Title

cond( ) — Condition number

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Syntax

real scalar `cond(`*numeric matrix A*`)`

real scalar `cond(`*numeric matrix A*`,` *real scalar p*`)`

Description

`cond(`A`)` returns `cond(`A`, 2)`.

`cond(`A`,` p`)` returns the value of the condition number of A for the specified norm p, where p may be 0, 1, 2, or `.` (missing).

Remarks and examples

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The condition number of a matrix A is

$$cond = \texttt{norm}(A,\ p) \times \texttt{norm}(A^{-1},\ p)$$

These functions return missing when A is singular.

Values near 1 indicate that the matrix is well conditioned, and large values indicate ill conditioning.

Conformability

`cond(`A`):`

A:	$r \times c$
result:	1×1

`cond(`A`,` p`):`

A:	$r \times c$
p:	1×1
result:	1×1

Diagnostics

`cond(`A`,` p`)` aborts with error if p is not 0, 1, 2, or `.` (missing).

`cond(`A`)` and `cond(`A`,` p`)` return missing when A is singular or if A contains missing values.

`cond(`A`)` and `cond(`A`,` p`)` return 1 when A is void.

`cond(A)` and `cond(A, 2)` return missing if the SVD algorithm fails to converge, which is highly unlikely; see [M-5] **svd()**.

Also see

[M-5] **norm()** — Matrix and vector norms

[M-4] **matrix** — Matrix functions