**Lmatrix() — Elimination matrix**

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**Description**

Lmatrix(n) returns the \( n(n + 1)/2 \times n^2 \) elimination matrix \( L \) for which \( L \cdot \text{vec}(X) = \text{vech}(X) \), where \( X \) is an \( n \times n \) symmetric matrix.

**Syntax**

```plaintext
real matrix Lmatrix(real scalar n)
```

**Remarks and examples**

Elimination matrices are frequently used in computing derivatives of functions of symmetric matrices. Section 9.6 of Lütkepohl (1996) lists many useful properties of elimination matrices.

**Conformability**

Lmatrix(n):

<table>
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<th>( n )</th>
<th>( 1 \times 1 )</th>
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<td>result:</td>
<td>( n(n + 1)/2 \times n^2 )</td>
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**Diagnostics**

Lmatrix(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] Dmatrix() — Duplication matrix

[M-5] Kmatrix() — Commutation matrix

[M-5] vec() — Stack matrix columns

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