Kmatrix() — Commutation matrix

Description

Kmatrix(m, n) returns the \( mn \times mn \) commutation matrix \( K \) for which \( K \cdot \text{vec}(X) = \text{vec}(X') \), where \( X \) is an \( m \times n \) matrix.

Syntax

\[
\text{real matrix Kmatrix(real scalar m, real scalar n)}
\]

Remarks and examples

Commutation matrices are frequently used in computing derivatives of functions of matrices. Section 9.2 of Lütkepohl (1996) lists many useful properties of commutation matrices.

Conformability

Kmatrix(m, n):

\[
\begin{align*}
m: & \quad 1 \times 1 \\
n: & \quad 1 \times 1 \\
result: & \quad mn \times mn
\end{align*}
\]

Diagnostics

Kmatrix(m, n) aborts with error if either \( m \) or \( n \) is less than 0 or is missing. \( m \) and \( n \) are interpreted as trunc(\( m \)) and trunc(\( n \)).

Reference


Also see

[M-5] Dmatrix() — Duplication matrix
[M-5] Lmatrix() — Elimination matrix
[M-5] vec() — Stack matrix columns
[M-4] standard — Functions to create standard matrices