

invorder() — Permutation vector manipulation

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Description

`invorder(p)` returns the permutation vector that undoes the permutation performed by p .

`revorder(p)` returns the permutation vector that is the reverse of the permutation performed by p .

Syntax

real vector `invorder(real vector p)`

real vector `revorder(real vector p)`

where p is assumed to be a [permutation vector](#).

Remarks and examples

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See [\[M-1\] permutation](#) for a description of permutation vectors. To summarize,

1. Permutation vectors p are used to permute the rows or columns of a matrix X : $r \times c$.

If p is intended to permute the rows of X , the permuted X is obtained via $Y = X[p, .]$.

If p is intended to permute the columns of X , the permuted X is obtained via $Y = X[., p]$.

2. If p is intended to permute the rows of X , it is called a row-permutation vector. Row-permutation vectors are $r \times 1$ column vectors.
3. If p is intended to permute the columns of X , it is called a column-permutation vector. Column-permutation vectors are $1 \times c$ row vectors.
4. Row-permutation vectors contain a permutation of the integers 1 to r .
5. Column-permutation vectors contain a permutation of the integers 1 to c .

Let us assume that p is a row-permutation vector, so that

$$Y = X[p, .]$$

`invorder(p)` returns the row-permutation vector that undoes p :

$$X = Y[\text{invorder}(p), .]$$

That is, using the matrix notation of [\[M-1\] permutation](#),

$$Y = PX \quad \text{implies} \quad X = P^{-1}Y$$

If p is the permutation vector corresponding to permutation matrix P , `invorder(p)` is the permutation vector corresponding to permutation matrix P^{-1} .

`revorder(p)` returns the permutation vector that reverses the order of p . For instance, say that row-permutation vector p permutes the rows of X so that the diagonal elements are in ascending order. Then `revorder(p)` would permute the rows of X so that the diagonal elements would be in descending order.

Conformability

`invorder(p)`, `revorder(p)`:

$$\begin{array}{lll} p: & r \times 1 & \text{or} & 1 \times c \\ \text{result:} & r \times 1 & \text{or} & 1 \times c \end{array}$$

Diagnostics

`invorder(p)` and `revorder(p)` can abort with error or can produce meaningless results when p is not a permutation vector.

Also see

[\[M-1\] permutation](#) — An aside on permutation matrices and vectors

[\[M-4\] manipulation](#) — Matrix manipulation