Dmatrix() — Duplication matrix

Syntax

```
real matrix Dmatrix(real scalar n)
```

Description

\( \text{Dmatrix}(n) \) returns the \( n^2 \times n(n+1)/2 \) duplication matrix \( D \) for which \( D \ast \text{vech}(X) = \text{vec}(X) \), where \( X \) is an arbitrary \( n \times n \) symmetric matrix.

Remarks and examples

Duplication matrices are frequently used in computing derivatives of functions of symmetric matrices. Section 9.5 of Lütkepohl (1996) lists many useful properties of duplication matrices.

Conformability

\( \text{Dmatrix}(n) \):

\[
\begin{array}{l}
\text{n:} \quad 1 \times 1 \\
\text{result:} \quad n^2 \times n(n+1)/2
\end{array}
\]

Diagnostics

\( \text{Dmatrix}(n) \) aborts with error if \( n \) is less than 0 or is missing. \( n \) is interpreted as \( \text{trunc}(n) \).

Reference


Also see

[M-5] Kmatrix() — Commutation matrix

[M-5] Lmatrix() — Elimination matrix

[M-5] vec() — Stack matrix columns

[M-4] standard — Functions to create standard matrices