LAPACK Quick

Reference Guide

to the

Driver Routines

Release 3.0

Simple Drivers

Simple Driver Routines for Linear Equations

Matrix Type	Routine
General	SGESV(N, NRHS, A, LDA, IPIV, B, LDB, INFO)
	CGESV(N, NRHS, A, LDA, IPIV, B, LDB, INFO)
General Band	SGBSV(N, KL, KU, NRHS, AB, LDAB, IPIV, B, LDB, INFO)
	CGBSV(N, KL, KU, NRHS, AB, LDAB, IPIV, B, LDB, INFO)
General Tridiagonal	SGTSV(N, NRHS, DL, D, DU, B, LDB, INFO)
	CGTSV(N, NRHS, DL, D, DU, B, LDB, INFO)
Symmetric/Hermitian Positive Definite	SPOSV(UPLO, N, NRHS, A, LDA, B, LDB, INFO)
	CPOSV(UPLO, N, NRHS, A, LDA, B, LDB, INFO)
Symmetric/Hermitian Positive Definite (Packed Storage)	SPPSV(UPLO, N, NRHS, AP, B, LDB, INFO)
	CPPSV(UPLO, N, NRHS, AP, B, LDB, INFO)
Symmetric/Hermitian Positive Definite Band	SPBSV(UPLO, N, KD, NRHS, AB, LDAB, B, LDB, INFO)
	CPBSV(UPLO, N, KD, NRHS, AB, LDAB, B, LDB, INFO)
Symmetric/Hermitian Positive Definite Tridiagonal	SPTSV(N, NRHS, D, E, B, LDB, INFO)
	CPTSV(N, NRHS, D, E, B, LDB, INFO)
Symmetric/Hermitian Indefinite	SSYSV(UPLO, N, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
	CSYSV(UPLO, N, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
	CHESV(UPLO, N, NRHS, A, LDA, IPIV, B, LDB, WORK, LWORK, INFO)
Symmetric/Hermitian Indefinite (Packed Storage)	SSPSV(UPLO, N, NRHS, AP, IPIV, B, LDB, INFO)
	CSPSV(UPLO, N, NRHS, AP, IPIV, B, LDB, INFO)
	CHPSV(UPLO, N, 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, M, N, NRHS, A, LDA, B, LDB, WORK, LWORK, INFO)
	CGELS(TRANS, M, N, NRHS, A, LDA, B, LDB, WORK, LWORK, INFO)
Solve LSE Problem Using GRQ	SGGLSE(M, N, P, A, LDA, B, LDB, C, D, X, WORK, LWORK, INFO)
	CGGLSE(M, N, P, A, LDA, B, LDB, C, D, X, WORK, LWORK, INFO)
Solve GLM Problem Using GQR	SGGGLM(N, M, P, A, LDA, B, LDB, D, X, Y, WORK, LWORK, INFO)
	CGGGLM(N, M, P, A, LDA, B, LDB, D, X, Y, WORK, LWORK, INFO)

Simple and Divide and Conquer Driver Routines for Standard Eigenvalue and Singular Value Problems

