

**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 ]
2  [ 3 ]
3  [ 0 ]
4  [ 2 ]
5  [ 1 ]

: selectindex(w)
      1
1  [ 2 ]
2  [ 4 ]
3  [ 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	$r_1 \times c_2,$	$r_2 \leq r_1, c_2 \leq c_1$
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`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