Title

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inorder() — Permutation vector manipulation

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Description

`inorder(`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 `inorder(`*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`, .]`

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

$X = Y$`[inorder(`p`), .]`

That is, using the matrix notation of [M-1] **Permutation**,

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

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`)`:

p:	$r \times 1$	or	$1 \times c$
result:	$r \times 1$	or	$1 \times c$

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