] Padilha, A. and Morelato, A. A W-Matrix methodology for solving sparse network equations on multiprocessor computers. *IEEE Trans. Power Systems*, PWRS-7(3):1023–1030, 1992.

[1636] Padua, D. A. and Wolfe, M. J. Advanced compiler optimizations for supercomputers. *Comm. ACM*, 29(2):1184–1201, 1986.

[1637] Page, E. S. and Wilson, L. B. *Information Representation and Manipulation in a Computer.* Cambridge University Press, 1973.

[1638] Paige, C. C. *The Computation of Eigenvalues and Eigenvectors of Very Large Sparse Matrices*. PhD thesis, Univ. of London, 1971.

[1639] Paige, C. C. and Saunders, M. A. Solution of sparse indefinite systems of linear equations. *SIAM J. Numer. Anal.*, 12(4):617–629, 1975.

[1640] Paige, C. C. and Saunders, M. A. Algorithm 583 : LSQR – Sparse linear equations and least squares problems. *ACM Trans. Math. Software*, 8:195–209, 1982.

[1641] Paige, C. C. and Saunders, M. A. LSQR : An algorithm for sparse linear equations and sparse least squares. *ACM Trans. Math. Software*, 8(1):43–71, 1982.

[1642] Pan, V. Strassen algorithm is not optimal : Trilinear technique of aggregating, uniting and canceling for constructing fast algorithms for matrix multiplication. In *Proc.* 19^{th} *Annual Symposium on the Foundations of Computer Science*, pages 166–176, Ann Arbor, 1978.

[1643] Pan, V. How can we speed up matrix multiplication ? *SIAM Review*, 26:393–415, 1984.

[1644] Pan, V. *How to Multiply Matrices Faster*. Lecture Notes in Computer Science. Springer-Verlag, 1984.

[1645] Pan, V. and Reif, J. Efficient parallel solution of linear systems. In *Proc.* 17^{th} *Annual ACM Symposium on Theory of Computing*, pages 143–152, 1985.

[1646] Papadimitriou, C. H. The NP-completeness of the bandwidth minimization problem. *Computing*.

[1647] Papadimitriou, C. H. and Steiglitz, K. *Combinatorial Optimization : Algorithms and Complexity*. Prentice-Hall, 1982.

[1648] Parlett, B. N. The development and use of methods of LR type. *SIAM Review*, 6:275–294, 1964.

[1649] Parlett, B. N. Laguerre's method applied to the matrix eigenvalue problem. *Math. of Computation*, 18:464–485, 1964.

[1650] Parlett, B. N. and Reid, J. K. On the solution of system of linear equations whose matrix is symmetric but not definite. *BIT*, 10:386–397, 1970.

[1651] Parlett, B. N. and Reid, J. K. Tracking the progress of the Lanczos algorithm for large symmetric eigenproblems. Tech. Report AERE-CSS-83, Harwell Laboratory, 1980.

[1652] Parlett, B. N., Simon, H., and Stringer, L. Estimating the largest eigenvalue with the Lanczos algorithm. *Math. of Computation*, 38:153–165, 1982.

[1653] Parodi, M. *Algèbre des Matrices et Applications Physiques*. 1958.

[1654] Parodi, M. *La Localisation des Valeurs Caractéristiques des Matrices et ses Applications*. Gauthier et Villars, 1959.

[1655] Parter, S. On 'two line' iterative methods for the Laplace and biharmonic difference equations. *Numer. Math.*, 1:240–252, 1959.

[1656] Parter, S. On the eigenvalues and eigenvectors of a class of matrices. *SIAM J. Appl. Math.*, 8:376–388, 1960.

[1657] Parter, S. The use of linear graphs in Gaussian elimination. *SIAM Review*, 3:119–130, 364–369, 1961.

[1658] Patel, R. V., Laub, A. J., and van Dooren, P. M. *Numerical Linear Algebra Techniques for Systems and Control.* IEEE Press, 1994.

[1659] Paton, K. An algorithm for the blocks and cutnodes of a graph. *Comm. ACM*, 14:468–475, 1971.

[1660] Patterson, D. A. Microprogramming. *Scientific American*, 248(3):36–43, 1983.

[1661] Patterson, D. A. Reduced instruction set computers. *Comm. ACM*, 28(1):8–21, 1985.

[1662] PDS. The performance database server, 1995.

[1663] Peaceman, D. W. and Rachford, H. H. The numerical solution of parabolic and elliptic differential equations. *SIAM J. Appl. Math.*, 3:28–41, 1955.

[1664] Pearson, K. R. and Rimmer, R. J. An efficient method for the solution of large computable general equilibrium models. In *Proc. 6^{th} Biennial Conference of the Simulation Society of Australia*, 1984. (Published at Journal of the International Association for Mathematics and Computers in Simulation).

[1665] Pearson, K. R. and Rimmer, R. J. Sparse matrix methods on the VAX 11/780. In *Proc. 24^{th} European DECUS Symposium*, pages 545–552, Amsterdam, 1984.

[1666] Pease, M. C. Matrix inversion using parallel processing. *J. ACM*, 14:757–764, 1967.

[1667] Peitgen, H. and Richter, P. *The Beauty of Fractals*. Springer-Verlag, 1986.

[1668] Peltier, J. *Résolution Numérique des Équations Algébriques.* 1957.

[1669] Pereira, L. A. C. Implementação de um programa de fluxo de potência ótimo utilizando programação quadrática sequencial. Master's thesis, Depto. de Eng. de Sistemas e Computação, COPPE/UFRJ, 1991.

[1670] Peschon, J. et al. Optimum control of reactive power flow. *IEEE Trans. Power Apparatus and Systems*, PAS-87(1):40–48, 1968.

[1671] Peters, F. J. Sparse matrices and substructures with a novel implementation of finite element algorithms. In *volume 119 of Mathematical Centre Tracts*, Amsterdam, 1980.

[1672] Peters, F. J. Parallel pivoting algorithms for sparse symmetric matrices. *Parallel Computing*, 1:99–110, 1984.

[1673] Peters, F. J. Parallelism and sparse linear equations. In Evans, D. J., editor, *Sparsity and Its Applications*, pages 285–301. Cambridge University Press, 1985.

[1674] Peters, G. and Wilkinson, J. H. Symmetric decomposition of positive definite band matrices. *Numer. Math.*, 7:355–361, 1965.

[1675] Peters, G. and Wilkinson, J. H. The least squares problem and pseudo-inverses. *Computing J.*, 13:309–316, 1970.

[1676] Peterson, N. M. and Meyer, W. S. Automatic adjustment of transformer and phase shifter taps in the Newton power flow. *IEEE Trans. Power Apparatus and Systems*, PAS-90(1):103–109, 1971.

[1677] Petrie, G. W. Matrix inversion and solution of simultaneous linear algebraic equations with the IBM 604 electronic calculating punch. *Nat. Bur. Standards Appl. Math.*, 29:105–110, 1953.

[1678] Peyton, B. W. *Some Applications of Clique Trees to the Solution of Sparse Linear Systems.* PhD thesis, Clemson Univ., 1986.

[1679] Phillips, A. T. and Rosen, J. B. A parallel algorithm for constrained concave quadratic global minimization. *Math. Programming*, 42(2):421–448, 1988.

[1680] Piessens, R. et al. *QUADPACK : A Subroutine Package for Automatic Integration.* Springer-Verlag, 1983.

[1681] Pinto, H. J. C. P. and Teixeira, M. J. Aplicação de processamento paralelo em otimização de grande porte. *Pesquisa Operacional*, 8(2):47–64, 1988.

[1682] Piskounov, N. *Cálculo Diferencial e Integral, volume 1.* Lopes da Silva Editora, Porto, 1978. (Translated from the Russian original).

[1683] Piskounov, N. *Cálculo Diferencial e Integral, volume 2.* Lopes da Silva Editora, Porto, 1978. (Translated from the Russian original).

[1684] Pissanetzky, S. Gauss elimination with supersparse matrices. Tech. Report BNL-26773, Brookhaven National Laboratory, 1979.

[1685] Pissanetzky, S. KUBIK : An automatic three-dimensional finite element mesh generator. *Int. J. Numer. Meth. in Eng.*, 17:255–269, 1981.

[1686] Pissanetzky, S. An infinite element and formula for numerical quadrature over an infinite interval. *Int. J. Numer. Meth. in Eng.*, 19:913–927, 1983.

[1687] Pissanetzky, S. *Sparse Matrix Technology.* Academic Press, Inc., 1984.

[1688] Plassmann, P. E. Sparse Jacobian estimation and factorization on a multiprocessor. Tech. Report MCS-P-243-0591, Argonne National Laboratory, 1991.

[1689] Platzman, G. W. Normal modes of the Atlantic and Indian oceans. *J. Phys. Oceanography*, 5:201–221, 1975.

[1690] Plauger, P. J. A review of Kernighan and Ritchie 1978. *Computing Reviews*, pages 2–4, 1979.

[1691] Polak, E. *Computational Methods in Optimization.* Academic Press, 1971.

[1692] Polak, R. *Numerical Methods in Optimization.* Academic Press, 1961.

[1693] Ponceleón, D. B. Barrier methods for large-scale quadratic programming. Tech. Report SOL-91-2, Systems Optimization Laboratory, Stanford Univ., 1991.

[1694] Ponstein, J. Self-avoiding paths and the adjacency graph of a matrix. *SIAM J. Appl. Math.*, 14:600–609, 1966.

[1695] Pooch, U. W. and Neider, A. A survey of indexing techniques for sparse matrices. *ACM Computing Surveys*, 5:109–133, 1973.

[1696] Postnikov, M. M. *The Variational Theory of Geodesics.* Dover Publications, 1967.

[1697] Pothen, A. The complexity of optimal elimination trees. Tech. Report CS-88-16, Dept. of Computer Science, Penn. State Univ., University Park, 1988.

[1698] Pothen, A. Simplicial cliques, shortest elimination trees, and supernodes in sparse Cholesky factorization. Tech. Report CS-88-13, Dept. of Computer Science, Penn. State Univ., University Park, 1988.

[1699] Pothen, A. Predicting the structure of sparse orthogonal factors. (Manuscript), 1991.

[1700] Pothen, A. and Fan, C. J. Computing the block triangular form of a sparse matrix. Tech. Report CS-88-51, Dept. of Computer Science, Penn. State Univ., University Park, 1988. (To be published at ACM Trans. Math. Software).

[1701] Pothen, A. and Fan, C. J. Computing the block triangular form of a sparse matrix. *ACM Trans. Math. Software*, 16:303–324, 1990.

[1702] Pothen, A., Rothberg, E., Simon, H., and Wang, L. Parallel sparse cholesky factorization using spectral nested dissection ordering on the INTEL PARAGON. Tech. Report, 1994. (In preparation).

[1703] Pothen, A., Rothberg, E., Simon, H., and Wang, L. Parallel sparse cholesky factorization with spectral nested dissection ordering. Tech. Report RN-94-011, NASA Ames Research Center, 1994.

[1704] Pothen, A., Simon, H., and Liou, K. Partitioning sparse matrices with eigenvectors of graphs. *SIAM J. Matrix Anal. and Appl.*, 11:430–452, 1990.

[1705] Pothen, A., Simon, H., and Wang, L. Spectral nested dissection. Tech. Report CS-92-01, Computer Science Dept., Pennsylvania State Univ., 1992.

[1706] Pothen, A. and Sun, C. A distributed multifrontal algorithm using clique trees. Tech. Report CTC-91-TR-72, Cornell Theory Center Report, Cornell Univ., 1991.

[1707] Pothen, A. and Sun, C. A mapping algorithm for parallel sparse cholesky factorization. *SIAM J. Sci. and Stat. Comput.*, 14:1253–1257, 1993.

[1708] Pothen, A. and Wang, L. An improved spectral nested dissection algorithm. Tech. Report, 1994. (In preparation).

[1709] Powell, M. J. D. A theorem on rank one modifications to a matrix and its inverse. *Computing J.*, 12:288–290, 1969.

[1710] Powell, M. J. D. A new algorithm for unconstrained optimization. In Rosen, J. B., Mangasarian, O. L., and Ritter, K., editors, *Nonlinear Programming*. Academic Press, 1970.

[1711] Powell, M. J. D. Variable metric methods for constrained optimization. In Bachem, A., Grötschel, M., and Korte, B., editors, *Mathematical Programming : The State of the Art, Bonn 1982*. Springer-Verlag, 1983.

[1712] Powell, M. J. D. On the global convergence of trust region algorithm for unconstrained minimization. *Math. Programming*, 29(3):297–303, 1984.

[1713] Powell, M. J. D. On the number of iterations of Karmarkar algorithm for linear programming. Tech. Report DAMTP-1991-NA-23, Dept. of Applied Mathematics and Theoretical Physics, Univ. Cambridge, 1991.

[1714] Powell, M. J. D. and Toint, Ph. L. On the estimation of sparse Hessian matrices. *SIAM J. Numer. Anal.*, 16:1060–1074, 1979.

