Release 2 News

1 NAG Parallel Library, Release 2 News

This Release represents a considerable expansion of the NAG Parallel Library. It contains a total of 86 documented routines, of which 35 are new. The linear algebra chapter sees the inclusion of routines for complex matrices and more routines from the ScaLAPACK project. In this release, all routines derived from ScaLAPACK (and associated distribution and input/output routines) are compatible with Release 1.2 of this package; existing routines have been modified accordingly. More functionality (i.e., preconditioners, associated distribution routines and black box routines) has been added to the F11 chapter which deals with the solution of sparse linear systems.

The areas covered by the new routines in this release include:

Solution of complex dense systems of equations (general or Hermitian positive definite)

Eigenvalue problems (real symmetric or complex Hermitian)

Singular value decomposition (complex)

Linear least-squares problems (real)

Solution of real sparse systems of linear equations (symmetric or unsymmetric)

Multi-dimensional quadrature

Distribution of matrices (real sparse, complex dense)

Input/output of distributed matrices (real sparse, complex dense)

Unconstrained nonlinear optimisation

2 New Routines

D01FAFP: Adaptive multi-dimensional quadrature

E04JBFP: General unconstrained nonlinear optimisation

F01YAFP: Distribution of a real sparse matrix

F01YEFP: Distribution of a real dense vector conformally to a sparse matrix

F01ZPFP: Gathering of a distributed vector on each logical processor

F01ZVFP: Block cyclic generation of complex data (for ScaLAPACK routines)

F01ZWFP: Block column generation of complex data

F01ZXFP: Block cyclic generation of complex data (for Black Box routines)

F02FRFP: Complex Hermitian eigenvalue problem

F02WRFP: Complex singular value decomposition

F04ECFP: Solution of complex general linear equations with multiple right-hand sides (Black Box)

F04FCFP: Solution of complex Hermitian positive definite linear equations with multiple right-hand sides (Black Box)

F04GBFP: Solution of a real linear least-squares problem, using QR factorisation (Black Box)

F07ARFP: LU factorisation of a complex matrix

F07ASFP: Solution of a complex system of linear equations, LU factorisation generated by F07ARFP

F07FRFP: Cholesky factorisation of a complex Hermitian positive definite matrix

F07FSFP: Solution of a complex Hermitian positive definite system of linear equations, using Cholesky factorisation generated by F07FRFP

F08ASFP: QR factorisation of a complex rectangular matrix

F08ATFP: Forming all or part of a unitary Q from QR factorisation determined by F08ASFP

F08AUFP: Application of the unitary transformation determined by F08ASFP

F08FEFP: Orthogonal reduction of a real symmetric matrix to symmetric tridiagonal form

F08JJFP: Computation of selected eigenvalues of a real symmetric tridiagonal matrix by bisection

F11DAFP: Incomplete LU factorisations of local diagonal blocks of a real sparse matrix

F11DBFP: Block Jacobi preconditioner for a real sparse matrix

F11DCFP: Solution of a real sparse (unsymmetric) system of linear equations, using a RGMRES and a block Jacobi preconditioner (Black Box).

F11XAFP: Generation of data structures required to perform optimised matrix-vector multiplications for a real sparse matrix

F11XBFP: Optimised (transposed) matrix-vector multiplication for real sparse matrix

F11ZAFP: Set-up of real sparse matrix in cyclic row block distribution

X04BRFP: Read complex matrix into cyclic 2-d block distribution (used by ScaLAPACK (F07 and F08) routines)

X04BSFP: Outputs a matrix distributed in cyclic 2-d block fashion to its natural form (used by ScaLAPACK (F07 and F08) routines)

X04BUFP: Outputs a matrix distributed in column block fashion to its natural from (used by eigenvalue and SVD routines)

X04BVFP: Reads a complex general matrix into cyclic 2-d block form (used by Black Box (F04) routines)

X04BWFP: Outputs a block cyclic complex matrix to natural form (used by Black (F04) Box routines)

X04YAFP: Outputs a real dense vector, distributed conformally to a sparse matrix

Z01CEFP: Determination of length of the workspace for F08FEFP
