

## NAG Library Chapter Contents

### f11 – Large Scale Linear Systems

f11 Chapter Introduction – a description of the Chapter and an overview of the algorithms available

Function Name	Mark of Introduction	Purpose
f11bdc	23	nag_sparse_nsym_basic_setup Real sparse nonsymmetric linear systems, setup for nag_sparse_nsym_basic_solver (f11bec)
f11bec	23	nag_sparse_nsym_basic_solver Real sparse nonsymmetric linear systems, preconditioned RGMRES, CGS, Bi-CGSTAB or TFQMR method
f11bfc	23	nag_sparse_nsym_basic_diagnostic Real sparse nonsymmetric linear systems, diagnostic for nag_sparse_nsym_basic_solver (f11bec)
f11brc	23	nag_sparse_nherm_basic_setup Complex sparse non-Hermitian linear systems, setup for nag_sparse_nherm_basic_solver (f11bsc)
f11bsc	23	nag_sparse_nherm_basic_solver Complex sparse non-Hermitian linear systems, preconditioned RGMRES, CGS, Bi-CGSTAB or TFQMR method
f11btc	23	nag_sparse_nherm_basic_diagnostic Complex sparse non-Hermitian linear systems, diagnostic for nag_sparse_nherm_basic_solver (f11bsc)
f11dac	5	nag_sparse_nsym_fac Incomplete $LU$ factorization (nonsymmetric)
f11dbc	23	nag_sparse_nsym_precon_ilu_solve Solution of linear system involving incomplete $LU$ preconditioning matrix generated by nag_sparse_nsym_fac (f11dac)
f11dcc	5	nag_sparse_nsym_fac_sol Solver with incomplete $LU$ preconditioning (nonsymmetric)
f11ddc	23	nag_sparse_nsym_precon_ssor_solve Solution of linear system involving preconditioning matrix generated by applying SSOR to real sparse nonsymmetric matrix
f11dec	5	nag_sparse_nsym_sol Solver with no Jacobi/SSOR preconditioning (nonsymmetric)
f11dfc	24	nag_sparse_nsym_precon_bdilu Real sparse nonsymmetric linear system, incomplete $LU$ factorization of local or overlapping diagonal blocks
f11dgc	24	nag_sparse_nsym_precon_bdilu_solve Solution of real sparse nonsymmetric linear system, RGMRES, CGS, Bi-CGSTAB or TFQMR method, incomplete $LU$ block diagonal preconditioner computed by nag_sparse_nsym_precon_bdilu (f11dfc)
f11dkc	23	nag_sparse_nsym_jacobi Real, sparse, symmetric or nonsymmetric, linear systems, line Jacobi preconditioner
f11dnc	23	nag_sparse_nherm_fac Complex sparse non-Hermitian linear systems, incomplete $LU$ factorization
f11dpc	23	nag_sparse_nherm_precon_ilu_solve Solution of complex linear system involving incomplete $LU$ preconditioning matrix generated by nag_sparse_nherm_fac (f11dnc)

