

**cond()** — Condition number

[Description](#)  
[Diagnostics](#)
[Syntax](#)  
[Also see](#)
[Remarks and examples](#)
[Conformability](#)

## 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).

## Syntax

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

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

## Remarks and examples

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The condition number of a matrix  $A$  is

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

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*:     $1 \times 1$

`cond(A, p)`:  
     *A*:         $r \times c$   
     *p*:         $1 \times 1$   
     *result*:     $1 \times 1$

## 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.

## 2 `cond()` — Condition number

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`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