

**vec()** — Stack matrix columns

Description	Syntax	Remarks and examples
Conformability	Diagnostics	Also see

**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

`vec(T)`:

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

`vech(T)`:

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

`invvech(v)`:

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

## Diagnostics

`vec(T)` cannot fail.

`vech(T)` aborts with error if *T* is not square. `vech()` records only the lower triangle of *T*; it does not require *T* be symmetric.

`invvech(v)` aborts with error if *v* does not have 0, 1, 3, 6, 10, ... rows.

## Also see

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