LAPACK Quick Reference Guide to the Driver Routines

Release 2.0

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 )`

Simple 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 )`
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	
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	
General	`SGEGS( JOBVSL, JOBVSR, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR, WORK, LWORK, INFO )`
Schur Factorization	`CGEGS( JOBVSL, JOBVSR, N, A, LDA, B, LDB, ALPHA, BETA, VSL, LDVSL, VSR, LDVSR, WORK, LWORK, RWORK, INFO )`
General	`SGEGV( JOBVL, JOBVR, N, A, LDA, B, LDB, ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR, WORK, LWORK, INFO )`
Eigenvalues/vectors	`CGEGV( 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	SPOSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
Positive Definite	CPOSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian	SPPSVX(FACT, UPLO, N, NRHS, AP, AFP, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
Positive Definite (Packed Storage)	CPPSVX(FACT, UPLO, N, NRHS, AP, AFP, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian	SPBSVX(FACT, UPLO, N, KD, NRHS, AB, LDAB, AFB, LDAFB, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
Positive Definite Band	CPBSVX(FACT, UPLO, N, KD, NRHS, AB, LDAB, AFB, LDAFB, EQUED, S, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian	SPTSVX(FACT, N, NRHS, D, E, DF, EF, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, INFO)
Positive Definite Tridiagonal	CPTSVX(FACT, N, NRHS, D, E, DF, EF, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, RWORK, INFO)
Symmetric/Hermitian	SSYSVX(FACT, UPLO, N, NRHS, A, LDA, AF, LDAF, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, LWORK, IWORK, INFO)
Indefinite	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	SSPSVX(FACT, UPLO, N, NRHS, AP, AFP, IPIV, B, LDB, X, LDX, RCOND, FERR, BERR, WORK, IWORK, INFO)
Indefinite (Packed Storage)	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)

Expert Driver Routines for Linear Least Squares Problems

Problem Type	Routine
Solve Using Orthogonal Factor	SGELSX(M, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, INFO)
	CGELSX(M, N, NRHS, A, LDA, B, LDB, JPVT, RCOND, RANK, WORK, RWORK, INFO)
Solve Using SVD,	SGELSS(M, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, INFO)
Allowing for Rank-Deficiency	CGELSS(M, N, NRHS, A, LDA, B, LDB, S, RCOND, RANK, WORK, LWORK, RWORK, INFO)

Expert Driver Routines for Standard Symmetric Eigenvalue Problems

Matrix/Problem Type	Routine
Symmetric/Hermitian	`SSYEVX( JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, IWORK, IFAIL, INFO )`
Eigenvalues/vectors	`CHEEVX( JOBZ, RANGE, UPLO, N, A, LDA, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, LWORK, RWORK, IWORK, IFAIL, INFO )`
Symmetric/Hermitian	`SSPEVX( JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO )`
(Packed Storage)	`CHPEVX( JOBZ, RANGE, UPLO, N, AP, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO )`
Eigenvalues/vectors	
Symmetric/Hermitian Band	`SSBEVX( JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO )`
Eigenvalues/vectors	`CHBEVX( JOBZ, RANGE, UPLO, N, KD, AB, LDAB, Q, LDQ, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, RWORK, IWORK, IFAIL, INFO )`
Symmetric Tridiagonal	`SSTEVX( JOBZ, RANGE, N, D, E, VL, VU, IL, IU, ABSTOL, M, W, Z, LDZ, WORK, IWORK, IFAIL, INFO )`
Eigenvalues/vectors	

Expert Driver Routines for Standard Nonsymmetric Eigenvalue Problems

Problem Type	Routine
Schur	`SGEESX( JOBVS, SORT, SELECT, SENSE, N, A, LDA, SDIM, WR, WI, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, IWORK, LIWORK, BWORK, INFO )`
Factorization	`CGEESX( JOBVS, SORT, SELECT, SENSE, N, A, LDA, SDIM, W, VS, LDVS, RCONDE, RCONDV, WORK, LWORK, RWORK, BWORK, INFO )`
Eigenvalues/	`SGEEVX( BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, WR, WI, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRM, RCONDE, RCONDV, WORK, LWORK, IWORK, INFO )`
vectors	`CGEEVX( BALANC, JOBVL, JOBVR, SENSE, N, A, LDA, W, VL, LDVL, VR, LDVR, ILO, IHI, SCALE, ABNRM, RCONDE, RCONDV, WORK, LWORK, RWORK, 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