

lowertriangle() — Extract lower or upper triangle

Description Diagnostics	Syntax Also see	Remarks and examples	Conformability
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Description

`lowertriangle()` returns the lower triangle of A .

`uppertriangle()` returns the upper triangle of A .

`_lowertriangle()` replaces A with its lower triangle.

`_uppertriangle()` replaces A with its upper triangle.

Syntax

numeric matrix `lowertriangle(numeric matrix A [, numeric scalar d])`

numeric matrix `uppertriangle(numeric matrix A [, numeric scalar d])`

void `_lowertriangle(numeric matrix A [, numeric scalar d])`

void `_uppertriangle(numeric matrix A [, numeric scalar d])`

where argument d is optional.

Remarks and examples

Remarks are presented under the following headings:

Optional argument d
Nonsquare matrices

Optional argument d

Optional argument d specifies the treatment of the diagonal. Specifying $d > .$, or not specifying d at all, means no special treatment; if

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

then

$$\text{lowertriangle}(A, .) = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 5 & 0 \\ 7 & 8 & 9 \end{bmatrix}$$

If a nonmissing value is specified for d , however, that value is substituted for each element of the diagonal, for example,

$$\text{lowertriangle}(A, 1) = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 7 & 8 & 1 \end{bmatrix}$$

Nonsquare matrices

`lowertriangle()` and `uppertriangle()` may be used with nonsquare matrices. If

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{bmatrix}$$

then

$$\text{lowertriangle}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 5 & 6 & 0 \\ 9 & 10 & 11 \end{bmatrix}$$

and

$$\text{uppertriangle}(A) = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 6 & 7 & 8 \\ 0 & 0 & 11 & 12 \end{bmatrix}$$

`_lowertriangle()` and `_uppertriangle()`, however, may not be used with nonsquare matrices.

Conformability

`lowertriangle(A, d)`:

A : $r \times c$
 d : 1×1 (optional)
result: $r \times \min(r, c)$

`uppertriangle(A, d)`:

A : $r \times c$
 d : 1×1 (optional)
result: $\min(r, c) \times c$

`_lowertriangle(A, d)`, `_uppertriangle(A, d)`:

input:

A : $n \times n$
 d : 1×1 (optional)

output:

A : $n \times n$

Diagnostics

None.

Also see

[M-4] [Manipulation](#) — Matrix manipulation