Title

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det( ) — Determinant of matrix

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Syntax

numeric scalar `det(`*numeric matrix A*`)`

numeric scalar `dettriangular(`*numeric matrix A*`)`

Description

`det(`*A*`)` returns the determinant of *A*.

`dettriangular(`*A*`)` returns the determinant of *A*, treating *A* as if it were triangular (even if it is not).

Remarks and examples

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Calculation of the determinant is made by obtaining the LU decomposition of *A* and then calculating the determinant of *U*:

$$\begin{aligned}\det(A) &= \det(PLU)\\ &= \det(P) \times \det(L) \times \det(U)\\ &= \pm 1 \times 1 \times \det(U)\\ &= \pm\det(U)\end{aligned}$$

Since *U* is (upper) triangular, det(*U*) is simply the product of its diagonal elements. See [M-5] **lud()**.

Conformability

`det(`*A*`)`, `dettriangular(`*A*`)`:

A:	$n \times n$
result:	1×1

Diagnostics

`det(`*A*`)` and `dettriangular(`*A*`)` return 1 if *A* is 0×0.

`det(`*A*`)` aborts with error if *A* is not square and returns missing if *A* contains missing values.

`dettriangular(`*A*`)` aborts with error if *A* is not square and returns missing if any element on the diagonal of *A* is missing.

Both `det(`A`)` and `dettriangular(`A`)` will return missing value if the determinant exceeds 8.99e+307.

Also see

[M-5] **lud( )** — LU decomposition

[M-4] **matrix** — Matrix functions