[1715] Powell, M. J. D. and Yuan, Y. A trust region algorithm for equality constrained optimization. Tech. Report DAMTP-1986-NA-2, Dept. of Applied Mathematics and Theoretical Physics, Univ. of Cambridge, Cambridge, England, 1986.

[1716] Pratt, T. W. *Programming Languages : Design and Implementation.* Prentice-Hall, 1975.

[1717] Preparata, F. P. and Shamos, M. I. *Computational Geometry : An Introduction.* Springer-Verlag, 1985.

[1718] Press, W. H., Flannery, B. P., Teukolsky, S. A., and Vetterling, W. T. *Numerical Recipes : The Art of Scientific Computing, (FORTRAN version).* Cambridge University Press, 1989.

[1719] Prim, R. C. Shortest connection networks and some generalizations. *Bell Systems Technology Journal*, 36:1389–1401, 1957.

[1720] Przemieniecki, J. S. *Theory of Matrix Structural Analysis.* McGraw-Hill, 1968.

[1721] Przybylski, S. A. *Cache Design : A Performance-Directed Approach.* Morgan Kaufmann Publishers, 1990.

[1722] Purdom, P. Jr. A transitive closure algorithm. *BIT*, 10:76–94, 1970.

[1723] Qing-shi, G. and Rong-Quan, W. Vector computer for sparse matrix operations. In *Proc. 1983 International Conference on Parallel Processing*, pages 87–89, 1983.

[1724] Quinn, M. J. *Designing Efficient Algorithms for Parallel Computers.* McGraw-Hill, 1987.

[1725] Quinn, M. J. and Deo, N. Parallel graph algorithms. *ACM Computing Surveys*, 16:319–348, 1984.

[1726] Rabinowitz, P. Applications of linear programming to numerical analysis. *SIAM Review*, 10:121–159, 1968.

[1727] Raghavan, P. and Pothen, A. Parallel orthogonal factorization. In Lewis, J. G. and Gilbert, J. R., editors, *Symposium on Sparse Matrices.* SIAM Publications, Salishan Resort, Gleneden Beach, Oregon, 1989.

[1728] Rall, L. B., editor. *Error in Digital Computation, volume 1, Proc. of the Symposium of the Mathematics Research Center, 1964*, Madison, 1965. Univ. Wisconsin.

[1729] Rall, L. B., editor. *Error in Digital Computation, volume 2, Proc. of the Symposium of the Mathematics Research Center, 1965*, Madison, 1965. Univ. Wisconsin.

[1730] Ralston, A. and Rabinowitz, P. *A First Course in Numerical Analysis.* McGraw-Hill, 2^{nd} edition, 1978. (First edition, 1965).

[1731] Ralston, A. and Wilf, H. S., editors. *Mathematical Methods for Digital Computers, volume 1.* John Wiley & Sons, 1960.

[1732] Ralston, A. and Wilf, H. S., editors. *Mathematical Methods for Digital Computers, volume 2.* John Wiley & Sons, 1967.

[1733] Ramamoorthy, C. V., Chandy, K. M., and Gonzalez, M. J. Optimal scheduling strategies in a multiprocessor system. *IEEE Trans. Comput.*, C-21:137–146, 1972.

[1734] Ramawoorthy, C. V. and Li, H. F. Pipeline architecture. *ACM Computing Surveys*, 9(1):61–102, 1977.

[1735] Randell, B. and Kuehner, J. Dynamic storage allocation systems. *Comm. ACM*, 11:297–306, 1968.

[1736] Read, R., editor. *Graph Theory and Computing*. Academic Press, 1973.

[1737] Redish, K. A. *An Introduction to Computational Methods*. John Wiley & Sons, 1961.

[1738] Reed, B. Finding approximate separators and computing tree-width quickly. In *Proc. 24^{th} Annual Symposium on Theory of Computing*, pages 221–228, 1992.

[1739] Reed, R., editor. *Graph Theory and Computing*. Academic Press, 1971.

[1740] Reichel, L., Varga, R. S., and Ruttan, A. Kent State launches Electronic Numerical Analysis journal. *SIAM News*, 26(6):20, 1993.

[1741] Reid, J. K. A method for finding the optimum successive over-relaxation parameter. *Computing J.*, 9:200–204, 1966.

[1742] Reid, J. K., editor. *Large Sparse Sets of Linear Equations*. Academic Press, 1971.

[1743] Reid, J. K. A note on the stability of Gaussian elimination. *J. Inst. Math. Appl.*, 8:374–375, 1971.

[1744] Reid, J. K. On the method of conjugate gradients for the solution of large sparse systems of linear equations. In *Proc. of the Conference on Large Sparse Sets of Linear Equations*. Academic Press, New York, 1971.

[1745] Reid, J. K. Two FORTRAN subroutines for direct solution of linear equations whose matrix is sparse, symmetric and positive-definite. Tech. Report R-7119, AERE/HMSO, 1972.

[1746] Reid, J. K. Least squares solution of sparse systems of non-linear equations by a modified Marquardt algorithm. In Himmelblau, D. M., editor, *Proc. NATO Conference at Cambridge, 1972*, pages 437–445. North-Holland, 1973.

[1747] Reid, J. K. Direct methods for sparse matrices. In Evans, D. J., editor, *Software for Numerical Mathematics*, pages 29–47. Academic Press, 1974.

[1748] Reid, J. K. FORTRAN subroutines for handling sparse linear programming bases. Tech. Report AERE-R-8269, HMSO, London, 1976.

[1749] Reid, J. K. A package of subroutines for the solution of very large sets of linear finite-element equations. Tech. Report AERE-M-2947, Harwell Laboratory, 1978.

[1750] Reid, J. K. A survey of sparse matrix computation. In Erisman, A. M., Neves, K. W., and Dwarakanath, M. H., editors, *Electric Power Problems : The Mathematical Challenge*, pages 41–68. SIAM Publications, 1980.

[1751] Reid, J. K. A sparsity exploiting variant of the Bartels-Golub decomposition for linear programming bases. *Math. Programming*, 24:55–69, 1982.

[1752] Reid, J. K. TREESOLVE : A FORTRAN package for solving large sets of linear finite-element equations. Tech. Report CSS-155, Computer Science and Systems Division, AERE Harwell Laboratory, 1984.

[1753] Reid, J. K. Sparse matrices. Tech. Report 84-1316, Harwell Laboratory, 1986.

[1754] Reingold, E. M., Nievergelt, J., and Deo, N., editors. *Combinatorial Algorithms : Theory and Practice.* Prentice-Hall, 1977.

[1755] Reiter, R. Scheduling parallel computations. *J. ACM*, 15:590–599, 1968.

[1756] Rendl, F. and Wolkowicz, H. A projection technique for partitioning the nodes of a graph. *Annals of Oper. Res.*, 1994. (To be published).

[1757] Renegar, J. Incorporating condition measures into the complexity theory of linear programming. (To be published at SIAM J. Optimization).

[1758] Renegar, J. Linear programming, complexity, theory and elementary functional analysis. (To be published at Math. Programming).

[1759] Renegar, J. Some perturbation theory for linear programming. *Math. Programming*, 65(1):73–92, 1994.

[1760] Rheinboldt, W. C. *Methods for Solving Systems of Nonlinear Equations.* SIAM Publications, 1974.

[1761] Rheinboldt, W. C. and Mesztenyi, C. K. GRAAL : A Graph Algorithmic Language. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, pages 167–176, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[1762] Rheinboldt, W. C. and Mesztenyi, C. K. On a programming language for graph algorithms. *BIT*, 12:220–241, 1972.

[1763] Rheinboldt, W. C. and Mesztenyi, C. K. Arc graphs and their possible application to sparse matrix problems. *BIT*, 14:227–239, 1973.

[1764] Rheinboldt, W. C. and Mesztenyi, C. K. Programs for the solution of large sparse matrix problems based on the arc-graph structure. Tech. Report TR-262, Computer Science Center, Univ. of Maryland, 1973.

[1765] Rice, J. R. *The Approximation of Functions, volume 1.* Addison-Wesley, 1964.

[1766] Rice, J. R. *The Approximation of Functions, volume 2.* Addison-Wesley, 1964.

[1767] Rice, J. R. *Numerical Methods, Software, and Analysis.* McGraw-Hill, 1983.

[1768] Rich, R. P. *Internal Sorting Methods Illustrated with PL/I Programs.* Prentice-Hall, 1972.

[1769] Riesel, H. *Prime Numbers and Computer Methods for Factorization.* Birkhäuser Verlag, 1985.

[1770] Riley, V. and Gass, S. I. *Linear Programming and Associated Techniques.* Bibliographic Reference Series. Johns Hopkins Press, 1958.

[1771] Ringeisen, R. D. and Roberts, F. S., editors. *Applications of Discrete Mathematics, Proc. Conference held in Clemson, South Carolina, 1986.* SIAM Publications, 1988.

[1772] Ritchie, D. M. *C Reference Manual.* Documents for use with the UNIX Time-Sharing System. BELL Labs., 5^{th} edition, 1974.

[1773] Ritchie, D. M., Johnson, S. C., Lesk, M. E., and Kernighan, B. W. The *C* programming language. *BELL System Tech. Journal*, 57(6):1991–2019, 1978.

[1774] Ritchie, D. M. and Thompson, K. The UNIX time-sharing system. *Comm. ACM*, 17(7):365–375, 1974. (Revised in BELL System Tech. Journal, 57(6):1905–1929, 1978).

[1775] Rivest, R. L. and Vuillemin, J. On recognizing graph properties from adjacency matrices. *Theoret. Comput. Sci.*, 3:371–384, 1976.

[1776] Roberts, E. *Thinking Recursively.* John Wiley & Sons, 1986.

[1777] Robertson, N. and Seymour, P. D. Graph minors – II: Algorithmic aspects of tree-width. *J. of Algorithms*, 7:309–322, 1986.

[1778] Robertson, N. and Seymour, P. D. Graph minors – XIII: The disjoint path problem. Manuscript, 1986.

[1779] Robertson, N. and Seymour, P. D. Graph minors – X: Obstructions to tree-decompositions. *J. Comb. Theory Series B*, 52:153–190, 1991.

[1780] Rockafellar, T. *Convex Analysis*, volume 28 of *Princeton Mathematics Series.* Princeton University Press, 1970.

[1781] Rockafellar, T. *Conjugate Duality and Optimization.* SIAM Publications, 1974.

[1782] Rodrigue, G., editor. *Parallel Processing for Scientific Computing.* SIAM Publications, 1989.

[1783] Rollet, J. S. and Wilkinson, J. H. An efficient scheme for the codiagonalization of a symmetric matrix with a two-level store. *Computing J.*, 4:177–180, 1961.

[1784] Romero, L. F. and Zapata, E. L. Data distributions for sparse matrix vector multiplication. *Parallel Computing*, 21:583–605, 1995.

[1785] Rose, D. J. An algorithm for solving a special class of tridiagonal systems of linear equations. *Comm. ACM*, 12:234–236, 1969.

[1786] Rose, D. J. *Symmetric Elimination on Sparse Positive Definite Systems and Potential Flow Network Problem.* PhD thesis, Mathematics Dept., Harvard Univ., Cambridge, 1970. (Partially revised and published in Graph Theory and Computing, Reed, R., ed., Academic Press, 1971).

[1787] Rose, D. J. Triangulated graphs and the elimination process. *J. Math. Anal. Appl.*, 32:597–609, 1970.

[1788] Rose, D. J. A note on consistent ordering and zero circulation. *J. ACM*, 18:573–575, 1971.

[1789] Rose, D. J. A graph-theoretic study of the numerical solution of sparse positive definite systems of linear equations. In Read, R., editor, *Graph Theory and Computing*, pages 183–217. Academic Press, 1973.

[1790] Rose, D. J. On simple characterization of k-trees. *Discrete Math.*, 7:317–322, 1974.

[1791] Rose, D. J. and Tarjan, R. E. Algorithmic aspects of vertex elimination. In *Proc. 7^{th} Annual ACM Symposium on Theory of Computing*, pages 245–254, 1975.

[1792] Rose, D. J. and Tarjan, R. E. Algorithm aspects of vertex elimination on directed graphs. *SIAM J. Appl. Math.*, 34(1):176–197, 1978.

[1793] Rose, D. J., Tarjan, R. E., and Lueker, G. S. Algorithm aspects of vertex elimination on graphs. *SIAM J. Computing*, 5(2):266–283, 1976.

[1794] Rose, D. J. and Whitten, G. F. Automatic nested dissection. In *Proc. ACM National Conference*, pages 82–88. 1974.

[1795] Rose, D. J. and Whitten, G. F. A recursive analysis of dissection strategies. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*, pages 59–84. Academic Press, 1976.

[1796] Rose, D. J., Whitten, G. F., Sherman, A. H., and Tarjan, R. E. Algorithms and software for in-core factorization of sparse symmetric positive definite matrices. *Computer & Structures*, 11:597–608, 1980.

[1797] Rose, D. J. and Willoughby, R. A., editors. *Sparse Matrices and Their Applications,*, New York, 1972. Plenum Press. (Proc. of the Conference at IBM Research Center, Yorktown Heights, Sept. 9–10, 1971).

