Title

det( ) — Determinant of matrix

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).

Syntax

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

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

Remarks and examples

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*):

$$
\begin{aligned}
A: \quad & n \times n \\
result: \quad & 1 \times 1
\end{aligned}
$$

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