NAG Library Chapter Contents

F01 – Matrix Operations, Including Inversion

F01 Chapter Introduction

Routine Name	Mark of Introduction	Purpose
F01ABF	1	nagf_matop_real_symm_posdef_inv Inverse of real symmetric positive definite matrix using iterative refinement
F01ADF	2	nagf_matop_real_symm_posdef_inv_noref Inverse of real symmetric positive definite matrix
F01BLF	5	nagf_matop_real_gen_pseudinv Pseudo-inverse and rank of real m by n matrix ($m \geq n$)
F01BRF	7	nagf_matop_real_gen_sparse_lu LU factorization of real sparse matrix
F01BSF	7	nagf_matop_real_gen_sparse_lu_reuse LU factorization of real sparse matrix with known sparsity pattern
F01BUF	7	nagf_matop_real_symm_posdef_fac $ULDL^{\mathrm{T}}U^{\mathrm{T}}$ factorization of real symmetric positive definite band matrix
F01BVF	7	nagf_matop_real_symm_posdef_geneig Reduction to standard form, generalized real symmetric-definite banded eigenproblem
F01CKF	2	nagf_matop_real_gen_matmul Matrix multiplication
F01CRF	7	nagf_matop_real_gen_trans_inplace Matrix transposition
F01CTF	14	nagf_matop_real_addsub Sum or difference of two real matrices, optional scaling and transposition
F01CWF	14	nagf_matop_complex_addsub Sum or difference of two complex matrices, optional scaling and transposition
F01ECF	22	nagf_matop_real_gen_matrix_exp Real matrix exponential
F01EDF	23	nagf_matop_real_symm_matrix_exp Real symmetric matrix exponential
F01EFF	23	nagf_matop_real_symm_matrix_fun Function of a real symmetric matrix
F01EJF	24	nagf_matop_real_gen_matrix_log Real matrix logarithm
F01EKF	24	nagf_matop_real_gen_matrix_fun_std Exponential, sine, cosine, sinh or cosh of a real matrix (Schur–Parlett algorithm)
F01ELF	24	nagf_matop_real_gen_matrix_fun_num Function of a real matrix (using numerical differentiation)

F01EMF	24	nagf_matop_real_gen_matrix_fun_usd Function of a real matrix (using user-supplied derivatives)
F01FCF	23	nagf_matop_complex_gen_matrix_exp Complex matrix exponential
F01FDF	23	nagf_matop_complex_herm_matrix_exp Complex Hermitian matrix exponential
F01FFF	23	nagf_matop_complex_herm_matrix_fun Function of a complex Hermitian matrix
F01FJF	24	nagf_matop_complex_gen_matrix_log Complex matrix logarithm
F01FKF	24	nagf_matop_complex_gen_matrix_fun_std Exponential, sine, cosine, sinh or cosh of a complex matrix (Schur–Parlett algorithm)
F01FLF	24	nagf_matop_complex_gen_matrix_fun_num Function of a complex matrix (using numerical differentiation)
F01FMF	24	nagf_matop_complex_gen_matrix_fun_usd Function of a complex matrix (using user-supplied derivatives)
F01GAF	24	nagf_matop_real_gen_matrix_actexp Action of a real matrix exponential on a real matrix
F01GBF	24	nagf_matop_real_gen_matrix_actexp_rcomm Action of a real matrix exponential on a real matrix (reverse communication)
F01HAF	24	nagf_matop_complex_gen_matrix_actexp Action of a complex matrix exponential on a complex matrix
F01HBF	24	nagf_matop_complex_gen_matrix_actexp_rcomm Action of a complex matrix exponential on a complex matrix (reverse communication)
F01JAF	24	nagf_matop_real_gen_matrix_cond_std Condition number for the exponential, logarithm, sine, cosine, sinh or cosh of a real matrix
F01JBF	24	nagf_matop_real_gen_matrix_cond_num Condition number for a function of a real matrix (using numerical differentiation)
F01JCF	24	nagf_matop_real_gen_matrix_cond_usd Condition number for a function of a real matrix (using user-supplied derivatives)
F01KAF	24	nagf_matop_complex_gen_matrix_cond_std Condition number for the exponential, logarithm, sine, cosine, sinh or cosh of a complex matrix
F01KBF	24	nagf_matop_complex_gen_matrix_cond_num Condition number for a function of a complex matrix (using numerical differentiation)
F01KCF	24	nagf_matop_complex_gen_matrix_cond_usd Condition number for a function of a complex matrix (using user-supplied derivatives)
F01LEF	11	nagf_matop_real_gen_tridiag_lu LU factorization of real tridiagonal matrix
F01LHF	13	nagf_matop_real_gen_blkdiag_lu LU factorization of real almost block diagonal matrix

