# NAG Library Chapter Contents

# f01 – Matrix Operations, Including Inversion

f01 Chapter Introduction

| Function Name | Mark of Introduction | Purpose |
|---|---|---|
| f01ecc | 9 | nag_real_gen_matrix_exp<br>Real matrix exponential |
| f01edc | 9 | nag_real_symm_matrix_exp<br>Real symmetric matrix exponential |
| f01efc | 23 | nag_matop_real_symm_matrix_fun<br>Function of a real symmetric matrix |
| f01ejc | 23 | nag_matop_real_gen_matrix_log<br>Real matrix logarithm |
| f01ekc | 23 | nag_matop_real_gen_matrix_fun_std<br>Exponential, sine, cosine, sinh or cosh of a real matrix (Schur–Parlett algorithm) |
| f01elc | 24 | nag_matop_real_gen_matrix_fun_num<br>Function of a real matrix (using numerical differentiation) |
| f01emc | 23 | nag_matop_real_gen_matrix_fun_usd<br>Function of a real matrix (using user-supplied derivatives) |
| f01enc | 24 | nag_matop_real_gen_matrix_sqrt<br>Real matrix square root |
| f01epc | 24 | nag_matop_real_tri_matrix_sqrt<br>Real upper quasi-triangular matrix square root |
| f01eqc | 24 | nag_matop_real_gen_matrix_pow<br>General power of a real matrix |
| f01fcc | 23 | nag_matop_complex_gen_matrix_exp<br>Complex matrix exponential |
| f01fdc | 23 | nag_matop_complex_herm_matrix_exp<br>Complex Hermitian matrix exponential |
| f01ffc | 23 | nag_matop_complex_herm_matrix_fun<br>Function of a complex Hermitian matrix |
| f01fjc | 23 | nag_matop_complex_gen_matrix_log<br>Complex matrix logarithm |
| f01fkc | 23 | nag_matop_complex_gen_matrix_fun_std<br>Exponential, sine, cosine, sinh or cosh of a complex matrix (Schur–Parlett algorithm) |
| f01flc | 24 | nag_matop_complex_gen_matrix_fun_num<br>Function of a complex matrix (using numerical differentiation) |
| f01fmc | 23 | nag_matop_complex_gen_matrix_fun_usd<br>Function of a complex matrix (using user-supplied derivatives) |
| f01fnc | 24 | nag_matop_complex_gen_matrix_sqrt<br>Complex matrix square root |
| f01fpc | 24 | nag_matop_complex_tri_matrix_sqrt<br>Complex upper triangular matrix square root |
| f01fqc | 24 | nag_matop_complex_gen_matrix_pow<br>General power of a complex matrix |
| f01gac | 24 | nag_matop_real_gen_matrix_actexp<br>Action of a real matrix exponential on a real matrix |
| f01gbc | 24 | nag_matop_real_gen_matrix_actexp_rcomm<br>Action of a real matrix exponential on a real matrix (reverse communication) |
| f01hac | 24 | nag_matop_complex_gen_matrix_actexp<br>Action of a complex matrix exponential on a complex matrix |

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|---|---|---|
| f01hbc | 24 | nag_matop_complex_gen_matrix_actexp_rcomm<br>Action of a complex matrix exponential on a complex matrix (reverse communication) |
| f01jac | 24 | nag_matop_real_gen_matrix_cond_std<br>Condition number for the exponential, logarithm, sine, cosine, sinh or cosh of a real matrix |
| f01jbc | 24 | nag_matop_real_gen_matrix_cond_num<br>Condition number for a function of a real matrix (using numerical differentiation) |
| f01jcc | 24 | nag_matop_real_gen_matrix_cond_usd<br>Condition number for a function of a real matrix (using user-supplied derivatives) |
| f01jdc | 24 | nag_matop_real_gen_matrix_cond_sqrt<br>Condition number for square root of real matrix |
| f01jec | 24 | nag_matop_real_gen_matrix_cond_pow<br>Condition number for real matrix power |
| f01jfc | 24 | nag_matop_real_gen_matrix_frcht_pow<br>Fréchet derivative of real matrix power |
| f01jgc | 24 | nag_matop_real_gen_matrix_cond_exp<br>Condition number for real matrix exponential |
| f01jhc | 24 | nag_matop_real_gen_matrix_frcht_exp<br>Fréchet derivative of real matrix exponential |
| f01jjc | 24 | nag_matop_real_gen_matrix_cond_log<br>Condition number for real matrix logarithm |
| f01jkc | 24 | nag_matop_real_gen_matrix_frcht_log<br>Fréchet derivative of real matrix logarithm |
| f01kac | 24 | nag_matop_complex_gen_matrix_cond_std<br>Condition number for the exponential, logarithm, sine, cosine, sinh or cosh of a complex matrix |
| f01kbc | 24 | nag_matop_complex_gen_matrix_cond_num<br>Condition number for a function of a complex matrix (using numerical differentiation) |
| f01kcc | 24 | nag_matop_complex_gen_matrix_cond_usd<br>Condition number for a function of a complex matrix (using user-supplied derivatives) |
| f01kdc | 24 | nag_matop_complex_gen_matrix_cond_sqrt<br>Condition number for square root of complex matrix |
| f01kec | 24 | nag_matop_complex_gen_matrix_cond_pow<br>Condition number for complex matrix power |
| f01kfc | 24 | nag_matop_complex_gen_matrix_frcht_pow<br>Fréchet derivative of complex matrix power |
| f01kgc | 24 | nag_matop_complex_gen_matrix_cond_exp<br>Condition number for complex matrix exponential |
| f01khc | 24 | nag_matop_complex_gen_matrix_frcht_exp<br>Fréchet derivative of complex matrix exponential |
| f01kjc | 24 | nag_matop_complex_gen_matrix_cond_log<br>Condition number for complex matrix logarithm |
| f01kkc | 24 | nag_matop_complex_gen_matrix_frcht_log<br>Fréchet derivative of complex matrix logarithm |
| f01mcc | 1 | nag_real_cholesky_skyline<br>$LDL^{\mathrm{T}}$ factorization of real symmetric positive definite variable-bandwidth (skyline) matrix |
| f01vac | 25 | nag_dtrttp<br>Copies a real triangular matrix from full format to packed format |
| f01vbc | 25 | nag_ztrttp<br>Copies a complex triangular matrix from full format to packed format |
| f01vcc | 25 | nag_dtpttr<br>Copies a real triangular matrix from packed format to full format |

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|---|---|---|
| f01vdc | 25 | nag_ztpttr<br>Copies a complex triangular matrix from packed format to full format |
| f01vec | 25 | nag_dtrttf<br>Copies a real triangular matrix from full format to Rectangular Full Packed format |
| f01vfc | 25 | nag_ztrttf<br>Copies a complex triangular matrix from full format to Rectangular Full Packed format |
| f01vgc | 25 | nag_dtfttr<br>Copies a real triangular matrix from Rectangular Full Packed format to full format |
| f01vhc | 25 | nag_ztfttr<br>Copies a complex triangular matrix from Rectangular Full Packed format to full format |
| f01vjc | 25 | nag_dtpttf<br>Copies a real triangular matrix from packed format to Rectangular Full Packed format |
| f01vkc | 25 | nag_ztpttf<br>Copies a complex triangular matrix from packed format to Rectangular Full Packed format |
| f01vlc | 25 | nag_dtfttp<br>Copies a real triangular matrix from Rectangular Full Packed format to packed format |
| f01vmc | 25 | nag_ztfttp<br>Copies a complex triangular matrix from Rectangular Full Packed format to packed format |