Conte	ents Description I	Remarks and examples Also see
ontents		
[M-5] Manual entry	Function	Purpose
Solvers		
cholsolve()	cholsolve() cholsolvelapacke	<ul> <li>A positive definite; symmetric or Hermitian</li> <li>A positive definite using LAPACK routines; symmetric or Hermitian</li> </ul>
lusolve()	lusolve()	A full rank, square, real or complex
_solvemat()	_solvemat()	generalized; real or complex
qrsolve()	qrsolve()	A general; $m \times n$ , $m \ge n$ , real or complex; least-squares generalized solution
svsolve()	<pre>svsolve()</pre>	generalized; $m \times n$ , real or complex; minimum norm, least-squares solution
lssolve()	lssolve()	generalized; $m \times n$ , real or complex; minimum norm, least-squares solution
lsesolve()	<pre>lsesolve()</pre>	generalized; $m \times n$ , real or complex; minimum norm, least-squares solution
lsglmsolve()	lsglmsolve()	generalized; $n \times m$ , real or complex
Inverters		
invsym()	invsym()	generalized; real symmetric
cholinv()	cholinv() cholinvlapacke()	positive definite; symmetric or Hermitian positive definite using LAPACK routines; symmetric or Hermitian
luinv()	luinv()	full rank; square; real or complex
qrinv()	qrinv()	generalized; $m \times n$ , $m \ge n$ ; real or complex
pinv()	pinv()	generalized; $m \times n$ , real or complex Moore–Penrose pseudoinverse
_invmat()	_invmat()	generalized; square; real or complex inverse for A full rank, otherwise Moore–Penrose pseudoinverse

## Description

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The above functions solve AX = B for X and solve for  $A^{-1}$ .

## **Remarks and examples**

Matrix solvers can be used to implement matrix inverters, and so the two nearly always come as a pair.

Solvers solve AX = B for X. One way to obtain  $A^{-1}$  is to solve AX = I. If f(A, B) solves AX=B, then f(A, I(rows(A))) solves for the inverse. Some matrix inverters are in fact implemented this way, although usually custom code is written because memory savings are possible when it is known that B = I.

The pairings of inverter and solver are

inverter	solver	
invsym()	(none)	
cholinv()	cholsolve()	
<pre>cholinvlapacke()</pre>	cholsolvelapacke()	
luinv()	lusolve()	
qrinv()	qrsolve()	
pinv()	svsolve()	
_invmat()	_solvemat()	
(none)	lssolve()	
(none)	lsesolve()	
(none)	lsglmsolve()	

## Also see

[M-4] Intro — Categorical guide to Mata functions

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