Title

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matrix — Matrix functions

Contents Description Remarks and examples Also see

Contents

QR decomposition, solvers, & inverters

qrd( )	`qrd()`	QR decomposition $A = QR$
	`qrdp()`	QR decomposition $A = QRP'$
	`hqrd()`	QR decomposition $A = f(H)R_1$
	`hqrdp()`	QR decomposition $A = f(H, tau)R_1P'$
	`hqrdmultq()`	return QX or $Q'X$, $Q = f(H, tau)$
	`hqrdmultq1t()`	return $Q_1'X$, $Q_1 = f(H, tau)$
	`hqrdq()`	return $Q = f(H, tau)$
	`hqrdq1()`	return $Q_1 = f(H, tau)$
	`hqrdr()`	return R
	`hqrdr1()`	return R_1
qrsolve( )	`qrsolve()`	solve $AX = B$ for X
qrinv( )	`qrinv()`	generalized inverse of matrix

Hessenberg decomposition & generalized Hessenberg decomposition

hessenbergd( )	`hessenbergd()`	Hessenberg decomposition $T = Q'XQ$
ghessenbergd( )	`ghessenbergd()`	gen. Hessenberg decomp. $T = Q'XQ$

Schur decomposition & generalized Schur decomposition

schurd( )	`schurd()`	Schur decomposition $T = U'AV$; $R = U'BA$
	`schurdgroupby()`	Schur decomp. with grouping of results
gschurd( )	`gschurd()`	gen. Schur decomposition $T = U'AV$; $R = U'BA$
	`gschurdgroupby()`	gen. Schur decomp. with grouping of results

Singular value decomposition, solvers, & inverters

svd( )	`svd()`	singular value decomposition $A = UDV'$
	`svdsv()`	singular values s
fullsvd( )	`fullsvd()`	singular value decomposition $A = USV'$
	`fullsdiag()`	convert s to S
svsolve( )	`svsolve()`	solve $AX = B$ for X
pinv( )	`pinv()`	Moore–Penrose pseudoinverse

Triangular solvers

solvelower( )	`solvelower()`	solve $AX = B$ for X, A lower triangular
	`solveupper()`	solve $AX = B$ for X, A upper triangular

Eigensystems, powers, & transcendental

eigensystem( )	`eigensystem()`	right eigenvectors and eigenvalues
	`eigenvalues()`	eigenvalues
	`lefteigensystem()`	left eigenvectors and eigenvalues
	`symeigensystem()`	eigenvectors/eigenvalues of symmetric matrix
	`symeigenvalues()`	eigenvalues of symmetric matrix
eigensystemselect( )	`eigensystemselect*()`	selected eigenvectors/eigenvalues
	etc.	
geigensystem( )	`geigensystem()`	generalized eigenvectors/eigenvalues
	etc.	
matpowersym( )	`matpowersym()`	powers of symmetric matrix
matexpsym( )	`matexpsym()`	exponentiation of symmetric matrix
	`matlogsym()`	logarithm of symmetric matrix

Equilibration

_equilrc( )	`_equilrc()`	row/column equilibration
	`_equilr()`	row equilibration
	`_equilc()`	column equilibration
	`_perhapsequilrc()`	row/column equilibration if necessary
	`_perhapsequilr()`	row equilibration if necessary
	`_perhapsequilc()`	column equilibration if necessary
	`rowscalefactors()`	row-scaling factors for equilibration
	`colscalefactors()`	column-scaling factors for equilibration

LAPACK

lapack( )	`LA_*()`	LAPACK linear-algebra functions
	`_flopin()`	convert matrix order from row major to column major
	`_flopout()`	convert matrix order from column major to row major

Description

The above functions are what most people would call mathematical matrix functions.

Remarks and examples

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For other mathematical functions, see

[M-4] **scalar**	Scalar mathematical functions
[M-4] **mathematical**	Important mathematical functions

Also see

[M-4] **intro** — Categorical guide to Mata functions