

## NAG C Library Chapter Contents

### f07 – Linear Equations (LAPACK)

#### f07 Chapter Introduction

| Routine | Mark of Introduction | Purpose  |
|---------|----------------------|--|
| f07adc  | 7                    | nag_dgetrf<br><i>LU</i> factorization of real $m$ by $n$ matrix  |
| f07aec  | 7                    | nag_dgetrs<br>Solution of real system of linear equations, multiple right-hand sides, matrix already factorized by nag_dgetrf (f07adc)         |
| f07agc  | 7                    | nag_dgecon<br>Estimate condition number of real matrix, matrix already factorized by nag_dgetrf (f07adc)                                       |
| f07ahc  | 7                    | nag_dgerfs<br>Refined solution with error bounds of real system of linear equations, multiple right-hand sides                                 |
| f07ajc  | 7                    | nag_dgetri<br>Inverse of real matrix, matrix already factorized by nag_dgetrf (f07adc)   |
| f07arc  | 7                    | nag_zgetrf<br><i>LU</i> factorization of complex $m$ by $n$ matrix   |
| f07asc  | 7                    | nag_zgetrs<br>Solution of complex system of linear equations, multiple right-hand sides, matrix already factorized by nag_zgetrf (f07arc)      |
| f07auc  | 7                    | nag_zgecon<br>Estimate condition number of complex matrix, matrix already factorized by nag_zgetrf (f07arc)                                    |
| f07avc  | 7                    | nag_zgerfs<br>Refined solution with error bounds of complex system of linear equations, multiple right-hand sides                              |
| f07awc  | 7                    | nag_zgetri<br>Inverse of complex matrix, matrix already factorized by nag_zgetrf (f07arc)  |
| f07bdc  | 7                    | nag_dgbtrf<br><i>LU</i> factorization of real $m$ by $n$ band matrix   |
| f07bec  | 7                    | nag_dgbtrs<br>Solution of real band system of linear equations, multiple right-hand sides, matrix already factorized by nag_dgbtrf (f07bdc)    |
| f07bgc  | 7                    | nag_dgbcon<br>Estimate condition number of real band matrix, matrix already factorized by nag_dgbtrf (f07bdc)                                  |
| f07bhc  | 7                    | nag_dgbtrfs<br>Refined solution with error bounds of real band system of linear equations, multiple right-hand sides                           |
| f07brc  | 7                    | nag_zgbtrf<br><i>LU</i> factorization of complex $m$ by $n$ band matrix  |
| f07bsc  | 7                    | nag_zgbtrs<br>Solution of complex band system of linear equations, multiple right-hand sides, matrix already factorized by nag_zgbtrf (f07brc) |
| f07buc  | 7                    | nag_zgbcon<br>Estimate condition number of complex band matrix, matrix already factorized by nag_zgbtrf (f07brc)                               |
| f07bvc  | 7                    | nag_zgbtrfs<br>Refined solution with error bounds of complex band system of linear equations, multiple right-hand sides                        |

