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- [1] Yunkang Liu. Projected Runge-Kutta methods for differential equations on matrix Lie groups. Technical Report NA1998/01, University of Cambridge, 1998.
- [2] Arieh Iserles, Arne Marthinsen, and Syvert Norsett. On the implementation of the method of Magnus series for linear differential equations. Technical Report NA1998/02, University of Cambridge, 1998.
- [3] M.J.D. Powell. Direct search algorithms for optimization calculations. Technical Report NA1998/04, University of Cambridge, 1998.

Center for Research on Parallel Computation (CRPC)

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TRs_online.html](http://softlib.rice.edu/CRPC/softlib/TRs_online.html)

- [1] Michael Ulbrich and Stefan Ulbrich. Superlinear convergence of affine-scaling interior-point Newton methods for infinite-dimensional nonlinear problems with pointwise bounds. Technical Report CRPC-TR97697, Center for Research on Parallel Computation, September 1997.
- [2] H. B. Keller. Numerical studies of the Gauss lattice problem. Technical Report CRPC-TR97699, Center for Research on Parallel Computation, January 1997.
- [3] Eldar Giladi and Herbert B. Keller. Space-time domain decomposition for parabolic problems. Technical Report CRPC-TR97701, Center for Research on Parallel Computation, March 1997.
- [4] William Gropp and Jorge J. More. Optimization environments and the NEOS server. Technical Report CRPC-TR97708, Center for Research on Parallel Computation, March 1997.
- [5] Petr Kloucek. The relaxation of non-convex variational integrals. Technical Report CRPC-TR97709, Center for Research on Parallel Computation, September 1997.
- [6] Mario Ahues and Francoise Tisseur. A new deflation criterion for the QR algorithm. Technical Report CRPC-TR97713-S, Center for Research on Parallel Computation, January 1997.
- [7] Frederic Desprez, Jack Dongarra, Antoine Petit, Cyril Randriamaro, and Yves Robert. Scheduling block-cyclic array redistribution. Technical Report CRPC-TR97714-S, Center for Research on Parallel Computation, February 1997.

- [8] Greg Henry, David Watkins, and Jack Dongarra. A parallel implementation of the nonsymmetric QR algorithm for distributed memory architectures. Technical Report CRPC-TR97716, Center for Research on Parallel Computation, March 1997.
- [9] A. Cleary and J. Dongarra. Implementation in ScaLAPACK of divide-and-conquer algorithms for banded and tridiagonal linear systems. Technical Report CRPC-TR97717, Center for Research on Parallel Computation, April 1997.
- [10] Sanjay Ranka, Hon W. Yau, Kenneth A. Hawick, and Geoffrey C. Fox. High-performance Fortran for SPMD programming: An applications overview. Technical Report CRPC-TR97722, Center for Research on Parallel Computation, June 1997.
- [11] M. Ehtesham Hayder, David E. Keyes, and Piyush Mehrotra. A comparison of PETSc library and HPF implementations of an archetypal PDE computation. Technical Report CRPC-TR97728, Center for Research on Parallel Computation, November 1997.
- [12] Francisco M. Gomes and Danny C. Sorensen. ARPACK++: A C++ implementation of ARPACK eigenvalue package (draft version). Technical Report CRPC-TR97729, Center for Research on Parallel Computation, August 1997.
- [13] Richard A. Tapia. On the fundamental role of interior-point methodology in constrained optimization. Technical Report CRPC-TR97730, Center for Research on Parallel Computation, April 1997.
- [14] Alan Carle and Mike Fagan. Finite differences vs automatic differentiation for restartable iterative procedures. Technical Report CRPC-TR97733, Center for Research on Parallel Computation, December 1997.
- [15] Ravi Ramamoorthi, Adam Rifkin, Boris Dimitrov, and K. Mani Chandy. A general resource reservation framework for scientific computing. Technical Report CRPC-TR97736-S, Center for Research on Parallel Computation, December 1997.
- [16] Alan Carle and Mike Fagan. Construction and evaluation of an incremental iterative version of a parallel multigrid CFD code via automatic differentiation for shape optimization. Technical Report CRPC-TR98738, Center for Research on Parallel Computation, February 1998.