[1798] Rosen, A. A new network theorem. *J. IEE, London*, 62:916–918, 1924.

[1799] Rosen, J. B. Parametric global minimization for large-scale problems. Tech. Report 81-40, Computer Science Dept., Univ. of Minnesota, 1981.

[1800] Rosen, J. B. Global minimization of a linearly constrained concave function by partition of feasible domain. *Math. Oper. Res.*, 8:215–230, 1983.

[1801] Rosen, J. B., Mangasarian, O. L., and Ritter, K., editors. *Nonlinear Programming.* Academic Press, 1970.

[1802] Rosen, R. Matrix bandwidth minimization. In *Proc. ACM National Conference*, Las Vegas, Nevada, 1968.

[1803] Rosenblatt, D. On the graphs and asymptotic forms of finite Boolean relation matrices and stochastic matrices. *Naval Res. Logistics Quart.*, 4:151–167, 1957.

[1804] Rosenfeld, A. and Kak, A. *Digital Picture Processing.* Academic Press, 1982.

[1805] Rosenfeld, J. L. A case study in programming for parallel processors. *Comm. ACM*, 12:645–655, 1969.

[1806] Ross, I. C. and Harary, F. A description of strengthening and weakening members of a group. *Sociometry*, 22:139–147, 1959.

[1807] Roth, J. P. An application of algebraic topology : Kron's method of tearing. *Quart. Appl. Math.*, 17:1–24, 1959.

[1808] Rothberg, E. *Exploiting the Memory Hierarchy in Sequential and Parallel Sparse Cholesky Factorization.* PhD thesis, Stanford Univ., 1993.

[1809] Rothberg, E. Performance of panel and block approaches to sparse Cholesky factorization on the INTEL iPSC/860 and PARAGON multicomputers. In *Proc. 1994 Scalable High Performance Computing Conference (SHPCC '94)*, 1994.

[1810] Rothberg, E. Alternatives for solving sparse triangular systems of equations. *Parallel Computing*, 1995. (To be published).

[1811] Rothberg, E. Alternatives for solving sparse triangular systems on distributed-memory multiprocessors. *Parallel Computing*, 21:1121–1136, 1995.

[1812] Rothberg, E. and Gupta, A. Fast sparse matrix factorization on modern workstations. Tech. Report STAN-CS-89-1286, Stanford Univ., 1989.

[1813] Rothberg, E. and Gupta, A. Techniques for improving the performance of sparse Cholesky factorization on multiprocessor workstations. *Proc. Supercomputing*, 90:232–243, 1990.

[1814] Rothberg, E. and Gupta, A. Efficient sparse matrix factorization on high-performance workstations : Exploiting the memory hierarchy. *ACM Trans. Math. Software*, 17:313–334, 1991.

[1815] Rothberg, E. and Gupta, A. An efficient block-oriented approach to parallel sparse Cholesky approaches to sparse Cholesky factorization. *Supercomputing*, pages 503–512, November 1993.

[1816] Rothberg, E. and Gupta, A. An evaluation of left-looking, right-looking and multifrontal approaches to sparse Cholesky factorization on hierarchical-memory machines. *Int. J. High Speed Computing*, 5:537–593, 1993.

[1817] Rothberg, E., Gupta, A., Ng, E., and Peyton, B. Parallel sparse Cholesky factorization algorithms for shared-memory multiprocessor systems. In *Proc. 7^{th} IMACS International Conference on Computer Methods for Partial Differential Equations*, 1992.

[1818] Roy, M. R. *A History of Computing Technology.* Prentice-Hall, 1985.

[1819] Rubinstein, R. *Simulation and the Monte Carlo Method.* John Wiley & Sons, 1981.

[1820] Russel, R. M. The CRAY-1 computer system. *Comm. ACM*, 21(1):63–72, 1978.

[1821] Russo, P. M. On the time domain analysis of linear time invariant networks with large time constant spreads by digital computer. *IEEE Trans. Circuit Theory.*

[1822] Rustin, R., editor. *Design and Optimization of Compilers.* Prentice-Hall, 1972. (5^{th} Courant Computer Science Symposium).

[1823] Rutishauer, H. Simultaneous iteration method for symmetric matrices. *Numer. Math.*, 16:205–223, 1970.

[1824] Rutishauser, H. On Jacobi rotation patterns. *Proc. Symposia in Applied Mathematics*, 15:219–239, 1963.

[1825] Ryder, B. G. The PFORT verifier. *Software Practice and Experience*, 4:359–377, 1974.

[1826] Saad, Y. Gaussian elimination on hypercubes. Tech. Report YALEU-DCS-RR-462, Dept. of Computer Science, Yale Univ., 1986.

[1827] Saad, Y. Krylov subspace methods on supercomputers. Tech. Report 19, RIACS, Moffet Field, 1988.

[1828] Saad, Y. *Iterative Methods for Sparse Linear Systems.* PWS publishing, 1996.

[1829] Sadayappan, P. and Visvanathan, V. Distributed sparse factorization of circuit matrices via recursive e-tree partitioning. In Lewis, J. G. and Gilbert, J. R., editors, *Symposium on Sparse Matrices.* SIAM Publications, Salishan Resort, Gleneden Beach, Oregon, 1989.

[1830] Salomaa, A. *Theory of Automata*, pages 120–123. Pergamon Press, 1969.

[1831] Saltz, J. Aggregation methods for solving sparse triangular systems on multiprocessors. *SIAM J. Sci. and Stat. Comput.*, 11:123–144, 1990.

[1832] Salvadori, M. G. and Baron, M. L. *Numerical Methods in Engineering.* Prentice-Hall, 1961.

[1833] Samples, A. D. and Hilfinger, P. N. Code reorganization for instruction caches. Tech. Report UCB-CSD-88-447, Univ. of California, Berkeley, 1988.

[1834] Sandberg, I. W. Theorems on the analysis of nonlinear transistor networks. *Bell Systems Tech. Journal*, 49:95–114, 1970.

[1835] Sangiovanni-Vicentelli, L., Chen, K., and Chua, L. O. An efficient heuristic cluster algorithm for tearing large-scale networks. *IEEE Trans. Circuit and Systems*, CAS-24:709–717, 1977.

[1836] Sargent, R. W. H. and Westerbeg, A. W. 'Speed-Up' in chemical engineering design. *Trans. Inst. Chem. Eng.*, 42:190–197, 1964.

[1837] Sato, N. and Tinney, W. F. Techniques for exploiting the sparsity of the network admittance matrix. *IEEE Trans. Power Apparatus and Systems*, PAS-82(12):944–950, 1963.

[1838] Saunders, M. A. Large-scale linear programming using the Cholesky factorization. Tech. Report STAN-CS-72-252, Computer Science Dept., Stanford Univ., 1972.

[1839] Saunders, M. A. Product form of the Cholesky factorization for large-scale linear programming. Tech. Report STAN-CS-72-301, Computer Science Dept., Stanford Univ., 1972.

[1840] Saunders, M. A. The complexity of LU updating in the simplex method. In Anderssen, R. S. and Brent, R. P., editors, *Complexity of Computational Problem Solving.* Queensland University Press, 1975.

[1841] Saunders, M. A. A fast, stable implementation of the simplex method using Bartels-Golub updating. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[1842] Saunders, M. A. Major Cholesky would feel proud. *ORSA J. Computing*, 6(1):23–27, 1994.

[1843] Saylor, P. E. Richardson's iteration with dynamic parameters and the SIP incomplete factorization for the solution of linear systems of equations. *Soc. of Petroleum Eng. Journal*, pages 691–708, 1981.

[1844] Scarborough, J. B. *Numerical Mathematical Analysis.* Johns Hopkins Press, 4^{th} edition, 1958.

[1845] Scharmer, G. B. and Carlsson, M. A new approach to multi-level non-LTE radiative transfer problems. *J. Comput. Phys.*, 38, 1985.

[1846] Schendel, U. *Introduction to Numerical Methods for Parallel Computers.* Ellis Horwood Limited, 1984.

[1847] Schendel, U. *Sparse Matrices : Numerical Aspects with Applications for Scientists and Engineers.* Halsted Press, 1989.

[1848] Schiff, R., Lifson, H., Pekeris, C. L., and Rabinowitz, P. $2^{1,3}p$, $3^{1,3}p$ and $4^{1,3}p$ states of He and the 2^1p state of li^+. *Phys. Review*, 140:A1104–A1121, 1965.

[1849] Schittkowski, K. *Nonlinear Programming Codes : Information, Tests, Performance*, volume 183 of *Lecture Notes in Economics and Mathematical Systems*. Springer-Verlag, 1980.

[1850] Schittkowski, K. The nonlinear programming method of Wilson, Han and Powell with an augmented Lagrangian type line search function. *Numer. Math.*, 38:83–114, 1981.

[1851] Schittkowski, K. On the convergence of a sequential quadratic programming method with an augmented Lagrangian line search function. *Mathematishe Operations Forschung und Statistik, Ser. Optimization*, 14:193–216, 1983.

[1852] Schittkowski, K. NLPQL : A FORTRAN subroutine solving constrained nonlinear programming problems. Working Paper, Univ. Stuttgart, 1984.

[1853] Schnabel, R. B. *Analyzing and Improving Quasi-Newton Methods for Unconstrained Optimization*. PhD thesis, Cornell Computer Science Dept., 1977.

[1854] Schnabel, R. B. Sequential and parallel methods for unconstrained optimization. In Iri, M. and Tanabe, K., editors, *Mathematics and Its Applications*, pages 227–261. Kluwer Academic Publishers, Tokyo, 1989.

[1855] Schnabel, R. B. and Eskow, E. A new modified Cholesky factorization. *SIAM J. Sci. and Stat. Comput.*, 11(6):1136–1158, 1990.

[1856] Schneck, P. B. *Supercomputer Architecture*. Kluwer Academic Publishers, 1987.

[1857] Schrage, L. *Linear, Integer and Quadratic Programming with LINDO*. The Scientific Press, Palo Alto, 1984.

[1858] Schreiber, R. A new implementation of sparse Gaussian elimination. *ACM Trans. Math. Software*, 8(3):256–276, 1982.

[1859] Schreiber, R. and Van Loan, C. F. A storage efficient WY representation for products of Householder transformations. *SIAM J. Sci. and Stat. Comput.*, 10:53–57, 1989.

[1860] Schreiber, T. *Simulation using GPSS*. John Wiley & Sons, 1974.

[1861] Schrijver, A. *Theory of Linear and Integer Programming*. John Wiley & Sons, 1986.

[1862] Schubert, L. K. Modification of a quasi-newton method for nonlinear equations with a sparse Jacobian. *Math. of Computation*, 24:27–30, 1970.

[1863] Schultz, G. L. and Meyer, R. R. An interior point method for block angular optimization. *SIAM J. Optimization*, 1(4):583–602, 1991.

[1864] Schultz, M. *Spline Analysis*. Prentice-Hall, 1973.

[1865] Schwartz, E. S. An automatic sequencing procedure with application to parallel processing. *J. ACM*, 8:513–537, 1961.

[1866] Schwartz, J. T. Large parallel computers. *J. ACM*, 13:25–32, 1966.

[1867] Schwarz, H. R. Algorithm 183 : Reduction of a symmetric band matrix to triple diagonal form. *Comm. ACM*, 6:315–316, 1963.

[1868] Schwarz, H. R. Tridiagonalization of a symmetric band matrix. *Numer. Math.*, 12:231–241, 1968.

[1869] Schwarz, H. R., Rutishauer, H., and Stiefel, E. *Numerical Analysis of Symmetric Matrices.* Prentice-Hall, 1973.

[1870] Scott, N. R. *Computer Number Systems and Arithmetic.* Prentice-Hall, 1985.

[1871] Sedgewick, R. *Algorithms.* Addison-Wesley, 2^{nd} edition, 1988.

[1872] Sedgewick, R. *Algorithms in* C^{++}. Addison-Wesley, 1992.

[1873] Seodore, S. et al. SCEPTRE : An automated digital computer program for determining the response of electronic systems to transient nuclear radiation, volume 11. Tech. Report AFWL-TR-66-126, IBM Space Guidance Center, Oswego, New York, 1966.

[1874] Sergeev, N. D. On a efficient scheme for solving systems of linear algebraic equations with sparse coefficient matrices. *Sbornik Tr. Leningrad Inz-Stroit*, 57:140–151, 1968. (In Russian).

[1875] Sethi, R. and Ullman, J. D. The generation of optimal code for arithmetic expressions. *J. ACM*, 17(4):715–728, 1970.

[1876] Shamir, R. The efficiency of the simplex method : A survey. *Management Sci.*, 33:301–334, 1987.

[1877] Shampine, L. F. and Allen, R. *Numerical Computing.* Philadelphia, Saunders, 1973.

[1878] Shampine, L. F. and Gordon, M. K. *Computer Solution of Ordinary Differential Equations : The Initial Value Problem.* Freeman & Co., 1975.

[1879] Shampine, L. F., Watts, H. A., and Davenport, S. M. Solving non-stiff ordinary differential equations : The state of the art. *SIAM Review*, 18:376–441, 1976.

