Current Institutional Reports *

SIGNUM Newsletter Volume 33, Number 2

April 1998

Cambridge

Dept. of Applied Mathematics and
Theoretical Physics
University of Cambridge
Silver Street
Cambridge CB3 9EW
England
0223 337900
email: Karen@amtp.cam.ac.uk
URL: *http://www.damtp.cam.ac.uk/DAMTP/user/na/reports.html*

[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)

Theresa Chatman
Center for Research on Parallel
Computation
Rice University
P.O. Box 1892
Houston, Texas 77251-1892
URL: *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-quasiconvex 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 Petitet, Cyril Randriamaro, and Yves Robert. Scheduling block-cyclic array redistribution. Technical Report CRPC-TR97714-S, Center for Research on Parallel Computation, February 1997.

*Reports can be obtained by writing to the person or address given for the publishing institution. We recommend requesting reports by author, title, and number, since the information listed in this column has been transcribed at least once from the original sources. URLs included in the contact's address point to reports that are available online. SIGNUM Newsletter Institutional Reports columns and their BibTeX bibliographies are available online at *http://www.netlib.org/signum-reports/*

[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.

CERFACS

Centre Euròpe en de Recherche et de Formation
Avancee en Calcul Scientifique
42, Avenue Gustave-Coriolis
31057 Toulouse Cedex,
France
Attn. Librarian: 010 33 61193131
email: library@cerfacs.fr
URL: *http://www.cerfacs.fr/algor/algo_reports.html*

[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. Fraysse, 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 Fraysse, and Jean-Christophe Rioual. ARNCHEB users' guide: Solution of large non symmetric or non Hermitian eigenvalue problems by the Arnoldi-Tchebycheff 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. Fraysse, 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.

University of Durham

Department of Mathematical Sciences
University of Durham
South Road
Durham DH1 3LE: 091 374 2349
URL: *http://fourier.dur.ac.uk:8000/num/publications.html*

[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.

Eidgenössiche Technische Hochschule

Seminar für Angewandte Mathematik
ETH-Zentrum
CH-8092 Zürich
URL: *ftp://ftp.sam.math.ethz.ch/pub/sam-reports/*

[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, Eidgenössiche Technische Hochschule, 1997.

[2] K. Gerdes and D. Schoetzau. *hp* FEM for incompressible fluid flow - stable and stabilized. Technical Report 97-18, Eidgenössiche Technische Hochschule, 1997.

[3] C. Schwab and M. Suri. Mixed *hp* finite element methods for stokes and non-Newtonian flow. Technical Report 97-19, Eidgenössiche Technische Hochschule, 1997.

[4] R.L. Actis, B.A. Szabo, and C. Schwab. Hierarchic models for laminated plates and shells. Technical Report 97-20, Eidgenössiche 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, Eidgenössiche Technische Hochschule, 1998.

[6] J.M. Melenk. On n-widths for elliptic problems. Technical Report 98-02, Eidgenössiche Technische Hochschule, 1998.

Institute for Advanced Computer Studies (UMIACS)

Institute for Advanced Computer Studies (UMIACS)
University of Maryland
College Park, MD 20742
email: tr@umiacs.umd.edu
URL: *http://www.cs.umd.edu/TRs/TRumiacs.html*

[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 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.

Institute for Computer Applications in Science and Engineering (ICASE)

NASA Langley Research Center
Hampton, VA 23665
Attn: Ms. Barbara Kraft
URL: *http://www.icase.edu/docs/library/reports/rdp/*

[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.

Minnesota Supercomputer Institute

University of Minnesota
1200 Washington Avenue South
Minneapolis, MN 55415
or fax (612)624-8861
URL: *http://www.msi.umn.edu/Reports/reporthead.html*

[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.

Oxford

Numerical Analysis Group
Oxford University Computing Laboratory
Wolfson Building
Parks Road
Oxford OX1 3QD, England

0865 273885
email: Bette.Byrne@comlab.ox.ac.uk
URL: *http://www.comlab.ox.ac.uk/oucl/publications/natr.html*

[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 $x_{n+1} = x_n \pm bx_{n-1}$. 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.

Rutherford Appleton Laboratory

Atlas Centre
Attn. L. Miles
Rutherford Appleton Laboratory
Didcot
Oxon OX11 0QX
England: 0235 445790
URL: *http://www.rl.ac.uk/departments/ccd/numerical/reports/reports.html*

[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.

Stanford University

SCCM Program, MC 9025
Stanford University
Gates Building 2B
Stanford, CA 94305-9025, USA
Phone: (415) 723-3125
Fax: (415) 723-2411
e-mail: info@sccm.stanford.edu
URL: *http://www-sccm.stanford.edu/tech_reports.html*

[1] P. A. Knight, M. Grinfeld, and H. Lamba. Nonnormality 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 pertubation 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.

University of Strathclyde

Department of Mathematics
Livingstone Tower

26 Richmond Street
Glasgow G1 1XH: 041 552 4400
URL:
http://www.maths.strath.ac.uk/reports/

[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.