

## Description

$\text{vec}(T)$  returns  $T$  transformed into a column vector with one column stacked onto the next.

$\text{vech}(T)$  returns square and typically symmetric matrix  $T$  transformed into a column vector; only the lower half of the matrix is recorded.

$\text{invvech}(v)$  returns  $\text{vech}()$ -style column vector  $v$  transformed into a symmetric (Hermitian) matrix.

## Syntax

*transmorphic colvector*  $\text{vec}(\text{transmorphic matrix } T)$

*transmorphic colvector*  $\text{vech}(\text{transmorphic matrix } T)$

*transmorphic matrix*  $\text{invvech}(\text{transmorphic colvector } v)$

## Remarks and examples

Remarks are presented under the following headings:

*Example of  $\text{vec}()$*

*Example of  $\text{vech}()$  and  $\text{invvech}()$*

### Example of $\text{vec}()$

```
: x
      1  2  3
1  [ 1  2  3 ]
2  [ 4  5  6 ]

: vec(x)
      1
1  [ 1 ]
2  [ 4 ]
3  [ 2 ]
4  [ 5 ]
5  [ 3 ]
6  [ 6 ]
```

## Example of vech() and invvech()

```

: x
[symmetric]
   1  2  3
1  1
2  2  4
3  3  6  9

: v = vech(x)
: v
   1
1  1
2  2
3  3
4  4
5  6
6  9

: invvech(v)
[symmetric]
   1  2  3
1  1
2  2  4
3  3  6  9

```

## Conformability

$\text{vec}(T)$ :

$T$ :  $r \times c$   
*result*:  $r * c \times 1$

$\text{vech}(T)$ :

$T$ :  $n \times n$   
*result*:  $(n(n+1)/2 \times 1)$

$\text{invvech}(v)$ :

$v$ :  $(n(n+1)/2 \times 1)$   
*result*:  $n \times n$

## Diagnostics

$\text{vec}(T)$  cannot fail.

$\text{vech}(T)$  aborts with error if  $T$  is not square.  $\text{vech}()$  records only the lower triangle of  $T$ ; it does not require  $T$  be symmetric.

$\text{invvech}(v)$  aborts with error if  $v$  does not have 0, 1, 3, 6, 10, ... rows.

## Also see

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

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