f11dq	23	nag_sparse_nherm_fac_sol Solution of complex sparse non-Hermitian linear system, RGMRES, CGS, Bi-CGSTAB or TFQMR method, preconditioner computed by nag_sparse_nherm_fac (f11dnc) (Black Box)
f11drc	23	nag_sparse_nherm_precon_ssor_solve Solution of linear system involving preconditioning matrix generated by applying SSOR to complex sparse non-Hermitian matrix
f11dsc	23	nag_sparse_nherm_sol Solution of complex sparse non-Hermitian linear system, RGMRES, CGS, Bi-CGSTAB or TFQMR method, Jacobi or SSOR preconditioner Black Box
f11dtc	24	nag_sparse_nherm_precon_bdilu Complex, sparse, non-Hermitian linear system, incomplete <i>LU</i> factorization of local or overlapping diagonal blocks
f11duc	24	nag_sparse_nherm_precon_bdilu_solve Solution of complex, sparse, non-Hermitian linear system, RGMRES, CGS, Bi-CGSTAB or TFQMR method, incomplete <i>LU</i> block diagonal preconditioner computed by nag_sparse_nherm_precon_bdilu (f11dtc)
f11dxc	23	nag_sparse_nherm_jacobi Complex, sparse, Hermitian or non-Hermitian, linear systems, line Jacobi preconditioner
f11gdc	23	nag_sparse_sym_basic_setup Real sparse symmetric linear systems, setup for nag_sparse_sym_basic_solver (f11gec)
f11gec	23	nag_sparse_sym_basic_solver Real sparse symmetric linear systems, preconditioned conjugate gradient or Lanczos method or the MINRES algorithm
f11gfc	23	nag_sparse_sym_basic_diagnostic Real sparse symmetric linear systems, diagnostic for nag_sparse_sym_basic_solver (f11gec)
f11grc	23	nag_sparse_herm_basic_setup Complex sparse Hermitian linear systems, setup for nag_sparse_herm_basic_solver (f11gsc)
f11gsc	23	nag_sparse_herm_basic_solver Complex sparse Hermitian linear systems, preconditioned conjugate gradient or Lanczos
f11gtc	23	nag_sparse_herm_basic_diagnostic Complex sparse Hermitian linear systems, diagnostic for nag_sparse_herm_basic_solver (f11gsc)
f11jac	5	nag_sparse_sym_chol_fac Incomplete Cholesky factorization (symmetric)
f11jbc	23	nag_sparse_sym_precon_ichol_solve Solution of linear system involving incomplete Cholesky preconditioning matrix generated by nag_sparse_sym_chol_fac (f11jac)
f11jcc	5	nag_sparse_sym_chol_sol Solver with incomplete Cholesky preconditioning (symmetric)
f11jdc	23	nag_sparse_sym_precon_ssor_solve Solution of linear system involving preconditioning matrix generated by applying SSOR to real sparse symmetric matrix
f11jec	5	nag_sparse_sym_sol Solver with Jacobi, SSOR, or no preconditioning (symmetric)
f11jnc	23	nag_sparse_herm_chol_fac Complex sparse Hermitian matrix, incomplete Cholesky factorization
f11jpc	23	nag_sparse_herm_precon_ichol_solve Solution of complex linear system involving incomplete Cholesky preconditioning matrix generated by nag_sparse_herm_chol_fac (f11jnc)

f11jqc	23	nag_sparse_herm_chol_sol Solution of complex sparse Hermitian linear system, conjugate gradient/ Lanczos method, preconditioner computed by nag_sparse_herm_chol_fac (f11jnc) (Black Box)
f11jrc	23	nag_sparse_herm_precon_ssor_solve Solution of linear system involving preconditioning matrix generated by applying SSOR to complex sparse Hermitian matrix
f11jsc	23	nag_sparse_herm_sol Solution of complex sparse Hermitian linear system, conjugate gradient/ Lanczos method, Jacobi or SSOR preconditioner (Black Box)
f11mdc	8	nag_superlu_column_permutation Real sparse nonsymmetric linear systems, setup for nag_superlu_lu_factor ize (f11mec)
f11mec	8	nag_superlu_lu_factorize <i>LU</i> factorization of real sparse matrix
f11mfc	8	nag_superlu_solve_lu Solution of real sparse simultaneous linear equations (coefficient matrix already factorized)
f11mgc	8	nag_superlu_condition_number_lu Estimate condition number of real matrix, matrix already factorized by nag_superlu_lu_factorize (f11mec)
f11mhc	8	nag_superlu_refine_lu Refined solution with error bounds of real system of linear equations, multiple right-hand sides
f11mkc	8	nag_superlu_matrix_product Real sparse nonsymmetric matrix-matrix multiply, compressed column storage
f11mlc	8	nag_superlu_matrix_norm 1-norm, $\infty$ -norm, largest absolute element, real, square, sparse matrix
f11mmc	8	nag_superlu_diagnostic_lu Real sparse nonsymmetric linear systems, diagnostic for nag_superlu_lu_ factorize (f11mec)
f11xac	23	nag_sparse_nsym_matvec Real, sparse, nonsymmetric matrix-vector multiply
f11xec	23	nag_sparse_sym_matvec Real sparse symmetric matrix-vector multiply
f11xnc	23	nag_sparse_nherm_matvec Complex sparse non-Hermitian matrix-vector multiply
f11xsc	23	nag_sparse_herm_matvec Complex sparse Hermitian matrix-vector multiply
f11yec	25	nag_sparse_sym_rcm Reverse Cuthill–McKee reordering of a sparse symmetric matrix in CCS format
f11zac	5	nag_sparse_nsym_sort Sparse sort (nonsymmetric)
f11zbc	5	nag_sparse_sym_sort Sparse sort (symmetric)
f11znc	23	nag_sparse_nherm_sort Complex sparse non-Hermitian matrix reorder function
f11zpc	23	nag_sparse_herm_sort Complex sparse Hermitian matrix reorder function

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