Matrix/Problem Type	Routine
Symmetric/Hermitian	SSYEV(JOBZ, UPLO, N, A, LDA, W, WORK, LWORK, INFO)
Eigenvalues/vectors	CHEEV(JOBZ, UPLO, N, A, LDA, W, WORK, LWORK, RWORK, INFO)
Divide and Conquer	SSYEVD(JOBZ, UPLO, N, A, LDA, W, WORK, LWORK, IWORK, LIWORK, INFO)
	CHEEVD(JOBZ, UPLO, N, A, LDA, W, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric/Hermitian	SSPEV(JOBZ, UPLO, N, AP, W, Z, LDZ, WORK, INFO)
(Packed Storage)	CHPEV(JOBZ, UPLO, N, AP, W, Z, LDZ, WORK, RWORK, INFO)
Eigenvalues/vectors	
Divide and Conquer	SSPEVD(JOBZ, UPLO, N, AP, W, Z, LDZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHPEVD(JOBZ, UPLO, N, AP, W, Z, LDZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric/Hermitian Band	SSBEV(JOBZ, UPLO, N, KD, AB, LDAB, W, Z, LDZ, WORK, INFO)
Eigenvalues/vectors	CHBEV(JOBZ, UPLO, N, KD, AB, LDAB, W, Z, LDZ, WORK, RWORK, INFO)
Divide and Conquer	SSBEVD(JOBZ, UPLO, N, KD, AB, LDAB, W, Z, LDZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHBEVD(JOBZ, UPLO, N, KD, AB, LDAB, W, Z, LDZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric Tridiagonal	SSTEV(JOBZ, N, D, E, Z, LDZ, WORK, INFO)
Eigenvalues/vectors	
Divide and Conquer	SSTEVD(JOBZ, N, D, E, Z, LDZ, WORK, LWORK, IWORK, LIWORK, INFO)
General	SGEES(JOBVS, SORT, SELECT, N, A, LDA, SDIM, WR, WI, VS, LDVS, WORK, LWORK, BWORK, INFO)
Schur Factorization	CGEES(JOBVS, SORT, SELECT, N, A, LDA, SDIM, W, VS, LDVS, WORK, LWORK, RWORK, BWORK, INFO)
General	SGEEV(JOBVL, JOBVR, N, A, LDA, WR, WI, VL, LDVL, VR, LDVR, WORK, LWORK, INFO)
Eigenvalues/vectors	CGEEV(JOBVL, JOBVR, N, A, LDA, W, VL, LDVL, VR, LDVR, WORK, LWORK, RWORK, INFO)
General	SGESVD(JOBU, JOBVT, M, N, A, LDA, S, U, LDU, VT, LDVT, WORK, LWORK, INFO)
Singular Values/Vectors	CGESVD(JOBU, JOBVT, M, N, A, LDA, S, U, LDU, VT, LDVT, WORK, LWORK, RWORK, INFO)
Divide and Conquer	SGESDD(JOBZ, M, N, A, LDA, S, U, LDU, VT, LDVT, WORK, LWORK, IWORK, INFO)
	CGESDD(JOBZ, M, N, A, LDA, S, U, LDU, VT, LDVT, WORK, LWORK, RWORK, IWORK, INFO)

Simple and Divide and Conquer Driver Routines for Generalized Eigenvalue and Singular Value Problems