F01MCF	8	nagf_matop_real_vband_posdef_fac LDL^{T} factorization of real symmetric positive definite variable-bandwidth matrix
F01QGF	14	nagf_matop_real_trapez_rq RQ factorization of real m by n upper trapezoidal matrix $(m \le n)$
F01QJF	14	nagf_matop_real_gen_rq RQ factorization of real m by n matrix $(m \le n)$
F01QKF	14	nagf_matop_real_gen_rq_formq Operations with orthogonal matrices, form rows of Q, after RQ factorization by F01QJF
F01RGF	14	nagf_matop_complex_trapez_rq RQ factorization of complex m by n upper trapezoidal matrix $(m \le n)$
F01RJF	14	nagf_matop_complex_gen_rq RQ factorization of complex m by n matrix $(m \le n)$
F01RKF	14	nagf_matop_complex_gen_rq_formq Operations with unitary matrices, form rows of Q, after RQ factorization by F01RJF
F01VAF	23	DTRTTP nagf_matop_dtrttp Copies a real triangular matrix from full format to packed format scheme
F01VBF	23	ZTRTTP nagf_matop_ztrttp Copies a complex triangular matrix from full format to packed format scheme
F01VCF	23	DTPTTR nagf_matop_dtpttr Copies a real triangular matrix from packed format to full format scheme
F01VDF	23	ZTPTTR nagf_matop_ztpttr Copies a complex triangular matrix from packed format to full format scheme
F01VEF	23	DTRTTF nagf_matop_dtrttf Copies a real triangular matrix from full format to Rectangular Full Packed format scheme
F01VFF	23	ZTRTTF nagf_matop_ztrttf Copies a complex triangular matrix from full format to Rectangular Full Packed format scheme
F01VGF	23	DTFTTR nagf_matop_dtfttr Copies a real triangular matrix from Rectangular Full Packed format to full format scheme
F01VHF	23	ZTFTTR nagf_matop_ztfttr Copies a complex triangular matrix from Rectangular Full Packed format to full format scheme
F01VJF	23	DTPTTF nagf_matop_dtpttf Copies a real triangular matrix from packed format to Rectangular Full Packed format scheme

F01VKF	23	ZTPTTF nagf_matop_ztpttf Copies a complex triangular matrix from packed format to Rectangular Full Packed format scheme
F01VLF	23	DTFTTP nagf_matop_dtfttp Copies a real triangular matrix from Rectangular Full Packed format to packed format scheme
F01VMF	23	ZTFTTP nagf_matop_ztfttp Copies a complex triangular matrix from Rectangular Full Packed format to packed format scheme
F01ZAF	14	nagf_matop_real_tri_pack Convert real matrix between packed triangular and square storage schemes
F01ZBF	14	nagf_matop_complex_tri_pack Convert complex matrix between packed triangular and square storage schemes
F01ZCF	14	nagf_matop_real_band_pack Convert real matrix between packed banded and rectangular storage schemes
F01ZDF	14	nagf_matop_complex_band_pack Convert complex matrix between packed banded and rectangular storage schemes