[1880] Shanno, D. F. On variable-metric methods for sparse hessians. *Math. of Computation*, 34(150):499–514, 1980.

[1881] Shanno, D. F. Computing Karmarkar projections quickly. *Math. Programming*, 41:61–71, 1988.

[1882] Shanno, D. F. and Bagchi, A. A unified view of interior point methods for linear programming. *Annals of Oper. Res.*, 22:55–70, 1990.

[1883] Shapiro, J. F. *Mathematical Programming, Structures and Algorithms.* John Wiley & Sons, 1979.

[1884] Shedler, G. S. Parallel numerical methods for solution of equations. *Comm. ACM*, 10:286–290, 1967.

[1885] Shedler, G. S. and Lehman, M. M. Evaluation of redundancy in a parallel algorithm. *IBM Systems Journal*, 6:142–149, 1967.

[1886] Shekel, J. *Analysis of Linear Networks.* PhD thesis, MIT, 1957.

[1887] Sherman, A. H. Subroutines for envelope solution of sparse linear equations. Tech. Report 35, Dept. of Computer Science, Yale Univ., 1974.

[1888] Sherman, A. H. On the efficient solution of sparse systems of linear and non-linear equations. Tech. Report 46, Dept. of Computer Science, Yale Univ., 1975.

[1889] Sherman, A. H. Yale Sparse Matrix Package (YSMP) "User's Guide". Tech. Report UCID-30114, Lawrence Livermore Laboratory, 1975.

[1890] Sherman, A. H. Algorithm 533 : NSPIV – A FORTRAN subroutine for sparse Gaussian elimination with partial pivoting. *ACM Trans. Math. Software*, 4(4):391–398, 1978.

[1891] Sherman, A. H. Algorithms for sparse Gaussian elimination with partial pivoting. *ACM Trans. Math. Software*, 4(4):330–338, 1978.

[1892] Sherman, J. and Morrison, W. J. Adjustment of an inverse matrix corresponding to changes in elements of a given column or a given row of the original matrix. *Ann. Math. Stat.*, 20:621, 1949.

[1893] Sherman, J. and Morrison, W. J. Adjustment of an inverse matrix corresponding to a change in one element of a given matrix. *Ann. Math. Stat.*, 21:124–127, 1950.

[1894] Shier, D. R. Inverting sparse matrices by tree partitioning. *J. Res. Nat. Bur. Standards*, B-80(2), 1976.

[1895] Shipley, R. B. and Coleman, D. A new direct matrix inversion method. *IEEE Trans. Power Apparatus and Systems*, PAS-78(11):568–572, 1959.

[1896] Shirey, R. W. *Implementation and Analysis of Efficient Graph Planarity Testing Algorithms*. PhD thesis, Univ. Wisconsin, Madison, 1969.

[1897] Shor, N. Z. Utilization of the operation of space dilatation in the minimization of convex functions. *Cybernetics*, 6:7–15, 1970. (Russian original published at Kibernetika, 1:6–12).

[1898] Shor, N. Z. *Minimization Methods for Non-Differentiable Functions*. Springer-Verlag, 1985.

[1899] Shultz, G., Schnabel, R., and Byrd, R. A family of trust-region-based algorithms for unconstrained minimization with strong global convergence properties. *SIAM J. Numer. Anal.*, 22:47–67, 1985.

[1900] Shurkin, J. *Engines of the Mind : A History of the Computer*. W. W. Norton, New York, 1984.

[1901] SIAM. Special Issue in honor of A. S. Householder. SIAM J. Numer. Anal., 7(4), 1970.

[1902] SIAM. Special Addendum on Parallel Processing. SIAM J. Sci. and Stat. Comput., 8(1):s1-s227, 1987.

[1903] SIAM. Special Section on Sparse Matrices. SIAM J. Matrix Anal. Appl., 11(3), 1990. From page 381. (Selection of works presented at Symposium on Sparse Matrices, Salishan Resort, Gleneden Beach, Oregon, 1989, promoted by SIAM Activity Group on Linear Algebra, chaired by Lewis, J. G., Gilbert, J. R., Plemmons, R. J., Simon, H. D.).

[1904] SIAM. Special Issue dedicated to Gene Golub on the occasion of his 60^{th} birthday. SIAM J. Matrix Anal. Appl., 13(1), 1992.

[1905] SIAM. Special Issue on Iterative Solution of Linear Systems. SIAM J. Sci. and Stat. Comput., 13(1), 1992.

[1906] SIAM. *Proc. 4^{th} ACM/SIAM Symposium on Discrete Algorithms.* SIAM Publications, Austin, Texas, 1993.

[1907] SIAM. *Proc. 5^{th} ACM/SIAM Symposium on Discrete Algorithms.* SIAM Publications, Arlington, Virginia, 1994.

[1908] SIAM. *Proc. 6^{th} ACM/SIAM Symposium on Discrete Algorithms.* SIAM Publications, San Francisco, California, 1995.

[1909] Siegel, S. *Nonparametric Statistics for the Behavioral Sciences.* McGraw-Hill, 1956.

[1910] SILICON GRAPHICS, INC. *Power C "User's Guide".*

[1911] Simon, H. D. Bounds for the dominant eigenvector of a graph. Tech. Report, Dept. of Applied Mathematics, State Univ. of New York, Stony Brook, 1982.

[1912] Simon, H. D. The Lanczos algorithm with partial reorthogonalization. *Math. of Computation*, 42:115–142, 1984.

[1913] Simon, H. D. Incomplete LU preconditioned conjugate-gradient-like methods in reservoir simulation. In *Proc. 8^{th} SPE Symposium on Reservoir Simulation*, Dallas, Texas, 1985.

[1914] Simon, H. D., Vu, P., and Yang, C. Performance of a supernodal general sparse solver on the CRAY Y-MP. Tech. Report SCA-TR-117, Boeing Computer Services, Seattle, Washington, 1989.

[1915] Simon, H. D., Vu, P., and Yang, C. Performance of a supernodal general sparse solver on the CRAY Y-MP : 1.68 GigaFlops with autotasking. Tech. Report SCA-TR-117, Boeing Computer Services, Seattle, Washington, 1989.

[1916] Simonnard, M. *Linear Programming.* Prentice-Hall, 1966. (Translated by Jewell, W. S. from the original, Dunod, Paris, 1962).

[1917] Sites, R. L. ALGOL W "Reference Manual". Report STAN-CS-71-230, Computer Science Dept., Stanford Univ., 1972.

[1918] Sites, R. L. How to use 1000 registers. In *Caltech Conference on VLSI*, 1979.

[1919] Sites, R. L. Instruction ordering for the CRAY-1 computer. Tech. Report 78-CS-023, Dept. of Computer Science, Univ. California, San Diego, 1979.

[1920] Slater, P. B. Migration regions of the united states : Two county-level 1965–70 analyses. Report, Community and Organization Research Institute, Univ. of California, Santa Barbara, 1983.

[1921] Sleator, D. D. and Tarjan, R. E. A data structure for dynamic trees. *J. Comput. System Sci.*, 24, 1983. (Also published at Proc. 13^{th} Annual ACM Symposium on Foundations of Computing, pages 114–122, 1981).

[1922] Sleator, D. D. and Tarjan, R. E. Self-adjusting binary trees. In *Proc. 15^{th} Annual ACM Symposium on Foundations of Computing*, pages 235–245, 1983.

[1923] Sleator, D. D. and Tarjan, R. E. Self-adjusting heaps. *SIAM J. Computing*, 15(1):52–69, 1986.

[1924] Sloan, S. W. An algorithm for profile and wavefront reduction of sparse matrices. *Int. J. Numer. Meth. Eng.*, 23:239–251, 1986.

[1925] Smale, S. On the average number of steps of the simplex method of linear programming. *Math. Programming*, 27:241–262, 1983.

[1926] Smith, A. J. Cache memories. *ACM Computing Surveys*, 14(3):473–530, 1982.

[1927] Smith, A. J. Bibliography and readings on CPU cache memories and related topics. *Computer Architecture News*, pages 22–42, January 1986.

[1928] Smith, A. J. and Lee, J. Branch prediction strategies and branch target buffer design. *Computer*, 17(1):6–22, 1984.

[1929] Smith, B. T., Boyle, J. M., Dongarra, J. J., Garbow, B. S., Ikebe, Y., Klema, V. C., and Moler, C. B. *Matrix Eigensystem Routines : EISPACK Guide*, volume 6 of *Lecture Notes in Computer Science*. Springer-Verlag, 1976.

[1930] Smith, D. M. Data logistics for matrix inversion. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[1931] Smith, D. M. and Orchard-Hays, W. Computational efficiency in product form LP codes. In Graves, R. L. and Wolfe, P., editors, *Recent Advances in Mathematical Programming*. McGraw-Hill, 1963.

[1932] Smith, J. E. A study of branch prediction strategies. In *Proc. 8^{th} Symposium on Computer Architecture*, pages 135–148, Minneapolis, 1981.

[1933] Smith, J. E. Decoupled access/execute computer architectures. *ACM Trans. Computer Systems*, 2(4):289–308, 1984.

[1934] Smith, J. E. Dynamic instruction scheduling and the ASTRONAUTICS ZS-1. *Computer*, 22(7):21–35, 1989.

[1935] Smith, M. D., Johnson, M., and Horowitz, M. A. Limits on multiple instruction issue. In *Proc. 3^{rd} Conference on Architectural Support for Programming Languages and Operating Systems*, pages 290–302, Boston, 1989. IEEE/ACM.

[1936] Smith, O. J. M. et al. Sparse solutions using hash storage. *IEEE Trans. Power Apparatus and Systems*, PAS-91:1396–1404, 1972.

[1937] Smyth, W. F. Algorithms for the reduction of matrix bandwidth and profile. *J. Comp. Appl. Math.*, 12/13:551–561, 1985.

[1938] Smyth, W. F. and Benzi, W. M. L. An algorithm for finding the diameter of a graph. In *IFIP Congress '74*, pages 500–503. North-Holland, 1974.

[1939] Smyth, W. F. and Dunn, J. Results of tests on matrix bandwidth and profile reduction algorithms. Report, Dept. of Computer Science and Systems, McMaster Univ., Ontario, Canada, 1986.

[1940] Solovay, R. and Strassen, V. A fast monte-carlo test for primality. *SIAM J. Comput.*, 6:84–85, 1977.

[1941] Sonnevend, G. *An 'Analytic Center' for Polyhedrons and New Classes of Global Algorithms for Linear, Smooth, Convex Programming*, volume 84 of *Lecture Notes in Control Inform. Sci.*, pages 866–876. Springer-Verlag, Budapest, 1986.

[1942] Sonnevend, G. New algorithms in convex programming based on a notion of 'centre' for systems of analytic inequalities and on rational extrapolation. In Hoffman, K. H., Hiriart-Urruty, J. B., Lemarechal, C., and Zowe, J., editors, *Trends in Mathematical Optimization*, pages 311–327. Birkhäuser Verlag, 1988.

[1943] Sonnevend, G. Global ellipsoidal approximations and homotopy methods for solving convex analytic programs. *Appl. Math. Optim.*, 21:139–166, 1990.

[1944] Sorensen, D. C. *Updating the Symmetric Indefinite Factorization with Applications in a Modified Newton's Method.* PhD thesis, Univ. of California, San Diego, 1977.

[1945] Sorensen, D. C. Newton's method with a model trust region modification. *SIAM J. Numer. Anal.*, 19:409–426, 1982.

[1946] Sorensen, D. C. Trust region methods for unconstrained minimization. In Powell, M. J. D., editor, *Nonlinear Optimization 1981.* Academic Press, 1982.

[1947] Sorensen, D. C. and Van Loan, C. Block factorizations for symmetric indefinite matrices. (Cornell Tech. Report in preparation).

[1948] Souriau, J. M. *Calcul Linéaire.* 1959.

[1949] SPEC. Benchmark suite release 1.0, 1989.

[1950] Spedicato, E., editor. *Algorithms for Continuous Optimization : The State of the Art*, volume 434 of *NATO ASI Series C – Mathematical and Physical Sciences.* Kluwer Academic Publishers, 1988.

[1951] Speelpenning, B. The generalized element method. Tech. Report UIUC-DCS-R-78-946, Dept. of Computer Science, Univ. of Illinois, Urbana, 1978.

[1952] Spiegel, M. R. *Mathematical Handbook of Formulas and Tables.* McGraw-Hill, 1968.

[1953] Spillers, W. R. Network techniques applied to structures. *Matrix Tensor Quart.*, 15:31–41, 1964.

[1954] Spillers, W. R. On diakoptics : Tearing and arbitrary system. *Quart. Appl. Math.*, 23:188–190, 1965.

[1955] Spillers, W. R. and Hickerson, N. Optimal elimination of sparse symmetric systems as a graph problem. *Quart. Appl. Math.*, 26:425–432, 1968.

[1956] Spira, P. M. and Pan, A. On finding and updating spanning trees and shortest paths. *SIAM J. Comput.*, 4:375–380, 1975.

[1957] Springer, J. Exact solution of general integer systems of linear equations. *ACM Trans. Math. Software*, 12(1):51–61, 1986.

