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:

<table>
<thead>
<tr>
<th>Desired calculation</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>diag(v)*X,</td>
<td>v:*X</td>
</tr>
<tr>
<td>v is a column</td>
<td>v'*:*X</td>
</tr>
<tr>
<td>v is a row</td>
<td>diagonal(v):*X</td>
</tr>
<tr>
<td>v is a matrix</td>
<td></td>
</tr>
</tbody>
</table>

| X*diag(v)           |             |
| v is a column       | X:*v'       |
| v is a row          | X:*v        |
| v is a matrix       | X:*diagonal(v)' |

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):

\[ Z: \quad m \times n \]
\[ \text{result:} \quad \min(m,n) \times \min(m,n) \]

diag(z):

\[ z: \quad 1 \times n \quad \text{or} \quad n \times 1 \]
\[ \text{result:} \quad n \times n \]

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