- [17] Andrew J. Booker, J. E. Dennis, Jr., Paul D. Frank, David B. Serafini, Virginia Torczon, and Michael W. Trosset. A rigorous framework for optimization of expensive functions by surrogates. Technical Report CRPC-TR98739-S, Center for Research on Parallel Computation, February 1998.

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- [1] I. S. Duff and J. Koster. The design and use of algorithms for permuting large entries to the diagonal of sparse matrices. Technical Report TR_PA_97_45, CERFACS, 1997.
- [2] L. M. Carvalho and L. Giraud. Block diagonal preconditioners for the Schur complement method. Technical Report TR_PA_97_46, CERFACS, 1997.
- [3] V. Frayssé, L. Giraud, and S. Gratton. A set of GMRES routines for real and complex arithmetics. Technical Report TR_PA_97_49, CERFACS, 1997.
- [4] Thierry Braconnier, Valerie Frayssé, and Jean-Christophe Rioual. ARNCHEB users' guide: Solution of large non symmetric or non Hermitian eigenvalue problems by the Arnoldi-Chebyshev method. Technical Report TR_PA_97_50, CERFACS, 1997.
- [5] P. R. Amestoy, I.S. Duff, and J.-Y. L'Excellent. MUMPS multifrontal massively parallel solver Version 2.0. Technical Report TR_PA_98_02, CERFACS, 1998.
- [6] L. H. Bezerra, Carlos Tomei, and R. Alan McCoy. Mobius transforms and solvers for large sparse generalized nonsymmetric eigenvalue problems. Technical Report TR_PA_98_03, CERFACS, 1998.
- [7] V. Frayssé, L. Giraud, and H. Kharraz-Aroussi. On the influence of the orthogonalization scheme on the parallel performance of GMRES. Technical Report TR_PA_98_07, CERFACS, 1998.

- [8] P. Amodio and F. Mazzia. A new approach to the backward error analysis in the LU factorization algorithm. Technical Report TR_PA_98_09, CERFACS, 1998.
- [9] F. Mazzia. Loss of biorthogonality and linear system solvers. Technical Report TR_PA_98_10, CERFACS, 1998.

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- [1] J. W. Barrett and J. F. Blowey. An improved error bound for a finite element approximation of a model for phase separation of a multi-component alloy with non-smooth free energy. Technical Report NA-98/01, University of Durham, 1998.

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- [1] L. Demkowicz, K. Gerdes, C. Schwab, A. Bajer, and T. Walsh. HP90: A general & flexible Fortran 90 *hp*-FE code. Technical Report 97-17, Eidgenössische Technische Hochschule, 1997.
- [2] K. Gerdes and D. Schoetzau. *hp* FEM for incompressible fluid flow - stable and stabilized. Technical Report 97-18, Eidgenössische Technische Hochschule, 1997.
- [3] C. Schwab and M. Suri. Mixed *hp* finite element methods for stokes and non-Newtonian flow. Technical Report 97-19, Eidgenössische Technische Hochschule, 1997.
- [4] R.L. Actis, B.A. Szabo, and C. Schwab. Hierarchic models for laminated plates and shells. Technical Report 97-20, Eidgenössische Technische Hochschule, 1997.

- [5] M. Feistauer and C. Schwab. Coupling of an interior Navier-Stokes problem with an exterior Oseen problem. Technical Report 98-01, Eidgenössische Technische Hochschule, 1998.
- [6] J.M. Melenk. On *n*-widths for elliptic problems. Technical Report 98-02, Eidgenössische Technische Hochschule, 1998.