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|--------|---|---|
| f07fdc | 7 | nag_dpotrf<br>Cholesky factorization of real symmetric positive-definite matrix   |
| f07fec | 7 | nag_dpotrs<br>Solution of real symmetric positive-definite system of linear equations, multiple right-hand sides, matrix already factorized by nag_dpotrf (f07fdc)                    |
| f07fgc | 7 | nag_dpocon<br>Estimate condition number of real symmetric positive-definite matrix, matrix already factorized by nag_dpotrf (f07fdc)  |
| f07fhc | 7 | nag_dporfs<br>Refined solution with error bounds of real symmetric positive-definite system of linear equations, multiple right-hand sides  |
| f07fjc | 7 | nag_dpotri<br>Inverse of real symmetric positive-definite matrix, matrix already factorized by nag_dpotrf (f07fdc)  |
| f07frc | 7 | nag_zpotrf<br>Cholesky factorization of complex Hermitian positive-definite matrix  |
| f07fsc | 7 | nag_zpotrs<br>Solution of complex Hermitian positive-definite system of linear equations, multiple right-hand sides, matrix already factorized by nag_zpotrf (f07frc)                 |
| f07fuc | 7 | nag_zpocon<br>Estimate condition number of complex Hermitian positive-definite matrix, matrix already factorized by nag_zpotrf (f07frc)   |
| f07fvc | 7 | nag_zporfs<br>Refined solution with error bounds of complex Hermitian positive-definite system of linear equations, multiple right-hand sides   |
| f07fwc | 7 | nag_zpotri<br>Inverse of complex Hermitian positive-definite matrix, matrix already factorized by nag_zpotrf (f07frc)   |
| f07gdc | 7 | nag_dpptrf<br>Cholesky factorization of real symmetric positive-definite matrix, packed storage   |
| f07gec | 7 | nag_dpptrs<br>Solution of real symmetric positive-definite system of linear equations, multiple right-hand sides, matrix already factorized by nag_dpptrf (f07gdc), packed storage    |
| f07ggc | 7 | nag_dppcon<br>Estimate condition number of real symmetric positive-definite matrix, matrix already factorized by nag_dpptrf (f07gdc), packed storage                                  |
| f07ghc | 7 | nag_dpprfs<br>Refined solution with error bounds of real symmetric positive-definite system of linear equations, multiple right-hand sides, packed storage                            |
| f07gjc | 7 | nag_dpptri<br>Inverse of real symmetric positive-definite matrix, matrix already factorized by nag_dpptrf (f07gdc), packed storage  |
| f07grc | 7 | nag_zpptrf<br>Cholesky factorization of complex Hermitian positive-definite matrix, packed storage  |
| f07gsc | 7 | nag_zpptrs<br>Solution of complex Hermitian positive-definite system of linear equations, multiple right-hand sides, matrix already factorized by nag_zpptrf (f07grc), packed storage |
| f07guc | 7 | nag_zppcon<br>Estimate condition number of complex Hermitian positive-definite matrix, matrix already factorized by nag_zpptrf (f07grc), packed storage                               |
| f07gvc | 7 | nag_zpprfs<br>Refined solution with error bounds of complex Hermitian positive-definite system of linear equations, multiple right-hand sides, packed storage                         |