Matrix/Problem Type	Routine
Symmetric-definite	SSYGV(ITYPE, JOBZ, UPLO, N, A, LDA, B, LDB, W, WORK, LWORK, INFO)
Eigenvalues/vectors	CHEGV(ITYPE, JOBZ, UPLO, N, A, LDA, B, LDB, W, WORK, LWORK, RWORK, INFO)
Divide and Conquer	SSYGVD(ITYPE, JOBZ, UPLO, N, A, LDA, B, LDB, W, WORK, LWORK, IWORK, LIWORK, INFO)
	CHEGVD(ITYPE, JOBZ, UPLO, N, A, LDA, B, LDB, W, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric-definite	SSPGV(ITYPE, JOBZ, UPLO, N, AP, BP, W, Z, LDZ, WORK, INFO)
(Packed Storage)	CHPGV(ITYPE, JOBZ, UPLO, N, AP, BP, W, Z, LDZ, WORK, RWORK, INFO)
Eigenvalues/vectors	
Divide and Conquer	SSPGVD(ITYPE, JOBZ, UPLO, N, AP, BP, W, Z, LDZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHPGVD(ITYPE, JOBZ, UPLO, N, AP, BP, W, Z, LDZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
Symmetric-definite	SSBGV(JOBZ, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, W, Z, LDZ, WORK, INFO)
(Band Storage)	CHBGV(JOBZ, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, W, Z, LDZ, WORK, RWORK, INFO)
Eigenvalues/vectors	
Divide and Conquer	SSBGVD(JOBZ, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, W, Z, LDZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHBGVD(JOBZ, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, W, Z, LDZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
General	SGGES(JOBVSL, JOBVSR, SORT, SELCTG, N, A, LDA, B, LDB, SDIM, ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR, WORK, LWORK, BWORK, INFO)
Schur Factorization	CGGES(JOBVSL, JOBVSR, SORT, SELCTG, N, A, LDA, B, LDB, SDIM, ALPHA, BETA, VSL, LDVSL, VSR, LDVSR, WORK, LWORK, RWORK, BWORK, INFO)
General	SGGEV(JOBVL, JOBVR, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, WORK, LWORK, INFO)
Eigenvalues/vectors	CGGEV(JOBVL, JOBVR, N, A, LDA, B, LDB, ALPHA, BETA, VL, LDVL, VR, LDVR, WORK, LWORK, RWORK, INFO)
General	SGGSVD(JOBU, JOBV, JOBQ, M, N, P, K, L, A, LDA, B, LDB, ALPHA, BETA, U, LDU, V, LDV, Q, LDQ, WORK, IWORK, INFO)
Singular Values/Vectors	CGGSVD(JOBU, JOBV, JOBQ, M, N, P, K, L, A, LDA, B, LDB, ALPHA, BETA, U, LDU, V, LDV, Q, LDQ, WORK, RWORK, IWORK, 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	`SPTSVX( FACT, N, NRHS, D, E, DF, EF, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, INFO )`
	`CPTSVX( 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( M, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, LWORK, INFO )`
	`CGELSY( M, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, LWORK, RWORK, INFO )`
Solve Using SVD, Allowing for Rank-Deficiency	`SGELSS( M, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, INFO )`
	`CGELSS( M, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, RWORK, INFO )`
Solve Using D&C SVD, Allowing for Rank-Deficiency	`SGELSD( M, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, IWORK, INFO )`
	`CGELSD( M, 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	SSYEVX(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, IWORK, IFAIL, INFO)
	CHEEVX(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, RWORK, IWORK, IFAIL, INFO)
	SSYEVR(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, ISUPPZ, WORK, LWORK, IWORK, LIWORK, INFO)
	CHEEVR(JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, ISUPPZ, WORK, LWORK, RWORK, LRWORK, IWORK, LIWORK, INFO)
	SSYGVX(ITYPE, JOBZ, RANGE, UPLO, N, A, LDA, B, LDB, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, IWORK, IFAIL, INFO)
	CHEGVX(ITYPE, JOBZ, RANGE, UPLO, N, A, LDA, B, LDB, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, RWORK, IWORK, IFAIL, INFO)
Symmetric/Hermitian (Packed Storage) Eigenvalues/vectors	SSPEVX(JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHPEVX(JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
	SSPGVX(ITYPE, JOBZ, RANGE, UPLO, N, AP, BP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHPGVX(ITYPE, JOBZ, RANGE, UPLO, N, AP, BP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
Symmetric/Hermitian Band Eigenvalues/vectors	SSBEVX(JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	CHBEVX(JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
	SSBGVX(JOBZ, RANGE, UPLO, N, KA, KB, AB, LDAB, BB, LDBB, Q, LDQ, VL, VU, IL, IU, ABSTOL, M, 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, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO)
Symmetric Tridiagonal Eigenvalues/vectors	SSTEVX(JOBZ, RANGE, N, D, E, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO)
	SSTEVR(JOBZ, RANGE, N, D, E, VL, VU, IL, IU, ABSTOL, M, 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, SDIM, WR, WI, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, IWORK, LIWORK, BWORK, INFO)
	CGEESX(JOBVS, SORT, SELECT, SENSE, N, A, LDA, SDIM, W, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, RWORK, BWORK, INFO)
	SGGESX(JOBVSL, JOBVSR, SORT, SELCTG, SENSE, N, A, LDA, B, LDB, SDIM, 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, SDIM, ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR, RCONDE, RCONDV, WORK, LWORK, RWORK, IWORK, LIWORK, BWORK, INFO)
Eigenvalues/ vectors	SGEEVX(BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, WR, WI, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRM, RCONDE, RCONDV, WORK, LWORK, IWORK, INFO)
	CGEEVX(BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, W, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRM, RCONDE, RCONDV, WORK, LWORK, RWORK, INFO)
	SGGEVX(BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, ILO, IHI, LSCALE, RSCALE, ABNRM, BBNRM, RCONDE, RCONDV, WORK, LWORK, IWORK, BWORK, INFO)
	CGGEVX(BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, ILO, IHI, LSCALE, RSCALE, ABNRM, BBNRM, 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