

LAPACK Quick Reference Guide

to the

Driver Routines

Release 3.0

Simple Drivers

Simple Driver Routines for Linear Equations

Matrix Type	Routine
General	SGESV(H, NRHS, A, LDA, IPIV, B, LDB, INFO)
	CGESV(H, NRHS, A, LDA, IPIV, B, LDB, INFO)
General Band	SGBSV(H, KL, KU, NRHS, AB, LDAB, IPIV, B, LDB, INFO)
	CGBSV(H, KL, KU, NRHS, AB, LDAB, IPIV, B, LDB, INFO)
General Tridiagonal	SGTSV(H, NRHS, DL, D, DU, B, LDB, INFO)
	CGTSV(H, NRHS, DL, D, DU, B, LDB, INFO)
Symmetric/Hermitian Positive Definite	SPOSV(UPLO, H, NRHS, A, LDA, B, LDB, INFO)
	CPOSV(UPLO, H, NRHS, A, LDA, B, LDB, INFO)
Symmetric/Hermitian Positive Definite (Packed Storage)	SPPSV(UPLO, H, NRHS, AP, B, LDB, INFO)
	CPPSV(UPLO, H, NRHS, AP, B, LDB, INFO)
Symmetric/Hermitian Positive Definite Band	SPBSV(UPLO, H, KD, NRHS, AB, LDAB, B, LDB, INFO)
	CPBSV(UPLO, H, KD, NRHS, AB, LDAB, B, LDB, INFO)
Symmetric/Hermitian Positive Definite Tridiagonal	SPTSV(H, NRHS, D, E, B, LDB, INFO)
	CPTSV(H, NRHS, D, E, B, LDB, INFO)
Symmetric/Hermitian Indefinite	SSYSV(UPLO, H, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
	CSYSV(UPLO, H, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
	CHESV(UPLO, H, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
Symmetric/Hermitian Indefinite (Packed Storage)	SSPSV(UPLO, H, NRHS, AP, IPIV, B, LDB, INFO)
	CSPSV(UPLO, H, NRHS, AP, IPIV, B, LDB, INFO)
	CHPSV(UPLO, H, NRHS, AP, IPIV, B, LDB, INFO)

Simple Driver Routines for Standard and Generalized Linear Least Squares Problems

Problem Type	Routine
Solve Using Orthogonal Factor, Assuming Full Rank	SGELS(TRANS, H, N, NRHS, A, LDA, B, LDB, WORK, LWORK, INFO)
	CGELS(TRANS, H, N, NRHS, A, LDA, B, LDB, WORK, LWORK, INFO)
Solve LSE Problem Using GRQ	SGLSE(H, N, P, A, LDA, B, LDB, C, D, X, WORK, LWORK, INFO)
	CGLSE(H, N, P, A, LDA, B, LDB, C, D, X, WORK, LWORK, INFO)
Solve GLM Problem Using GQR	SGGLH(H, H, P, A, LDA, B, LDB, D, X, Y, WORK, LWORK, INFO)
	CGGLH(H, H, P, A, LDA, B, LDB, D, X, Y, WORK, LWORK, INFO)

Expert Drivers

Expert Driver Routines for Linear Equations

Matrix Type	Routine
General	SGESVX(FACT, TRANS, N, NRHS, A, LDA, AF, LDAF, IPIV, EQUED, R, C, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CGESVX(FACT, TRANS, N, NRHS, A, LDA, AF, LDAF, IPIV, EQUED, R, C, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
General Band	SGBSVX(FACT, TRANS, N, KL, KU, NRHS, AB, LDAB, AFB, LDAFB, IPIV, EQUED, R, C, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CGBSVX(FACT, TRANS, N, KL, KU, NRHS, AB, LDAB, AFB, LDAFB, IPIV, EQUED, R, C, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
General Tridiagonal	SGTSVX(FACT, TRANS, N, NRHS, DL, D, DU, DLF, DF, DUF, DU2, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CGTSVX(FACT, TRANS, N, NRHS, DL, D, DU, DLF, DF, DUF, DU2, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian Positive Definite	SPOSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CPOSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian Positive Definite (Packed Storage)	SPPSVX(FACT, UPLO, N, NRHS, AP, AFP, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CPPSVX(FACT, UPLO, N, NRHS, AP, AFP, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian Positive Definite Band	SPBSVX(FACT, UPLO, N, KD, NRHS, AB, LDAB, AFB, LDAFB, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CPBSVX(FACT, UPLO, N, KD, NRHS, AB, LDAB, AFB, LDAFB, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian Positive Definite Tridiagonal	SPTSXV(FACT, N, NRHS, D, E, DF, EF, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, INFO)
	CPTSXV(FACT, N, NRHS, D, E, DF, EF, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian Indefinite	SSYSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, LWORK, IWORK, INFO)
	CSYSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, LWORK, RWORK, INFO)
	CHESVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, LWORK, RWORK, INFO)
Symmetric/Hermitian Indefinite (Packed Storage)	SSPSVX(FACT, UPLO, N, NRHS, AP, AFP, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
	CSPSVX(FACT, UPLO, N, NRHS, AP, AFP, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
	CHPSVX(FACT, UPLO, N, NRHS, AP, AFP, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)

