Kmatrix( ) — Commutation matrix

Syntax

real matrix Kmatrix(real scalar m, real scalar n)

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.

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

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 \( \text{trunc}(m) \) and \( \text{trunc}(n) \).

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