

Description

diag() creates diagonal matrices.

diag(*Z*), *Z* a matrix, extracts the principal diagonal of *Z* to create a new matrix. *Z* must be square.

diag(*z*), *z* a vector, creates a new matrix with the elements of *z* on its diagonal.

Syntax

numeric matrix diag(*numeric matrix Z*)

numeric matrix diag(*numeric vector z*)

Remarks and examples

Do not confuse diag() with its functional inverse, diagonal(); see [M-5] **diagonal()**. diag() creates a matrix from a vector (or matrix); diagonal() extracts the diagonal of a matrix into a vector.

Use of diag() should be avoided because it wastes memory. The **colon operators** will allow you to use vectors directly:

Desired calculation	Equivalent
diag(<i>v</i>)* <i>X</i> ,	
<i>v</i> is a column	<i>v</i> :* <i>X</i>
<i>v</i> is a row	<i>v</i> ' : * <i>X</i>
<i>v</i> is a matrix	diagonal(<i>v</i>):* <i>X</i>
<i>X</i> *diag(<i>v</i>)	
<i>v</i> is a column	<i>X</i> :* <i>v</i> '
<i>v</i> is a row	<i>X</i> :* <i>v</i>
<i>v</i> is a matrix	<i>X</i> :*diagonal(<i>v</i>)'

In the above table, it is assumed that *v* is real. If *v* might be complex, the transpose operators that appear must be changed to transposeonly() calls, because we do not want the conjugate. For instance, *v*' : **X* would become transposeonly(*v*):**X*.

Conformability

diag(Z):

Z : $m \times n$
result: $\min(m, n) \times \min(m, n)$

diag(z):

z : $1 \times n$ or $n \times 1$
result: $n \times n$

Diagnostics

None.

Also see

[M-5] [_diag\(\)](#) — Replace diagonal of a matrix

[M-5] [diagonal\(\)](#) — Extract diagonal into column vector

[M-5] [isdiagonal\(\)](#) — Whether matrix is diagonal

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

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