Divide and Conquer and Expert Driver Routines for Linear Least Squares Problems

Problem Type	Routine
Solve Using Orthogonal Factor	SGELSY(H, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, LWORK, INFO)
	CGELSY(H, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, LWORK, RWORK, INFO)
Solve Using SVD, Allowing for Rank-Deficiency	SGELSS(H, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, INFO)
	CGELSS(H, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, RWORK, INFO)
Solve Using D&C SVD, Allowing for Rank-Deficiency	SGELSD(H, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, IWORK, INFO)
	CGELSD(H, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, RWORK, IWORK, INFO)

Expert and RRR Driver Routines for Standard and Generalized Symmetric Eigenvalue Problems

Matrix/Problem Type	Routine
Symmetric/Hermitian Eigenvalues/vectors	SSYEYX(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, LWORK, IWORK, IFAIL, INFO)
	CHEEVX(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, LWORK, RWORK, IWORK, IFAIL, INFO)
	SSYEVR(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, ISUPPZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHEEVR(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, ISUPPZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric/Hermitian (Packed Storage) Eigenvalues/vectors	SSYGVX(ITYPE, JOBZ, RANGE, UPLO, N, A, LDA, B, LDB, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, LWORK, IWORK, IFAIL, INFO)
	CHEGVX(ITYPE, JOBZ, RANGE, UPLO, N, A, LDA, B, LDB, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, LWORK, RWORK, IWORK, IFAIL, INFO)
	SSPEVX(JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHPEVX(JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
Symmetric/Hermitian Band Eigenvalues/vectors	SSPGVX(ITYPE, JOBZ, RANGE, UPLO, N, AP, BP, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHPGVX(ITYPE, JOBZ, RANGE, UPLO, N, AP, BP, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
	SSBEVX(JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHBEVX(JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
Symmetric Tridiagonal Eigenvalues/vectors	SSBGVX(JOBZ, RANGE, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, Q, LDQ, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHBGVX(JOBZ, RANGE, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, Q, LDQ, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
Symmetric Tridiagonal Eigenvalues/vectors	SSTEYX(JOBZ, RANGE, N, D, E, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	SSTEVR(JOBZ, RANGE, N, D, E, VL, VU, IL, IU, ABSTOL, H, W, Z, LDZ, ISUPPZ, WORK, LWORK, IWORK, LIWORK, INFO)

Expert Driver Routines for Standard and Generalized Nonsymmetric Eigenvalue Problems

Problem Type	Routine
Schur Factorization	SGEESX(JOBVS, SORT, SELECT, SENSE, N, A, LDA, SDIH, WR, WI, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, IWORK, LIWORK, BWORK, INFO)
	CGEESX(JOBVS, SORT, SELECT, SENSE, N, A, LDA, SDIH, W, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, RWORK, IWORK, LIWORK, BWORK, INFO)
Eigenvalues/ vectors	SGGESX(JOBVSL, JOBVSR, SORT, SELCTG, SENSE, N, A, LDA, B, LDB, SDIH, ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR, RCONDE, RCONDV, WORK, LWORK, IWORK, LIWORK, BWORK, INFO)
	CGGESX(JOBVSL, JOBVSR, SORT, SELCTG, SENSE, N, A, LDA, B, LDB, SDIH, ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR, RCONDE, RCONDV, WORK, LWORK, RWORK, IWORK, LIWORK, BWORK, INFO)
	SGEEVX(BALANC, JOBV, JOBVR, SENSE, N, A, LDA, WR, WI, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRH, RCONDE, RCONDV, WORK, LWORK, IWORK, INFO)
	CGEEVX(BALANC, JOBV, JOBVR, SENSE, N, A, LDA, W, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRH, RCONDE, RCONDV, WORK, LWORK, RWORK, IWORK, INFO)
	SGGEVX(BALANC, JOBV, JOBVR, SENSE, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, ILO, IHI, LSCALE, RSCALE, ABNRH, BBNRH, RCONDE, RCONDV, WORK, LWORK, IWORK, BWORK, INFO)
	CGGEVX(BALANC, JOBV, JOBVR, SENSE, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, ILO, IHI, LSCALE, RSCALE, ABNRH, BBNRH, RCONDE, RCONDV, WORK, LWORK, RWORK, IWORK, BWORK, INFO)

Meaning of prefixes

Routines beginning with "S" are available in:

S - REAL

D - DOUBLE PRECISION

Routines beginning with "C" are available in:

C - COMPLEX

Z - COMPLEX*16

Note: COMPLEX*16 may not be supported by all machines