[1958] Squire, W. *Integration for Engineers and Scientists.* Modern Analytic and Computational Methods in Science and Mathematics. Elsevier Publishing Co., 1970. Bellmann, R., ed.

[1959] Sreenivasa Kumar, P., Kishore Kumar, M., and Basu, A. A parallel algorithm for elimination tree computation and symbolic factorization. *Parallel Computing*, 18:849–856, 1992.

[1960] Sreenivasa Kumar, P., Kishore Kumar, M., and Basu, A. Parallel algorithms for sparse triangular system solution. *Parallel Computing*, 19:187–196, 1993.

[1961] Stagg, G. W. and El-Abaid, A. H. *Computer Methods in Power Systems Analysis.* McGraw-Hill, 1968.

[1962] Standish, T. A. *Data Structure Techniques.* Addison-Wesley, 1980.

[1963] Stark, P. A. *Introduction to Numerical Methods.* Macmillan, 1970.

[1964] Steenrod, N. *The Topology of Fibre Bundles.* Princeton University Press, 1950.

[1965] Steffensen, J. F. *Interpolation.* Chelsea Publishing, 2^{nd} edition, 1950. (First edition, 1927).

[1966] Sterbenz, P. *Floating Point Computation.* Prentice-Hall, 1974.

[1967] Stern, N. Who invented the first electronic digital computer. *Annals of the History of Computing*, 2(4):375–376, 1980.

[1968] Steward, D. V. On an approach to techniques for the analysis of the structure of large systems of equations. *SIAM Review*, 4:321–342, 1962.

[1969] Steward, D. V. Partitioning and tearing systems of equations. *SIAM J. Numer. Anal.*, 2:345–365, 1965.

[1970] Steward, D. V. Tearing analysis of the structure of disorderly sparse matrices. In Willoughby, R., editor, *Proc. of the Symposium on Sparse Matrices and their Applications*, pages 65–75, Yorktown Heights, 1969.

[1971] Steward, D. V. *The Analysis of the Structure of Systems.* PhD thesis, Univ. Wisconsin, Madison, 1973.

[1972] Stewart, G. W. *Introduction to Matrix Computations.* Academic Press, 1973.

[1973] Stewart, G. W. Modifying pivot elements in Gaussian elimination. *Math. of Computation*, 28:537–542, 1974.

[1974] Stewart, G. W. The numerical treatment of large eigenvalue problems. In *Proc. 1974 IFIP Congress*, pages 666–672. North-Holland, Amsterdam, 1974.

[1975] Stewart, G. W. A bibliographical tour of the large sparse generalized eigenvalue problem. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[1976] Stewart, G. W. Simultaneous iteration for computing invariant subspaces of non-Hermitian matrices. *Numer. Math.*, 25:123–136, 1976.

[1977] Stewart, G. W. On the perturbation of pseudo-inverses, projections and linear least squares problems. *SIAM Review*, 19:634–662, 1977.

[1978] Stewart, G. W. On scaled projection for pseudo-inverses. *Lin. Alg. Appl.*, 112:189–193, 1989.

[1979] Stewart, G. W. *Afternotes on Numerical Analysis.* SIAM Publications, 1996. (To be published).

[1980] Stiefel, E. L. *An Introduction to Numerical Mathematics.* Academic Press, 1963.

[1981] Stoer, J. and Bulirsch, R. *Introduction to Numerical Analysis.* Springer-Verlag, 1980.

[1982] Stone, H. L. Iterative solution of implicit approximations of multidimensional partial differential equations. *SIAM J. Numer. Anal.*, 5:530–558, 1968.

[1983] Stone, H. S. Parallel tridiagonal equation solvers. *ACM Trans. Math. Software*, 1(4):289–307, 1975.

[1984] Stone, H. S. *High Performance Computer Architecture*. Addison-Wesley, 2^{nd} edition, 1990.

[1985] Storer, J. A. *Data Compression : Methods and Theory*. Computer Science Press, 1988.

[1986] Stot, B. Power system dynamic response calculations. *Proc. of the IEEE*, 67:219–241, 1979.

[1987] Stott, B. and Alsaç, O. Fast decoupled load-flow. *IEEE Trans. Power Apparatus and Systems*, PAS-93:859–869, 1974.

[1988] Stott, B. and Alsaç, O. An overview of sparse matrix techniques for on-line network applications. In *Proc. IFAC Symposium on Power Systems and Power Plant Control*, pages 17–23, Beijing, China, 1986.

[1989] Stott, B. and Hobson, E. Solution of large power systems networks by ordered elimination. *Proc. of the Institution of Electrical Engineers*, 118(1):125–134, 1971.

[1990] Stotts, P. D. Jr. A comparative survey of concurrent programming languages. *SIGPLAN Notices*, 17(9):76–87, 1982.

[1991] Straffin, P. D. Linear algebra in geography : Eigenvector networks. *Math. Mag.*, 53:269–276, 1980.

[1992] Strang, G. and Nguyen, T. *Wavelets and Filter Banks*. Wellesley-Cambridge Press, 1996.

[1993] Strang, G. W. *Linear Algebra and its Applications*. Academic Press, 2^{nd} edition, 1980.

[1994] Strang, G. W. and Fix, G. J. *An Analysis of the Finite Element Method*. Prentice-Hall, 1973.

[1995] Strassen, V. Gaussian elimination is not optimal. *Numer. Math.*, 13:354–356, 1969.

[1996] Strecker, W. D. Cache memories for the PDP-11 ? In *Proc.* 3^{rd} *Annual Symposium on Computer Architecture*, pages 155–158, Pittsburgh, 1976.

[1997] Strecker, W. D. VAX-11/780 : A virtual address extension to the PDP-11 family. In *Proc. AFIPS National Computer Conference, 47*, pages 967–980, 1978.

[1998] Stroud, A. H. *Approximate Calculation of Multiple Integrals*. Prentice-Hall, 1972.

[1999] Stroud, A. H. *Numerical Quadrature and Solution of Ordinary Differential Equations*. Springer-Verlag, 1974.

[2000] Stroud, A. H. and Secrest, D. *Gaussian Quadrature Formulas*. Prentice-Hall, 1966.

[2001] Stroustrup, B. The C^{++} Programming Language.

[2002] Stroustrup, B. and Ellis, M. *The Annotated* C^{++} *Reference Manual*. Addison-Wesley, 1990.

[2003] Stubbs, D. F. and Webre, N. W. *Data Structures with Abstract Data Types and PASCAL*. Brooks/Cole Publishing, Monterey, CA, 1985.

[2004] Suhl, U. H. and Suhl, L. M. Computing sparse LU factorizations for large-scale linear programming bases. *ORSA J. Computing*, 2:325–335, 1990.

[2005] SUN. *The SPARC "Architecture Manual", version 8*. SUN Microsystems, 1989. Part 800-1399-09.

[2006] Swamy, M. N. S. and Thulasiraman, K. *Graphs, Networks, and Algorithms*. John Wiley & Sons, 1981.

[2007] Swartz, J. T. Ultracomputers. *ACM Trans. Programming Languages and Systems*, 4(2):484–521, 1980.

[2008] Swarztrauber, P. N. and Sweet, R. A. Efficient FORTRAN subprograms for the solution of elliptic partial differential equations. Tech. Report, National Center of Atmospheric Research, Boulder, 1975.

[2009] Swift, G. A comment on matrix inversion by partitioning. *SIAM Review*, 2:132–133, 1960.

[2010] Syslo, M., Deo, N., and Kowalik, J. *Discrete Optimization Algorithms with PASCAL Programs*. Prentice-Hall, 1983.

[2011] Szwarcfiter, J. L. and Markenzon, L. Estruturas de dados e seus algoritmos. In *I Escola Brasileira de Otimização*, Rio de Janeiro, 1989.

[2012] Szwarficter, J. L. and Barroso, M. Enumerating the maximal cliques of circle graphs. In Chung, R. F. K., Graham, R. L., and Hsu, D. F., editors, *Graph Theory, Combinatorics, Algorithms and Applications*, pages 511–517. SIAM Publications, 1991.

[2013] Szyld, D. B. Using sparse matrix techniques to solve a model of the world economy. In Duff, I. S., editor, *Sparse Matrices and Their Uses*, pages 357–365. Academic Press, 1981.

[2014] Takagi, N., Yasuura, H., and Yajima, S. High speed VLSI multiplication algorithm with a redundant binary addition tree. *IEEE Trans. Comput.*, C-34(9):789–796, 1985.

[2015] Tanenbaum, A. S. Implications of structured programming for machine architecture. *Comm. ACM*, 21(3):237–246, 1978.

[2016] Tanenbaum, A. S. *Structured Computer Organization*. Prentice-Hall, 3^{rd} edition, 1991.

[2017] Tardos, E. A strongly polynomial algorithm to solve combinatorial linear programs. *Operations Res.*, 35:250–256, 1986.

[2018] Tarjan, R. E. Updating a balanced search tree in $O(1)$ rotations. (Published at Inform. Proc. Letters).

[2019] Tarjan, R. E. An efficient planarity algorithm. Tech. Report 244, Computer Science Dept., Stanford Univ., 1971.

[2020] Tarjan, R. E. Deep-first search and linear graph algorithms. *SIAM J. Computing*, 1:146–160, 1972.

[2021] Tarjan, R. E. Finding dominators in directed graphs. *SIAM J. Comput.*, 3:62–89, 1974.

[2022] Tarjan, R. E. Efficiency of a good but not linear set union algorithm. *J. ACM*, 22(2):215–225, 1975.

[2023] Tarjan, R. E. Graph theory and Gaussian elimination. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations*. Academic Press, 1976.

[2024] Tarjan, R. E. Finding optimum branchings. *Networks*, 7:25–35, 1977.

[2025] Tarjan, R. E. Complexity of combinatorial algorithms. *SIAM Review*, 20:457–491, 1978.

[2026] Tarjan, R. E. Applications of path compression on balanced trees. *J. ACM*, 26:690–715, 1979.

[2027] Tarjan, R. E. A class of algorithms which require nonlinear time to maintain disjoint sets. *J. of Computer and System Sciences*, 18:110–127, 1979.

[2028] Tarjan, R. E. Recent developments in the complexity of combinatorial algorithms. In *Proc. 5^{th} IBM Symposium on Mathematical Foundations of Computer Science*, pages 1–28, Tokyo, 1980.

[2029] Tarjan, R. E. A unified approach to path problems. *J. ACM*, 28:577–593, 1981.

[2030] Tarjan, R. E. Sensitivity analysis of minimum spanning trees and shortest path trees. *Inform. Proc. Letters*, 14:30–33, 1982.

[2031] Tarjan, R. E. *Data Structures and Network Algorithms*. SIAM Publications, 1983.

[2032] Tarjan, R. E. Space-efficient implementations of graph search methods. *ACM Trans. Math. Software*, 9(3):326–339, 1983.

[2033] Tarjan, R. E. Amortized computational complexity. *SIAM J. Alg. and Discr. Meth.*, 6(2):306–318, 1985.

[2034] Tarjan, R. E. and van Leeuwen, J. Worst-case analysis of set union algorithms. (Published at J. ACM).

[2035] Tarjan, R. E. and Yannakakis, M. Simple linear-time algorithms to test chordality of graphs, test acyclicity of hipergraphs, and selectively reduce acyclic hypergraphs. *SIAM J. Comput.*, 13:566–579, 1984.

[2036] Taylor, G. S. Compatible hardware for division and square root. In *Proc. 5^{th} IEEE Symposium on Computer Arithmetic*, pages 127–134, 1981.

[2037] Taylor, G. S. Radix 16 SRT dividers with overlapped quotient selection stages. In *Proc. 7^{th} IEEE Symposium on Computer Arithmetic*, pages 64–71, 1985.

[2038] Terry, L. A. and Pereira, M. V. F. Tratamento de sistemas lineares esparsos. Relatório Interno Projeto 7167, Centro de Pesquisas em Energia Elétrica (CEPEL), Rio de Janeiro, 1980.

[2039] Tewarson, R. P. On the product form of inverses of sparse matrices. *SIAM Review*, 8:336–342, 1966.

[2040] Tewarson, R. P. On the product form of inverses of sparse matrices and graph theory. *SIAM Review*, 9(1):91–99, 1967.

[2041] Tewarson, R. P. Row-column permutation of sparse matrices. *Computing J.*, 10:300–305, 1967.

[2042] Tewarson, R. P. Solution of a system of simultaneous linear equations with a sparse coefficient matrix by elimination methods. *BIT*, 7:226–239, 1967.

[2043] Tewarson, R. P. On computing generalized inverses. *Computing*, 1968.

[2044] Tewarson, R. P. On the orthonormalization of sparse vectors. *Computing*, 3:268–279, 1968.

[2045] Tewarson, R. P. The Crout reduction for sparse matrices. *Computing J.*, 12:158–159, 1969.

[2046] Tewarson, R. P. Computation with sparse matrices. *SIAM Review*, 12(4):523–543, 1970.

[2047] Tewarson, R. P. Sorting and ordering sparse linear systems. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 151–168. Academic Press, 1971.