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|--------|---|--|
| f07gwc | 7 | nag_zpptri<br>Inverse of complex Hermitian positive-definite matrix, matrix already factorized by nag_zpptrf (f07grc), packed storage                                      |
| f07hdc | 7 | nag_dpbtrf<br>Cholesky factorization of real symmetric positive-definite band matrix   |
| f07hec | 7 | nag_dpbtrs<br>Solution of real symmetric positive-definite band system of linear equations, multiple right-hand sides, matrix already factorized by nag_dpbtrf (f07hdc)    |
| f07hgc | 7 | nag_dpbcon<br>Estimate condition number of real symmetric positive-definite band matrix, matrix already factorized by nag_dpbtrf (f07hdc)                                  |
| f07hhc | 7 | nag_dpbrfs<br>Refined solution with error bounds of real symmetric positive-definite band system of linear equations, multiple right-hand sides                            |
| f07hrc | 7 | nag_zpbtrf<br>Cholesky factorization of complex Hermitian positive-definite band matrix  |
| f07hsc | 7 | nag_zpbtrs<br>Solution of complex Hermitian positive-definite band system of linear equations, multiple right-hand sides, matrix already factorized by nag_zpbtrf (f07hrc) |
| f07huc | 7 | nag_zpbcon<br>Estimate condition number of complex Hermitian positive-definite band matrix, matrix already factorized by nag_zpbtrf (f07hrc)                               |
| f07hvc | 7 | nag_zpbrfs<br>Refined solution with error bounds of complex Hermitian positive-definite band system of linear equations, multiple right-hand sides                         |
| f07mdc | 7 | nag_dsytrf<br>Bunch–Kaufman factorization of real symmetric indefinite matrix  |
| f07mec | 7 | nag_dsytrs<br>Solution of real symmetric indefinite system of linear equations, multiple right-hand sides, matrix already factorized by nag_dsytrf (f07mdc)                |
| f07mgc | 7 | nag_dsycon<br>Estimate condition number of real symmetric indefinite matrix, matrix already factorized by nag_dsytrf (f07mdc)  |
| f07mhc | 7 | nag_dsyrfs<br>Refined solution with error bounds of real symmetric indefinite system of linear equations, multiple right-hand sides  |
| f07mjc | 7 | nag_dsytri<br>Inverse of real symmetric indefinite matrix, matrix already factorized by nag_dsytrf (f07mdc)  |
| f07mrc | 7 | nag_zhetrf<br>Bunch–Kaufman factorization of complex Hermitian indefinite matrix   |
| f07msc | 7 | nag_zhetrs<br>Solution of complex Hermitian indefinite system of linear equations, multiple right-hand sides, matrix already factorized by nag_zhetrf (f07mrc)             |
| f07muc | 7 | nag_zhecon<br>Estimate condition number of complex Hermitian indefinite matrix, matrix already factorized by nag_zhetrf (f07mrc)   |
| f07mvc | 7 | nag_zherfs<br>Refined solution with error bounds of complex Hermitian indefinite system of linear equations, multiple right-hand sides                                     |
| f07mwc | 7 | nag_zhetri<br>Inverse of complex Hermitian indefinite matrix, matrix already factorized by nag_zhetrf (f07mrc)   |
| f07nrc | 7 | nag_zsytrf<br>Bunch–Kaufman factorization of complex symmetric matrix  |
| f07nsc | 7 | nag_zsytrs<br>Solution of complex symmetric system of linear equations, multiple right-hand sides, matrix already factorized by nag_zsytrf (f07nrc)                        |

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|--------|---|--|
| f07nuc | 7 | nag_zsycon<br>Estimate condition number of complex symmetric matrix, matrix already factorized by nag_zsytrf (f07nrc)  |
| f07nvc | 7 | nag_zsyrfs<br>Refined solution with error bounds of complex symmetric system of linear equations, multiple right-hand sides  |
| f07nwc | 7 | nag_zsytri<br>Inverse of complex symmetric matrix, matrix already factorized by nag_zsytrf (f07nrc)  |
| f07pdc | 7 | nag_dsptrf<br>Bunch–Kaufman factorization of real symmetric indefinite matrix, packed storage  |
| f07pec | 7 | nag_dsptrs<br>Solution of real symmetric indefinite system of linear equations, multiple right-hand sides, matrix already factorized by nag_dsptrf (f07pdc), packed storage    |
| f07pgc | 7 | nag_DSPCON<br>Estimate condition number of real symmetric indefinite matrix, matrix already factorized by nag_dsptrf (f07pdc), packed storage                                  |
| f07phc | 7 | nag_DSPRFS<br>Refined solution with error bounds of real symmetric indefinite system of linear equations, multiple right-hand sides, packed storage                            |
| f07pjc | 7 | nag_DSPTRI<br>Inverse of real symmetric indefinite matrix, matrix already factorized by nag_dsptrf (f07pdc), packed storage  |
| f07prc | 7 | nag_ZHPTRF<br>Bunch–Kaufman factorization of complex Hermitian indefinite matrix, packed storage   |
| f07psc | 7 | nag_ZHPTRS<br>Solution of complex Hermitian indefinite system of linear equations, multiple right-hand sides, matrix already factorized by nag_zhptrf (f07prc), packed storage |
| f07puc | 7 | nag_ZHPCON<br>Estimate condition number of complex Hermitian indefinite matrix, matrix already factorized by nag_zhptrf (f07prc), packed storage                               |
| f07pvc | 7 | nag_ZHPRFS<br>Refined solution with error bounds of complex Hermitian indefinite system of linear equations, multiple right-hand sides, packed storage                         |
| f07pwc | 7 | nag_ZHPTRI<br>Inverse of complex Hermitian indefinite matrix, matrix already factorized by nag_zhptrf (f07prc), packed storage   |
| f07qrc | 7 | nag_ZSPTRF<br>Bunch–Kaufman factorization of complex symmetric matrix, packed storage  |
| f07qsc | 7 | nag_ZSPTRS<br>Solution of complex symmetric system of linear equations, multiple right-hand sides, matrix already factorized by nag_zsptrf (f07qrc), packed storage            |
| f07quc | 7 | nag_ZSPCON<br>Estimate condition number of complex symmetric matrix, matrix already factorized by nag_zsptrf (f07qrc), packed storage  |
| f07qvc | 7 | nag_ZSPRFS<br>Refined solution with error bounds of complex symmetric system of linear equations, multiple right-hand sides, packed storage                                    |
| f07qwc | 7 | nag_ZSPTRI<br>Inverse of complex symmetric matrix, matrix already factorized by nag_zsptrf (f07qrc), packed storage  |
| f07tec | 7 | nag_DTRTRS<br>Solution of real triangular system of linear equations, multiple right-hand sides  |
| f07tgc | 7 | nag_DTRCON<br>Estimate condition number of real triangular matrix  |