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- [1] G. W. Stewart. On the adjoint matrix. Technical Report UMIACS-TR-98-02, Institute for Advanced Computer Studies (UMIACS), January 1998.
- [2] G. W. Stewart. Two algorithms for the efficient computation of truncated pivoted QR approximations to a sparse matrix. Technical Report UMIACS-TR-98-12, Institute for Advanced Computer Studies (UMIACS), February 1998.
- [3] Howard C. Elman and Dianne P. O'Leary. Eigenanalysis of some preconditioned Helmholtz problems. Technical Report UMIACS-TR-98-22, Institute for Advanced Computer Studies (UMIACS), March 1998.

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- [1] M. Ehtesham Hayder, David E. Keyes, and Piyush Mehrotra. A comparison of PETSC library and

HPF implementations of an archetypal PDE computation. Technical Report NASA/CR-97-206278 ICASE Report No. 97-72, Institute for Computer Applications in Science and Engineering, December 1997.

- [2] David E. Keyes, Dinesh K. Kaushik, and Barry F. Smith. Prospects for CFD on petaflops systems. Technical Report NASA/CR-97-206279 ICASE Report No. 97-73, Institute for Computer Applications in Science and Engineering, December 1997.
- [3] Changqing Hu and Chi-Wang Shu. A discontinuous Galerkin finite element method for Hamilton-Jacobi equations. Technical Report NASA/CR-1998-206903 ICASE Report No. 98-2, Institute for Computer Applications in Science and Engineering, January 1998.
- [4] Robert Michael Lewis and Virginia Torczon. Pattern search methods for linearly constrained minimization. Technical Report NASA/CR-1998-206904 ICASE Report No. 98-3, Institute for Computer Applications in Science and Engineering, January 1998.
- [5] Dimitri J. Mavriplis. Multigrid strategies for viscous flow solvers on anisotropic unstructured meshes. Technical Report NASA/CR-1998-206910 ICASE Report No. 98-6, Institute for Computer Applications in Science and Engineering, January 1998.
- [6] Dimitri J. Mavriplis. Directional agglomeration multigrid techniques for high-Reynolds number viscous flows. Technical Report NASA/CR-1998-206911 ICASE Report No. 98-7, Institute for Computer Applications in Science and Engineering, January 1998.
- [7] Robert V. Wilson, Ayodeji O. Demuren, and Mark Carpenter. Higher-order compact schemes for numerical simulation of incompressible flows. Technical Report NASA/CR-1998-206922 ICASE Report No. 98-13, Institute for Computer Applications in Science and Engineering, February 1998.
- [8] Eyal Arian and Veer N. Vatsa. A preconditioning method for shape optimization governed by the Euler equations. Technical Report NASA/CR-1998-206926 ICASE Report No. 98-14, Institute for Computer Applications in Science and Engineering, February 1998.

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- [1] C. Le Calvez and Y. Saad. Modified Krylov acceleration for parallel environments. Research Report UMSI 98/6, University of Minnesota Supercomputing Institute, January 1998.
- [2] Y. Saad and J. Zhang. Diagonal threshold techniques in robust multi-level ILU preconditioners for general sparse linear systems. Research Report UMSI 98/7, University of Minnesota Supercomputing Institute, January 1998.
- [3] K. Wu, Y. Saad, and A. Stathopoulos. Inexact Newton preconditioning techniques for eigenvalue problems. Research Report UMSI 98/10, University of Minnesota Supercomputing Institute, January 1998.
- [4] A. Gupta, F. Gustavson, M. Joshi, G. Karypis, and V. Kumar. Design and implementation of a scalable parallel direct solver for sparse symmetric positive definite systems: Preliminary results. Research Report UMSI 98/16, University of Minnesota Supercomputing Institute, February 1998.
- [5] A. Stathopoulos and Y. Saad. Restarting techniques for preconditioned symmetric eigenvalue methods. Research Report UMSI 98/20, University of Minnesota Supercomputing Institute, February 1998.
- [6] T. Braconnier and Y. Saad. Eigenvalue bounds from the Schur form. Research Report UMSI 98/21, University of Minnesota Supercomputing Institute, February 1998.