[2048] Tewarson, R. P. *Sparse Matrices.* Academic Press, 1973.

[2049] Tewarson, R. P. and Cheng, K. Y. A desirable form for sparse matrices when computing their inverses in factored forms. *Computing*, 9, 1972.

[2050] Thorelli, L. E. An algorithm for computing all paths in a graph. *BIT*, 6:347–349, 1966.

[2051] Thorlin, J. F. Code generation for PIE (parallel instruction execution) computers. In *Proc. Spring Joint Computer Conference*, Atlantic City, 1967.

[2052] Thornton, J. E. Parallel operation in the CONTROL DATA 6600. In *Proc. Fall Joint Computer Conference*, pages 26, 33–40, 1964.

[2053] Thornton, J. E. *Design of a Computer : The CONTROL DATA 6600.* Scott, Foresman, Glenview, Illinois, 1970.

[2054] Thurnau, D. Algorithm 195 : BANDSOLVE. *Comm. ACM*, 6:441, 1963.

[2055] Tinney, W. F. Notes on network solutions by ordered triangular factorization. Bonneville, Power Administration, P.O. Box 3621, Portland, Oregon 97208.

[2056] Tinney, W. F. Optimal ordering for sparsely coupled subnetworks. Bonneville, Power Administration, P.O. Box 3621, Portland, Oregon 97208, 1968.

[2057] Tinney, W. F. Comments on using sparsity techniques for power systems problems. In Willoughby, R. A., editor, *Proc. of the Symposium on Sparse Matrices and their Applications*, pages 25–34, Yorktown Heights, 1969. (RAI 3-12-69).

[2058] Tinney, W. F. Some example of sparse matrix methods for power network problems. (Presented at Power Systems Computation Conference, Rome), 1969.

[2059] Tinney, W. F. Some examples of sparse matrix methods for power network problems. In *Power System Computation Conference*, Rome, 1969.

[2060] Tinney, W. F. Compensation methods for network solutions by optimally ordered triangular factorization. *IEEE Trans. Power Apparatus and Systems*, PAS-91(1):123–127, 1972.

[2061] Tinney, W. F., Brandwajn, V., and Chan, S. M. Sparse vector methods. *IEEE Trans. Power Apparatus and Systems*, PAS-104(2):295–301, 1985.

[2062] Tinney, W. F. and Hart, C. E. Power flow solution by Newton's method. *IEEE Trans. Power Apparatus and Systems*, PAS-86(11):1449–1460, 1967.

[2063] Tinney, W. F. and Ogbuobiri, E. C. Sparsity techniques : Theory and practice. Tech. Report, Bonneville Power Administration, Portland, 1970.

[2064] Tinney, W. F. and Powell, W. L. Notes on the Newton-Raphson method for solution of AC power flow problems. (Internal Publication), Bonneville Power Administration, Portland, Oregon, 1971.

[2065] Tinney, W. F., Powell, W. L., and Peterson, N. M. Sparsity oriented network reduction. In *Proc. 8^{th} PICA Conference*, Minneapolis, 1973.

[2066] Tinney, W. F. and Walker, J. Direct solution of sparse network equations by optimally ordered triangular factorization. *Proc. of the IEEE*, 55:1801–1809, 1967.

[2067] Tjaden, G. S. and Flynn, M. J. Detection and parallel execution of independent instructions. *IEEE Trans. Comput.*, C-19(10):889–895, 1970.

[2068] Tobey, R. G., editor. *Proc. 1968 Summer Institute on Symbolic Mathematical Computation, IBM Boston Programming Center*, Cambridge, Massachusetts, 1968.

[2069] Todd, J., editor. *Survey of Numerical Analysis*. McGraw-Hill, 1962.

[2070] Todd, M. J. Theory and practice for interior point methods. *ORSA J. Computing*, 6(1):28–31, 1994.

[2071] Toint, Ph. L. On sparse and symmetric matrix updating subject to a linear equation. *Math. of Computation*, 31:954–961, 1977.

[2072] Toint, Ph. L. Some numerical results using a sparse matrix updating formula in unconstrained optimization. *Math. of Computation*, 32:839–851, 1978.

[2073] Toint, Ph. L. A sparse quasi-Newton update derived variationally with a non-diagonally weighted Frobenius norm. *Math. of Computation*, 37:425–434, 1981.

[2074] Toint, Ph. L. Towards an efficient sparsity exploiting Newton method for minimization. In Duff, I. S., editor, *Sparse Matrices and Their Uses*, pages 57–88. Academic Press, 1981.

[2075] Tomasulo, R. M. An efficient algorithm for exploiting multiple arithmetic units. *IBM J. of Research and Development*, 11(1):25–33, 1967.

[2076] Tomlin, J. A. Maintaining sparse inverse in the simplex method. Tech. Report 70-15, Operations Res. Dept., Stanford Univ., 1970.

[2077] Tomlin, J. A. Pivoting for size and sparsity in linear programming inversion routines. *J. Inst. Math. Appl.*, 10:289–295, 1972.

[2078] Tomlin, J. A. On pricing and backward transformation in linear programming. *Math. Programming*, 6:42–47, 1974.

[2079] Tomlin, J. A. An experimental approach to Karmarkar's projective method for linear programming. *Math. Programming Study*, 31:175–191, 1987.

[2080] Traub, J. F. *Iterative Methods for the Solution of Equations*. Prentice-Hall, 1964.

[2081] Traub, J. F., editor. *Complexity of Sequential and Parallel Numerical Algorithms.* Academic Press, 1973.

[2082] Treleaven, P. C., Brownbridge, D. R., and Hopkins, R. P. Data-driven and demand-driven computer architectures. *ACM Computing Surveys*, 14(1):93–143, 1982.

[2083] Troiani, M., Ching, S. S., Quaynor, N. N., Bloem, J. E., and Colon Osorio, F. C. The VAX 8600-I box : A pipelined implementation of the VAX architecture. *Digital Technical Journal*, 1:4–19, 1985.

[2084] Tsuchiya T. and Muramatsu, M. Global convergence of the long-step affine scaling algorithm for degenerate linear programming problems. Tech. Report 423, The Institute of Statistical Mathematics, Tokyo, 1992.

[2085] Tucker, S. G. Microprogram control for the System/360. *IBM Systems Journal*, 6(4):222–241, 1967.

[2086] Tuma, J. J. *Technology Mathematics Handbook.* McGraw-Hill, 1975.

[2087] Tuma, J. J. *Engineering Mathematics Handbook.* McGraw-Hill, 1979.

[2088] Turing, A. M. On computable numbers, with an application to the Entscheidungs problem. *Proc. London Math. Soc.*, 2(42):230–265, 1936. (Corrections on volume 2(43):544–546).

[2089] Turing, A. M. Rounding-off errors in matrix processes. *Quart. J. Mech. Appl. Math.*, 1:287–308, 1948.

[2090] Ullman, J. D. Fast algorithms for the elimination of subexpressions. *Acta Informatica*, 2:191–213, 1973.

[2091] Ullman, J. D. *Computational Aspects of VLSI.* Computer Science Press, Rockville, MD, 1984.

[2092] Underwood, R. *An Iterative Block Lanczos Method for the Solution of Large Sparse Symmetric Eigenproblems.* PhD thesis, Computer Science Dept., Stanford Univ., 1975. (Report STAN-CS-75-496).

[2093] Undrill, J. M. and Happ, H. H. Automatic sectionalization of power system networks for networks solution. *IEEE Trans. Power Apparatus and Systems*, PAS-90(1):46–63, 1971.

[2094] Vaidya, P. M. An algorithm for linear programming which requires $O(((m+n)n^2 + (m+n)^{1.5}n)L)$ arithmetic operations. In *Proc. 19th ACM Symposium on Theory of Computing*, pages 29–38, 1987.

[2095] Vaidya, P. M. Speeding-up linear programming using fast matrix multiplication. Tech. Report, AT&T BELL Labs., Murray Hill, 1989.

[2096] van der Sluis, A. Condition numbers and equilibration of matrices. *Numer. Math.*, 14:14–23, 1969.

[2097] van der Sluis, A. Condition, equilibration and pivoting in linear algebraic systems. *Numer. Math.*, 15:74–86, 1970.

[2098] van der Vorst, H. A. High performance preconditioning. *SIAM J. Sci. and Stat. Comput.*, 10:1174–1185, 1989.

[2099] Van Huffel, S. and Vandewalle, J., editors. *The Total Least Squares Problem : Computational Aspects and Analysis.* SIAM Publications, 1991.

[2100] van Leeuwen, J. Graph algorithms. In *Handbook of Theoretical Computer Science – A : Algorithms and Complexity Theory.* North Holland, 1990.

[2101] Van Loan, C. *Computational Frameworks for the Fast Fourier Transform.* SIAM Publications, 1992.

[2102] van Ness, J. E. and Griffin, J. H. Elimination methods for load-flow studies. *IEEE Trans. Power Apparatus and Systems*, PAS-80(6):299–304, 1961.

[2103] van Wijngaarden, A. et al. Report on the algorithmic language ALGOL 68. *Numer. Math.*, 14:79–218, 1969.

[2104] Vanderbei, R. J. Dense columns in interior point methods. In *Proc. IMACS'91 World Congress on Computation and Applied Mathematics*, Dublin, Ireland, 1991.

[2105] Vanderbei, R. J. Splitting dense columns in sparse linear systems. *Lin. Alg. Appl.*, 152:107–117, 1991.

[2106] Vanderbei, R. J. LOQO "User's Manual". Tech. Report SOR-92-5, School of Eng. and Applied Science, Dept. of Civil Eng. and Oper. Research, Princeton Univ., 1992.

[2107] Vanderbei, R. J. Symmetric quasi-definite matrices. Tech. Report SOR-91-10, School of Eng. and Applied Science, Dept. of Civil Eng. and Oper. Research, Princeton Univ., 1992.

[2108] Vanderbei, R. J. Interior point methods : Algorithms and formulations. *ORSA J. Computing*, 6(1):32–34, 1994.

[2109] Vanderbei, R. J. and Carpenter, T. J. Symmetric indefinite systems for interior point methods. *Math. Programming*, 58:1–32, 1993.

[2110] Vandergraft, J. S. *Introduction to Numerical Computations.* Academic Press, 1978.

[2111] Vannelli, A. A parallel implementation of an interior point method for linear programming. In *Parallel Processing for Scientific Computing*, pages 163–167, Houston, Texas, 1991. SIAM Publications.

[2112] Vardi, A. A trust region algorithm for equality constrained minimization : Convergence properties and implementation. *SIAM J. Numer. Anal.*, 22(3):575–591, 1985.

[2113] Varga, R. S. Factorization and normalized iteration methods. In Langer, R. E., editor, *Boundary Problems in Differential Equations, Proc. Mathematical Research Center*, pages 121–142. University of Wisconsin Press, Madison, 1959.

[2114] Varga, R. S. *Matrix Iterative Analysis.* Prentice-Hall, 1962.

[2115] Varga, R. S. *Functional Analysis and Approximation Theory in Numerical Analysis.* SIAM Publications, 1971.

[2116] Varga, R. S. *Scientific Computation on Mathematical Problems and Conjectures.* SIAM Publications, 1990.

[2117] Vavasis, S. A. Stable finite elements for problems with wild coefficients. Tech. Report 93-1364, Dept. of Computer Science, Cornell Univ., 1993. (To be published at SIAM J. Numerical Analysis).

[2118] VAX. FORTRAN version 4.0 "User's Guide", DEC, 1984.

[2119] Veldhorst, M. An analysis of sparse matrix storage schemes. In *volume 150 of Mathematical Centre Tracts*, Amsterdam, 1982.

[2120] Veloso, P., Azeredo, P., and Furtado, A. L. *Estruturas de Dados.* Editora Campus, 1983.

[2121] Vichnevetsky, R., editor. *Advances in Computer Methods for Partial Differential Equations – III.* Publ. IMACE, 1979.

[2122] Vichnevetsky, R. and Stepleman, editors. *Proc. AICA International Symposium on Computer Methods for Partial Differential Equations, Bethlehem.* Prentice-Hall, 1975.

[2123] Vignes, J. *Algorithmes Numériques, Analyse et Mise en Œuvre, tome II : Équations et Systèmes Non Linéaires.* Éditions Technip, 1980.

[2124] Villers, F. A. *Methoden der Praktischen Analysis.* Walter de Gruyter, 1957.

[2125] Villiers, E. and Wilson, L. B. Hashing the subscripts of a sparse matrix. *BIT*, 14:347–358, 1974.

[2126] Volgenant, T. and Jonker, R. The symmetric travelling salesman problem and edge exchanges in minimal 1-trees. *European Journal of Operations Research*, 12:394–403, 1983.

[2127] von Neumann, J. and Goldstine, H. H. Numerical inverting of matrices of high order. *Bull. Amer. Math. Soc.*, 53:1021–1099, 1947.

[2128] von Rosenberg, D. V., editor. *Methods for the Numerical Solution of Partial Differential Equations.* American Elsevier, New York, 1969.