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|--------|---|--|
| f07thc | 7 | nag_dtrrfs<br>Error bounds for solution of real triangular system of linear equations, multiple right-hand sides                     |
| f07tjc | 7 | nag_dtrtri<br>Inverse of real triangular matrix  |
| f07tsc | 7 | nag_ztrtrs<br>Solution of complex triangular system of linear equations, multiple right-hand sides                                   |
| f07tuc | 7 | nag_ztrcon<br>Estimate condition number of complex triangular matrix   |
| f07tvc | 7 | nag_ztrrfs<br>Error bounds for solution of complex triangular system of linear equations, multiple right-hand sides                  |
| f07twc | 7 | nag_ztrtri<br>Inverse of complex triangular matrix   |
| f07uec | 7 | nag_dptrs<br>Solution of real triangular system of linear equations, multiple right-hand sides, packed storage                       |
| f07ugc | 7 | nag_dtpcon<br>Estimate condition number of real triangular matrix, packed storage  |
| f07uhc | 7 | nag_dtprrfs<br>Error bounds for solution of real triangular system of linear equations, multiple right-hand sides, packed storage    |
| f07ujc | 7 | nag_dtptri<br>Inverse of real triangular matrix, packed storage  |
| f07usc | 7 | nag_ztptrs<br>Solution of complex triangular system of linear equations, multiple right-hand sides, packed storage                   |
| f07uuc | 7 | nag_ztpcon<br>Estimate condition number of complex triangular matrix, packed storage   |
| f07uvc | 7 | nag_ztprrfs<br>Error bounds for solution of complex triangular system of linear equations, multiple right-hand sides, packed storage |
| f07uwc | 7 | nag_ztptri<br>Inverse of complex triangular matrix, packed storage   |
| f07vec | 7 | nag_dtbtrs<br>Solution of real band triangular system of linear equations, multiple right-hand sides                                 |
| f07vgc | 7 | nag_dtbcon<br>Estimate condition number of real band triangular matrix   |
| f07vhc | 7 | nag_dtbrfs<br>Error bounds for solution of real band triangular system of linear equations, multiple right-hand sides                |
| f07vsc | 7 | nag_ztbtrs<br>Solution of complex band triangular system of linear equations, multiple right-hand sides                              |
| f07vuc | 7 | nag_ztbcon<br>Estimate condition number of complex band triangular matrix  |
| f07vvc | 7 | nag_ztbrfs<br>Error bounds for solution of complex band triangular system of linear equations, multiple right-hand sides             |

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