

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 Eigenvalues/vectors Divide and Conquer	SSYEV(JOBZ, UPLO,	N,	A, LDA,	W,			WORK, LWORK,			INFO)
	CHEEV(JOBZ, UPLO,	N,	A, LDA,	W,			WORK, LWORK, RWORK,			INFO)
	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 (Packed Storage) Eigenvalues/vectors Divide and Conquer	SSPEV(JOBZ, UPLO,	N,	AP,	W,	Z, LDZ,		WORK,			INFO)
	CHPEV(JOBZ, UPLO,	N,	AP,	W,	Z, LDZ,		WORK,	RWORK,		INFO)
	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 Eigenvalues/vectors Divide and Conquer	SSBEV(JOBZ, UPLO,	N, KD, AB, LDAB,	W,	Z, LDZ,			WORK,			INFO)
	CHBEV(JOBZ, UPLO,	N, KD, AB, LDAB,	W,	Z, LDZ,			WORK,	RWORK,		INFO)
	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 Eigenvalues/vectors Divide and Conquer	SSTEVD(JOBZ,	N,	D, E,		Z, LDZ,		WORK,			INFO)
	SSTEVD(JOBZ,	N,	D, E,		Z, LDZ,		WORK, LWORK,	IWORK, LIWORK,		INFO)
General Schur Factorization	SGEES(JOBVS, SORT, SELECT,	N,	A, LDA, SDIM, WR, WI, VS, LDVS,				WORK, LWORK,		BWORK, INFO)	
	CGEES(JOBVS, SORT, SELECT,	N,	A, LDA, SDIM, W, VS, LDVS,				WORK, LWORK, RWORK,		BWORK, INFO)	
General Eigenvalues/vectors	SGEEV(JOBV, JOBVR,	N,	A, LDA,	WR, WI, VL, LDVL, VR, LDVR,	WORK, LWORK,					INFO)
	CGEEV(JOBV, JOBVR,	N,	A, LDA,	W, VL, LDVL, VR, LDVR,	WORK, LWORK, RWORK,					INFO)
General Singular Values/Vectors	SGESVD(JOBU, JOBV, VT,	M, N,	A, LDA,	S, U, LDU, VT, LDVT,	WORK, LWORK,					INFO)
	CGESVD(JOBU, JOBV, VT,	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 Eigenvalues/vectors	SSYGV(ITYPE, JOBZ, UPLO,	N, A, LDA, B, LDB,	W,				WORK, LWORK,			INFO)
	CHEGV(ITYPE, JOBZ, UPLO,	N, A, LDA, B, LDB,	W,				WORK, LWORK, RWORK,			INFO)
Symmetric-definite (Packed Storage) Eigenvalues/vectors	SSPGV(ITYPE, JOBZ, UPLO,	N, AP, BP,	W,		Z, LDZ,		WORK,			INFO)
	CHPGV(ITYPE, JOBZ, UPLO,	N, AP, BP,	W,		Z, LDZ,		WORK,	RWORK,		INFO)
Symmetric-definite (Band Storage) Eigenvalues/vectors	SSBGV(JOBZ, UPLO,	N, KA, KB, AB, LDAB, BB, LDBB, W,			Z, LDZ,		WORK,			INFO)
	CHBGV(JOBZ, UPLO,	N, KA, KB, AB, LDAB, BB, LDBB, W,			Z, LDZ,		WORK,	RWORK,		INFO)
General Schur Factorization	SGEGS(JOBVSL, JOBVSR,	N, A, LDA, B, LDB,	ALPHAR, ALPHAI, BETA, VSL, LDVSL, VSR, LDVSR,	WORK, LWORK,						INFO)
	CGEGS(JOBVSL, JOBVSR,	N, A, LDA, B, LDB,	ALPHA, BETA, VSL, LDVSL, VSR, LDVSR,	WORK, LWORK, RWORK,						INFO)
General Eigenvalues/vectors	SGEGV(JOBV, JOBVR,	N, A, LDA, B, LDB,	ALPHAR, ALPHAI, BETA, VL, LDVL, VR, LDVR,	WORK, LWORK,						INFO)
	CGEGV(JOBV, JOBVR,	N, A, LDA, B, LDB,	ALPHA, BETA, VL, LDVL, VR, LDVR,	WORK, LWORK, RWORK,						INFO)
General Singular Values/Vectors	SGGSVD(JOBU, JOBV, JOBQ, M, N, P, K, L, A, LDA, B, LDB,		ALPHA,		BETA, U, LDU, V, LDV, Q, LDQ,	WORK,			IWORK, INFO)	
	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	)

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, 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)																							

Expert Driver Routines for Standard Symmetric Eigenvalue Problems

Matrix/Problem Type	Routine														
Symmetric/Hermitian Eigenvalues/vectors	SSYEVS(	JOBZ,	RANGE,	UPLO,	N,	A,	LDA,	VL,	VU,	IL,	IU,	ABSTOL,	M,	W,	Z,
	CHEEVX(	JOBZ,	RANGE,	UPLO,	N,	A,	LDA,	VL,	VU,	IL,	IU,	ABSTOL,	M,	W,	Z,
Symmetric/Hermitian (Packed Storage) Eigenvalues/vectors	SSPEVS(	JOBZ,	RANGE,	UPLO,	N,	AP,		VL,	VU,	IL,	IU,	ABSTOL,	M,	W,	Z,
	CHPEVS(	JOBZ,	RANGE,	UPLO,	N,	AP,		VL,	VU,	IL,	IU,	ABSTOL,	M,	W,	Z,
Symmetric/Hermitian Band Eigenvalues/vectors	SSBEVS(	JOBZ,	RANGE,	UPLO,	N,	KD,	AB,	LDAB,	Q,	LDQ,	VL,	VU,	IL,	IU,	ABSTOL,
	CHBEVS(	JOBZ,	RANGE,	UPLO,	N,	KD,	AB,	LDAB,	Q,	LDQ,	VL,	VU,	IL,	IU,	ABSTOL,
Symmetric Tridiagonal Eigenvalues/vectors	SSTEVS(	JOBZ,	RANGE,		N,	D,	E,	VL,	VU,	IL,	IU,	ABSTOL,	M,	W,	Z,

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,
Factorization	CGEESX(	JOBVS,	SORT,	SELECT,	SENSE,	N,	A,	LDA,	SDIM,	W,		VS,	LDVS,	RCONDE,	RCONDV,
Eigenvalues/ vectors	SGEEVS(	BALANC,	JOBVL,	JOBVR,	SENSE,	N,	A,	LDA,		WR,	WI,	VL,	LDVL,	VR,	LDVR,
	CGEEVS(	BALANC,	JOBVL,	JOBVR,	SENSE,	N,	A,	LDA,		W,		VL,	LDVL,	VR,	LDVR,

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