[2129] Vygodsky, M. *Mathematical Handbook : Higher Mathematics.* Mir Publishers, 1975.

[2130] Wachspress, E. L. *Iterative Solution of Elliptic Systems and Applications to the Neutron Diffusion Equations of Reactor Physics.* Prentice-Hall, 1966.

[2131] Wagner, R. Parallel solution of arbitrarily sparse linear systems. Tech. Report CS-1984-13, Dept. of Computer Science, Duke Univ., 1984.

[2132] Wagner, R. and Patrick, M. A sparse matrix algorithm on the Boolean vector machine. *Parallel Computing*, 6:359–372, 1988.

[2133] Wagner, R. A. A shortest path algorithm for edge-sparse graphs. *J. ACM*, 23:50–57, 1976.

[2134] Wagner, R. E. Indexing design considerations. *IBM Systems Journal*, 4:351–367, 1973.

[2135] Waite, W. M. Path detection in multidimensional iterative arrays. *J. ACM*, 14:300–310, 1967.

[2136] Wakerly, J. *Microcomputer Architecture and Programming.* John Wiley & Sons, 1989.

[2137] Walker, H. F. Implementation of the GMRES method using Householder transformations. *SIAM J. Sci. and Stat. Comput.*, 9:152–163, 1988.

[2138] Walker, J. W. Renumbering subroutine : Complete documentation of program for near-optimal ordering. Bonneville, Power Administration, P.O. Box 3621, Portland, Oregon 97208, 1967.

[2139] Waltz, D. L., editor. *Neural and Artificial Parallel Computation, Proc.* 5^{th} *NEC Research Symposium.* SIAM Publications, 1995.

[2140] Wang, H. H. A parallel method for tridiagonal equations. *ACM Trans. Math. Software*, 7:170–183, 1981.

[2141] Wang, L. *Eigenvalue Analysis of Large Power Systems.* PhD thesis, Univ. Toronto, 1991.

[2142] Wang, L. *Spectral Nested Dissection.* PhD thesis, Dept. of Computer Science and Engineering, The Pennsylvania State Univ., 1994.

[2143] Wang, L. and Semlyen, A. Application of sparse eigenvalue techniques to the small-signal stability analysis of power systems. *IEEE Trans. Power Systems*, PWRS-5:635–642, 1990.

[2144] Ward, J. B. and Hale, H. W. Digital computer solution of power flow problems. *IEEE Trans. Power Apparatus and Systems*, PAS-75(3):398–404, 1956.

[2145] Ware, W. The ultimate computer. *IEEE Spectrum*, pages 89–91, 1973.

[2146] Warshall, S. A theorem on Boolean matrices. *J. ACM*, 9:11–12, 1962.

[2147] Watanabe, T. Architecture and performance of the NEC supercomputer SX system. *Parallel Computing*, 5:247–255, 1987.

[2148] WATCOM. *C* version 9.1 “User’s Guide”.

[2149] WATCOM. FORTRAN version 9.1 “User’s Guide”.

[2150] Waters, F. *IBM RT Personal Computer Technology.* IBM, Austin, Texas, 1986.

[2151] Watson, G. A. *Numerical Analysis, Dundee 1977*, volume 630 of *Lecture Notes in Mathematics*. Springer-Verlag, 1978.

[2152] Watson, L. T., Billups, S. C., and Morgan, A. P. HOMPACK : A suite of codes for globally convergent homotopy algorithms. *ACM Trans. Math. Software*, 13:281–310, 1987.

[2153] Weaver, H. J. *Applications of Discrete and Continuous Fourier Analysis.* John Wiley & Sons, 1983.

[2154] Weaver, W. Jr. *Computer Programs for Structural Analysis.* Van Nostrand-Reinhold, Princeton, New Jersey, 1967.

[2155] Wegman, M. N. and Carter, J. L. New hash functions and their use in authentication and set equality. *J. Comput. System Sci.*, 22:265–279, 1981.

[2156] Weicker, R. P. DHRYSTONE : A synthetic systems programming benchmark. *Comm. ACM*, 27(10):1013–1030, 1984.

[2157] Weinberg, G. *The Psychology of Computer Programming.* Van Nostrand, 1971.

[2158] Weinberg, L. *Network Analysis and Systems.* McGraw-Hill, 1962.

[2159] Weiss, S. and Smith, J. E. Instruction issue logic for pipelined supercomputers. In *Proc. 11^{th} Symposium on Computer Architecture*, pages 110–118, Ann Arbor, 1984.

[2160] Weiss, S. and Smith, J. E. A study of scalar compilation techniques for pipelined supercomputers. In *Proc. 2^{nd} Conference on Architectural Support for Programming Languages and Operating Systems*, pages 105–109, Palo Alto, 1987. IEEE/ACM.

[2161] Weissman, C. Psychological complexity of computer programs : An initial experiment, 1973. Computer Systems Research Group Technical Report, Univ. of Toronto.

[2162] Wendroff, B. *Theoretical Numerical Analysis.* Academic Press, 1966.

[2163] Wendroff, B. *First Principles of Numerical Analysis : An Undergraduate Text.* Addison-Wesley, 1969.

[2164] Westlake, J. R. *A Handbook of Numerical Matrix Inversion and Solution of Linear Equations.* John Wiley & Sons, 1968.

[2165] Whitby-Strevens, C. The TRANSPUTER. In *Proc. 12^{th} International Symposium on Computer Architecture*, pages 292–300, Boston, 1985.

[2166] Whittaker, E. and Robinson, G. *The Calculus of Observations.* Blackie and Son, London, 1924.

[2167] Whitten, G. F. *Structurally Recursive Algorithms.* PhD thesis, Committee on Applied Mathematics, Harvard Univ., 1978.

[2168] Wichmann, B. A. *ALGOL 60 Compilation and Assessment.* Academic Press, 1973.

[2169] Widlund, O. B. On the rate of convergence of an alternating direction implicit method in a non-commutative case. *Math. of Computation*, 20:500–515, 1966.

[2170] Wiecek, C. A case study of the VAX 11 instruction set usage for compiler execution. In *Proc. Symposium on Architectural Support for Programming Languages and Operating Systems*, pages 174–184, Palo Alto, 1982. IEEE/ACM.

[2171] Wilde, D. J. *Optimum Seeking Methods.* Prentice-Hall, 1964.

[2172] Wilf, H. S. Matrix inversion by the annihilation of rank. *SIAM J. Appl. Math.*, 7:149–151, 1959.

[2173] Wilf, H. S. *Combinatorial Algorithms : An Update.* SIAM Publications, 1989.

[2174] Wilkes, M. V. The best way to design an automatic calculating machine. In *Manchester University Computer Inaugural Conference, London, 1951*, 1953. (Republished at The Genesis of Microprogramming, Annals of the History of Computing, 8:116).

[2175] Wilkes, M. V. Slave memories and dynamic storage allocation. *IEEE Trans. Electronic Computers*, EC-14(2):270–271, 1965.

[2176] Wilkes, M. V. The growth of interest in microprogramming : A literature survey. *ACM Computing Surveys*, 1:139–145, 1969.

[2177] Wilkes, M. V. *Time-Sharing Computing Systems.* Elsevier, New York, 1969.

[2178] Wilkes, M. V. *Memoirs of a Computer Pioneer.* MIT Press, 1985.

[2179] Wilkes, M. V. and Renwick, W. Report of a conference on high speed automatic calculating machines, 1949.

[2180] Wilkes, M. V. and Stringer, J. B. Microprogramming and the design of the control circuits in an electronic digital computer. In *Proc. Cambridge Philosophical Society, volume 49*, pages 230–238, 1953. (Republished at Siewiorek, D. P. and Bell, C. G. and Newell, A., Computer Structures : Principles and Examples, pages 158–163, McGraw-Hill, 1982 and in The Genesis of Microprogramming, Annals of the History of Computing, 8:116).

[2181] Wilkes, M. V., Wheeler, D. J., and Gill, S. *The Preparation of Programs for an Electronic Digital Computer.* Addison-Wesley, 1951.

[2182] Wilkinson, J. H. The evaluation of ill-conditioned polynomials – I, II. *Numer. Math.*, 1:150–180, 1959.

[2183] Wilkinson, J. H. Error analysis of direct methods of matrix inversion. *J. ACM*, 8:281–330, 1961.

[2184] Wilkinson, J. H. Instability of the elimination method of reducing a matrix to tridiagonal form. *Computing J.*, 5:61–70, 1962.

[2185] Wilkinson, J. H. *Rounding Errors in Algebraic Processes.* Prentice-Hall, 1963.

[2186] Wilkinson, J. H. *The Algebraic Eigenvalue Problem.* Clarendon Press, Oxford, 1965.

[2187] Wilkinson, J. H. The solution of ill-conditioned linear equations. In Ralston, A. and Wilf, H. S., editors, *Mathematical Methods for Digital Computers, volume 2*, pages 65–93. John Wiley & Sons, 1967.

[2188] Wilkinson, J. H. A survey of error analysis of matrix algorithms. *Appl. Math.*, 13:93–102, 1968.

[2189] Wilkinson, J. H.and Reinsch, C. *Handbook for Automatic Computation, volume 2 : Linear Algebra.* Springer-Verlag, 1971.

[2190] Williams, J. W. J. Algorithm 232 : HEAPSORT. *Comm. ACM*, 7:347–348, 1964.

[2191] Williams, T. E., Horowitz, M., Alverson, R. L., and Yang, T. S. A self-timed chip for division. In *Proc. 1987 Stanford Conference on Advanced Research in VLSI.* MIT Press, 1987.

[2192] Willner, E. and Demchak, B. *Advanced UCSD PASCAL Programming Techniques.* Prentice-Hall, 1985.

[2193] Willoughby, R. A. Some numerical analysis aspects of computational circuit design. In *Proc. Cornell Conference on Computerized Electronics*, pages 24–35, Ithaca, 1969. Cornell Univ.

[2194] Willoughby, R. A., editor. *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center. (Tech. Report RA-1-11707, Table of Cont. MR-39 No. 1106).

[2195] Willoughby, R. A. Some pivot considerations in direct methods for sparse matrices. In *Proc. Mexico 1971 International IEEE Conference on Systems, Networks and Computers*, 1971.

[2196] Willoughby, R. A. Sparse matrix algorithms and their relation to problem classes and computer architecture. In Reid, J. K., editor, *Large Sparse Sets of Linear Equations*, pages 255–277. Academic Press, 1971.

[2197] Willoughby, R. A. A characterization of matrix irreducibility via triangular factorization. Tech. Report RC-3931, IBM Thomas J. Watson Research Center, Yorktown Heights, New York, 1972.

[2198] Willoughby, R. A. A matrix reducibility algorithm. *Math. of Computation*, 1972.

[2199] Willoughby, R. A. A survey of sparse matrix technology. In *Conference on Computer Oriented Analysis of Shell Structures, 1970*, Lockheed, Palo Alto, 1972. (IBM Tech. Report RC-3872).

[2200] Willoughby, R. A. The inverse M-Matrix problem. Tech. Report RC-5441, IBM Thomas J. Watson Research Center, Yorktown Heights, New York, 1975.

[2201] Wilson, A. W. Jr. Hierarchical cache/bus architecture for shared memory multiprocessors. In *Proc. 14^{th} International Symposium on Computer Architecture*, pages 244–252, Pittsburgh, 1987.

[2202] Wilson, E. L. Solution of sparse stiffness matrices for structural systems. In Duff, I. S. and Stewart, G. W., editors, *Sparse Matrix Proceedings 1978.* SIAM Publications, 1979.

[2203] Wilson, E. L., Bathe, K. L., and Doherty, W. P. Direct solution of large systems of linear equations. *Computers and Structures*, 4:363–372, 1974.

[2204] Wilson, L. B. Solution of certain large sets of equations on PEGASUS using matrix methods. *Computing J.*, 2:130–133, 1959.

[2205] Wilson, R. B. *A Simplicial Algorithm for Concave Programming.* PhD thesis, Harvard University Graduate School of Economics, Cambridge, 1963.

[2206] Windley, P. F. Transposing matrices in a digital computer. *Computing J.*, 2:47–48, 1959.

[2207] Wing, O. A content addressable systolic array for sparse matrix computation. *J. Par. and Dist. Comp.*, 2:170–181, 1985.

[2208] Wing, O. and Huang, J. A parallel triangulation process of sparse matrices. In *Proc. 1977 International Conference on Parallel Processing*, pages 207–214, 1977.

[2209] Wing, O. and Huang, J. W. A computation model of parallel solution of linear equations. *IEEE Trans. Comput.*, C-29:632–638, 1980.

[2210] Winograd, S. A new algorithm for inner product. *IEEE Trans. Comput.*, C-18:693–694, 1968.

[2211] Winograd, S. On the number of multiplications required to compute certain functions. *Comm. Pure and Appl. Math.*, 23:165–179, 1970.

[2212] Winograd, S. *Arithmetic Complexity of Computations.* SIAM Publications, 1980.

[2213] Wirth, N. The design of a PASCAL compiler. *Software Practice and Experience*, 1:309–333, 1971.

