**Dmatrix() — Duplication matrix**

**Description**

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

**Syntax**

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

**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**

\[
\text{Dmatrix}(n): \\
\text{n: } 1 \times 1 \\
\text{result: } n^2 \times n(n + 1)/2
\]

**Diagnostics**

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**