Description

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

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

Syntax

> *real vector* inorder(*real vector p*)

> *real vector* reorder(*real vector p*)

where p is assumed to be a permutation vector.

Remarks and examples

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:

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

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}.

`reorder(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 `reorder(p)` would permute the rows of X so that the diagonal elements would be in descending order.

Conformability

```
invorder(p), reorder(p):
           p:    r × 1    or    1 × c
       result:   r × 1    or    1 × c
```

Diagnostics

`invorder(p)` and `reorder(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