[2214] Wirth, N. Program development by stepwise refinement. *Comm. ACM*, 14(4):221–227, 1971.

[2215] Wirth, N. The programming language PASCAL. *Acta Informatica*, 1:35–63, 1971.

[2216] Wirth, N. *Systematic Programming : An Introduction.* Prentice-Hall, 1973.

[2217] Wirth, N. From programming techniques to programming methods. In Günter, Levrat, and Lipps, editors, *International Computing Symposium 1973.* North-Holland, 1974.

[2218] Wirth, N. On the design of programming languages. In Rosenfeld, L., editor, *Information Processing 1974.* North-Holland, 1974.

[2219] Wirth, N. An assessment of the programming language PASCAL. *IEEE Trans. Software Engineering*, SE-1(2):192–198, 1975.

[2220] Wirth, N. *Algorithms + Data Structures = Programs.* Prentice-Hall, 1976.

[2221] Wirth, N. MODULA : A language for modular multiprogramming. *Software Practice and Experience*, 7:3–35, 1977.

[2222] Wirth, N. Programming languages : What to demand and how to assess them. In Perrot, R. H., editor, *Software Engineering.* Academic Press, 1977.

[2223] Wirth, N. A computation model of parallel solution of linear equations. *IEEE Trans. Comput.*, C-29:632–638, 1980.

[2224] Wirth, N. *Algorithms & Data Structures.* Prentice-Hall, 1986.

[2225] Wirth, N. and Hoare, C. A. R. A contribution to the development of ALGOL. *Comm. ACM*, 9(6):413–431, 1966.

[2226] Withers, G. Parallel programming on the iPSC/860 system. Proc. 4^{th} ISMM/IASTED International Conference on Parallel and Distributed Computing and Systems, pages 341-343, 1991.

[2227] Witzgall, C. and Zahn, C. T. Jr. Modification of Edmond's maximum matching algorithm. *J. Res. Nat. Bur. Standards*, B69:91–98, 1966.

[2228] Wolfe, M. J. Loop skewing : The wavefront method revised. *J. of Parallel Programming*, 1986.

[2229] Wolfe, P. The composite simplex algorithm. *SIAM Review*, 7(1):42–54, 1965.

[2230] Wolfe, P. Convergence conditions for ascent methods. *SIAM Review*, 11:226–235, 1969.

[2231] Wolfe, P. Trends in linear programming computations. In Willoughby, R. A., editor, *Sparse Matrix Proceedings, Symposium on Sparse Matrices and Their Applications*, pages 107–112, Yorktown Heights, New York, 1969. IBM Thomas J. Watson Research Center.

[2232] Wolfe, P. Convergence conditions for ascent methods – II : Some corrections. *SIAM Review*, 13:185–188, 1971.

[2233] Wolfe, P. and Cutler, L. Experiments in linear programming. In Graves, R. L. and Wolfe, P., editors, *Recent Advances in Mathematical Programming.* 1963.

[2234] Wolfram, S. *Mathematica : A System for doing Mathematics by Computer.* Addison-Wesley, 2^{nd} edition, 1991.

[2235] Woo, P. T., Eisenstat, S. C., and Schultz, M. H.and Sherman, A. H. Application of sparse matrix techniques to reservoir simulation. In Bunch, J. R. and Rose, D. J., editors, *Sparse Matrix Computations.* Academic Press, 1976.

[2236] Woo, P. T., Roberts, S. J., and Gustavson, F. G. Application of sparse matrix techniques in reservoir simulation. In *Proc.* 48^{th} *Annual Fall Meeting Soc. Petroleum Eng., AIME*, Las Vegas, 1973. (Paper SPE-4544).

[2237] Woodbury, M. Inverting modified matrices. Memo. Report 42, Statistical Research Group, Princeton Univ., 1950.

[2238] Woof, C. and Hodgkinson, D. *MuMath : A Microcomputer Algebra System.* Academic Press, 1987.

[2239] Worley, P. and Schreiber, R. Nested dissection on a mesh-connected processor array. In Wouk, A., editor, *New Computing Environments : Parallel, Vector and Systolic.* SIAM Publications, 1986.

[2240] Wouk, A., editor. *New Computing Environments : Parallel, Vector and Systolic.* SIAM Publications, 1986.

[2241] Wouk, A., editor. *New Computing Environments : Microcomputers in Large-Scale Computing.* SIAM Publications, 1987.

[2242] Wright, M. H. Interior methods for constrained optimization. In Iserles, A., editor, *Acta Numerica 1992*, pages 341–407. Cambridge University Press, 1992.

[2243] Wright, S. Implementing proximal point methods for linear programming. Tech. Report ANL-MCS-P-45-0189, Argonne National Laboratory, Argonne, Illinois, 1989.

[2244] Wulf, W. Compilers and computer architecture. *Computer*, 14(7):41–47, 1981.

[2245] Yang, C. and Vu, P. A vector/parallel implementation of the multifrontal method for sparse symmetric definite linear systems on the CRAY Y-MP. Tech. Report, CRAY Research, 1990.

[2246] Yang, E. and Tolle, J. A class of methods for solving large convex quadratic programs subject to box constraints. Preprint, Dept. of Operations Research, University of North Carolina, Chapel Hill, North Carolina, 1988.

[2247] Yannakakis, M. Computing the minimum fill-in is NP-Complete. *SIAM J. Alg. and Discr. Meth.*, 2(1):77–79, 1981.

[2248] Yaspan, A. On finding a maximal assignment. *Operations Res.*, 14:646–651, 1966.

[2249] Ye, Y. Karmarkar's algorithm and the ellipsoid method. *Operations Res. Letters*, 4:177–182, 1987.

[2250] Young, D. M. Iterative methods for solving partial difference equations of elliptic type. *Trans. Amer. Math. Soc.*, 76:92–111, 1954.

[2251] Young, D. M. *Iterative Solution of Large Linear Systems.* Academic Press, 1971.

[2252] Young, D. M. A survey of modern numerical analysis. *SIAM Review*, 15(2), 1973.

[2253] Young, D. M. and Gregory, R. T. *A Survey of Numerical Mathematics, volume 1.* Addison-Wesley, 1972.

[2254] Yu, D. C., Chen, S. T., and Alvarado, F. L. An interactive graphic interface to illustrate sparse matrix/vector methods. Paper 90-WM-072-9-PWRS, Univ. of Wisconsin, Madison, 1990. (Presented at IEEE Winter Power Meeting).

[2255] Yuan, Y. On a subproblem of trust region algorithms for constrained optimization. Tech. Report DAMTP-1986-NA-10, Dept. of Applied Mathematics and Theoretical Physics, Univ. of Cambridge, England, 1987.

[2256] Yuan, Y. A dual algorithm for minimizing a quadratic function with two quadratic constraints. Tech. Report DAMTP-1988-NA-3, Dept. of Applied Mathematics and Theoretical Physics, Univ. of Cambridge, England, 1988.

[2257] Zangwill, W. I. *Nonlinear Programming.* Prentice-Hall, 1969.

[2258] Zenios, S. A. On fine-grain decomposition of multicommodity transportation problems. *SIAM J. Optimization*, 1(4):643–669, 1991.

[2259] Zenios, S. A. Parallel computing : The introduction of novel computer architectures greatly alters technical landscape. *OR/MS Today*, pages 44–49, August 1992.

[2260] Zenios, S. A. and Mulvey, J. M. Relaxation techniques for strictly convex network problems. *Annals of Oper. Res.*, 1986.

[2261] Zenios, S. A. and Mulvey, J. M. Vectorization and multitasking of nonlinear network programming algorithms. *Math. Programming*, 42:449–470, 1988.

[2262] Zenios, S. A. and Pinar, M. Ç. Parallel block-partitioning of truncated Newton methods for nonlinear network optimization. Tech. Report 89-09-08, Decision Sciences Dept., The Wharton School, Univ. of Pennsylvania, 1989.

[2263] Zhang, G. and Elman, H. C. Parallel sparse Cholesky factorization on a shared memory multiprocessor. *Parallel Computing*, 18:1009–1022, 1992.

[2264] Zhang, Y. Computing a Celis-Dennis-Tapia trust region step for equality constrained optimization. Tech. Report TR-88-16, Dept. of Mathematical Sciences, Rice Univ., Houston, Texas, 1988.

[2265] Zhang, Y., Tapia, R. A., and Dennis, J. E. Jr. On the superlinear and quadratic convergence of primal-dual interior point linear programming algorithms. *SIAM J. Optimization*, 2:304–324, 1992.

[2266] Zhou, Y. F. Optimal parallel triangulation of a sparse matrix : A graphical approach. In *IEEE 1981 Symposium on Circuits and Systems*, 1981.

[2267] Zielke, G. Adjustment of the inverse of a symmetric matrix when two symmetric elements are changed. *Comm. ACM*, 11:118, 1968.

[2268] Zielke, G. Inversion of modified symmetric matrices. *J. ACM*, 15:402–408, 1968.

[2269] Zielke, G. Variation of the inverse of a symmetric matrix under symmetric variation of rows and columns. *Computing*, 3:76–77, 1968.

[2270] Zienkiewicz, O. C. *The Finite Element Method in Structural and Continuum Mechanics.* McGraw-Hill, 1967.

[2271] Zienkiewicz, O. C. *The Finite Element Method.* McGraw-Hill, 1977.

[2272] Zisman, A. A árvore-B e uma proposta de implementação. Master's thesis, Instituto de Matemática e Estatística, USP, 1993.

[2273] Zisman, A. and Setzer, V. W. Um novo algoritmo de concorrência para acesso e compactação de árvores-B. In *Anais do V Simpósio Brasileiro de Arquitetura de Computadores e Processamento de Alto Desempenho – XIII Congresso da Sociedade Brasileira de Computação*, pages 614–630, 1993.

[2274] Zitney, S. E. A frontal code for aspen plus on advanced architecture computers. In *American Inst. of Chemical Eng. (AIChE) Symposium on Parallel Computing*, 1990.

[2275] Zitney, S. E., Mallya, J., Davis, T. A., and Stadtherr, M. A. Multifrontal vs. frontal techniques for chemical process simulation on supercomputers. *Comput. Chem. Eng.*, 1995. (To be published).

[2276] Zitney, S. E. and Stadtherr, M. A. A frontal algorithm for equation-based chemical process flowsheeting on vector and parallel computers. In *American Inst. of Chemical Eng. (AIChE) Annual Meeting*, Washington, 1988.

[2277] Zitney, S. E. and Stadtherr, M. A. Supercomputing strategies for the design and analysis of complex separation systems. *Ind. Eng. Chem. Res.*, 32:604–612, 1993.

[2278] Zlatev, Z. On some pivotal strategies in Gaussian elimination by sparse technique. *SIAM J. Numer. Anal.*, 17:18–30, 1980.

[2279] Zlatev, Z. Comparison of two pivotal strategies in sparse plane rotations. *Comput. Math. Appl.*, 8:119–135, 1982.

[2280] Zlatev, Z. *Computational Methods for General Sparse Matrices.* Kluwer Academic Publishers, 1991.

[2281] Zlatev, Z. and Barker, V. A.and Thomsen, P. G. SSLEST : A FORTRAN IV subroutine for solving sparse systems of linear equations, "User's Guide". Tech. Report NI-78-01, Numerisk Institut, Lyngby, Denmark, 1978.

[2282] Zlatev, Z. and Nielsen, H. LLSS01 : A FORTRAN subroutine for solving least squares problems, "User's Guide". Tech. Report 79-07, Institute of Numerical Analysis, Technical Univ. of Denmark, Lyngby, 1979.

[2283] Zlatev, Z. and Thomsen, P. G. ST : A FORTRAN IV subroutine for the solution of large systems of linear algebraic equations with real coefficients by use of sparse technique. Tech. Report 76-05, Institute of Numerical Analysis, Technical Univ. of Denmark, 1976.

[2284] Zlatev, Z., Wasniewski, J., and Schaumburg, K. *Y12M : Solution of Large and Sparse Systems of Linear Algebraic Equations, Documentation of Subroutines*, volume 121 of *Lecture Notes in Computer Science*. Springer-Verlag, 1981.

[2285] Zmijewski, E. *Sparse Cholesky Factorization on a Multiprocessor.* PhD thesis, Dept. of Computer Science, Cornell Univ., 1987. (Report 87-856).

[2286] Zmijewski, E. Limiting communication in parallel sparse Cholesky factorization. Tech. Report TRCS-89-18, Dept. of Computer Science, Univ. of California, Santa Barbara, 1989.

[2287] Zmijewski, E. and Gilbert, J. R. A parallel algorithm for large sparse Cholesky factorization on a multiprocessor. Tech. Report TR-86-733, Dept. of Computer Science, Cornell Univ., Ithaca, 1986.

[2288] Zmijewski, E. and Gilbert, J. R. A parallel algorithm for sparse symbolic Cholesky factorization on a multiprocessor. *Parallel Computing*, 7:199–210, 1988.

[2289] Zurmühl, R. *Praktische Mathematik*. Springer-Verlag, 1957.

[2290] Zurmühl, R. *Matrizen*. Springer-Verlag, 1958.