

select() — Select rows, columns, or indices

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Description

`select(X, v)` returns X

1. omitting the rows for which $v[i]==0$ (v a column vector) or
2. omitting the columns for which $v[j]==0$ (v a row vector).

`st_select(A, X, v)` does the same thing, except that the result is placed in A and, if X is a view, A will be a view.

`selectindex(v)` returns

1. a row vector of column indices j for which $v[j]!=0$ (v a row vector) or
2. a column vector of row indices i for which $v[i]!=0$ (v a column vector).

Syntax

transmorphic matrix `select(transmorphic matrix X, real vector v)`

void `st_select(A, transmorphic matrix X, real vector v)`

real vector `selectindex(real vector v)`

Remarks and examples

Remarks are presented under the following headings:

Examples
Using st_select()

Examples

1. To select rows 1, 2, and 4 of $5 \times c$ matrix X ,

```
submat = select(X, (1\1\0\1\0))
```

See [M-2] [subscripts](#) for another solution, `submat = X[(1\2\4), .]`.

2. To select columns 1, 2, and 4 of $r \times 5$ matrix X ,

```
submat = select(X, (1,1,0,1,0))
```

See [M-2] [subscripts](#) for another solution, `submat = X[., (1,2,4)]`.

3. To select rows of X for which the first element is positive,

```
submat = select(X, X[:,1]:>0)
```

4. To select columns of X for which the first element is positive,

```
submat = select(X, X[1,:]:>0)
```

5. To select rows of X for which there are no missing values,

```
submat = select(X, rowmissing(X):==0)
```

6. To select rows and columns of square matrix X for which the diagonal elements are positive,

```
pos      = diagonal(X):>0
submat   = select(X, pos)
submat   = select(submat, pos')
```

or, equivalently,

```
pos      = diagonal(X):>0
submat   = select(select(X, pos), pos')
```

7. To select column indices for which $v[j] \neq 0$,

```
: v
      1  2  3  4  5
1  

|   |   |   |   |   |
|---|---|---|---|---|
| 6 | 0 | 7 | 0 | 8 |
|---|---|---|---|---|



: selectindex(v)
      1  2  3
1  

|   |   |   |
|---|---|---|
| 1 | 3 | 5 |
|---|---|---|


```

8. To select row indices for which $v[i] \neq 0$,

```
: w
      1
1  

|   |
|---|
| 0 |
| 3 |
| 0 |
| 2 |
| 1 |



: selectindex(w)
      1
1  

|   |
|---|
| 2 |
| 4 |
| 5 |


```

Using st_select()

Coding

$$\text{st_select}(\text{submat}, X, v) \quad (1)$$

produces the same result as coding

$$\text{submat} = \text{st_select}(X, v) \quad (2)$$

The difference is in how the result is stored. If X is a view (it need not be), then (1) will produce `submat` as a view or, if you will, a subview, whereas in (2), `submat` will always be a regular (nonview) matrix.

When X is a view, (1) executes more quickly than (2) and produces a result that consumes less memory.

See [M-5] [st_view\(\)](#) for a description of views.

Conformability

`select(X, v)`:

| | | | | |
|-----------------|------------------|----|--------------------|------------------------------|
| X : | $r_1 \times c_1$ | | | |
| v : | $r_1 \times 1$ | or | $1 \times c_1$ | |
| <i>result</i> : | $r_2 \times c_1$ | or | $r_1 \times c_2$, | $r_2 \leq r_1, c_2 \leq c_1$ |

`st_select(A, X, v)`:

input:

| | | | |
|-------|------------------|----|----------------|
| X : | $r_1 \times c_1$ | | |
| v : | $r_1 \times 1$ | or | $1 \times c_1$ |

output:

| | | | | |
|-------|------------------|----|--------------------|------------------------------|
| A : | $r_2 \times c_1$ | or | $r_1 \times c_2$, | $r_2 \leq r_1, c_2 \leq c_1$ |
|-------|------------------|----|--------------------|------------------------------|

`selectindex(v)`:

| | | | | |
|-----------------|----------------|----|------------------|------------------------------|
| v : | $r_1 \times 1$ | or | $1 \times c_1$ | |
| <i>result</i> : | $r_2 \times 1$ | or | $1 \times c_2$, | $r_2 \leq r_1, c_2 \leq c_1$ |

Diagnostics

None.

Also see

[M-5] [st_subview\(\)](#) — Make view from view

[M-2] [op_colon](#) — Colon operators

[M-2] [subscripts](#) — Use of subscripts

[M-4] [utility](#) — Matrix utility functions