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- [1] E. Suli. A posteriori error analysis and adaptivity for finite element approximations of hyperbolic problems. Technical Report NA-97/21, Oxford, 1997.
- [2] Mark Embree and Lloyd N. Trefethen. The random recurrence $x_{n+1} = x_n \pm b x_{n-1}$. Technical Report NA-97/22, Oxford, 1997.
- [3] Nicolas Jackson, Endre Suli, and Sam Howison. Computation of deterministic volatility surfaces. Technical Report NA-98/01, Oxford, 1998.

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- [1] N. I. M. Gould and J. Nocedal. The modified absolute-value factorization norm for trust-region minimization. Technical Report RAL-TR-97-071, Rutherford Appleton Laboratory, 1997.
- [2] N. I. M. Gould, S. Lucidi, M. Roma, and Ph. L. Toint. A linesearch algorithm with memory for unconstrained optimization. Technical Report RAL-TR-98-003, Rutherford Appleton Laboratory, 1998.
- [3] M. J. Dayde, J. Decamps, and N. I. M. Gould. Subspace-by-subspace preconditioners for structured linear systems. Technical Report RAL-TR-98-005, Rutherford Appleton Laboratory, 1998.
- [4] J. K. Reid and J. A. Scott. Ordering symmetric sparse matrices for small profile and wavefront. Technical Report RAL-TR-98-016, Rutherford Appleton Laboratory, 1998.
- [5] J. K. Reid. Implicit scaling of linear least squares problems. Technical Report RAL-TR-98-027, Rutherford Appleton Laboratory, 1998.

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- [1] P. A. Knight, M. Grinfeld, and H. Lamba. Non-normality and finite precision arithmetic in power method dynamics. Technical Report SCCM-97-14, Stanford University, 1997.
- [2] Ahmed Sameh Gene H. Golub and Vivek Sarin. A parallel balanced method for sparse linear systems. Technical Report SCCM-97-15, Stanford University, 1997.
- [3] T. Zhang, G. H. Golub, and K. H. Law. Eigenvalue perturbation and generalized Krylov subspace methods. Technical Report SCCM-98-01, Stanford University, 1998.
- [4] A. Melman. Spectral functions for real symmetric toeplitz matrices. Technical Report SCCM-98-02, Stanford University, 1998.
- [5] Z. Bai, M. Fahey, G. Golub, M. Menon, and E. Richter. Computing partial eigenvalue sum in electronic structure calculations. Technical Report SCCM-98-03, Stanford University, 1998.
- [6] M. Benzi and G. H. Golub. Bounds for the entries of matrix functions with applications to preconditioning. Technical Report SCCM-98-04, Stanford University, 1998.
- [7] H. Lamba and A. M. Stuart. Convergence proofs for numerical IVP software. Technical Report SCCM-98-05, Stanford University, 1998.
- [8] M. Drexler. Towards a global convergence theory for Newton's method. Technical Report SCCM-98-06, Stanford University, 1998.

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- [1] Y. Qiu and D. M. Sloan. On multiple solutions of a convection-diffusion boundary value problem produced by an adaptive mesh method. Technical Report 1997/42, University of Strathclyde, 1997.
- [2] D. J. Higham. Trust region algorithms and timestep selection. Technical Report 1998/3, University of Strathclyde, 1998.
- [3] M. A. Aves, P. J. Davies, and D. J. Higham. The effect of quadrature on the dynamics of a discretised nonlinear integro-differential equation. Technical Report 1998/5, University of Strathclyde, 1998.
- [4] D. F. Griffiths M. A. Aves and D. J. Higham. Runge-Kutta solutions of a hyperbolic conservation law with source term. Technical Report 1998/6, University of Strathclyde, 1998.