vec() — Stack matrix columns

Description

vec(T) returns T transformed into a column vector with one column stacked onto the next.

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

invvech(v) returns vech()-style column vector v transformed into a symmetric (Hermitian) matrix.

Syntax

transmorphic colvector vec(transmorphic matrix T)
transmorphic colvector vech(transmorphic matrix T)
transmorphic matrix invvech(transmorphic colvector v)

Remarks and examples

Remarks are presented under the following headings:

Example of vec()
Example of vech() and invvech()

Example of vec()

: x
  1 2 3
  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()`

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

Conformability

`vec(T)`:

\[
T: \quad r \times c \\
result: \quad r \times c \times 1
\]

`vech(T)`:

\[
T: \quad n \times n \\
result: \quad (n(n + 1)/2 \times 1)
\]

`invvech(v)`:

\[
v: \quad (n(n + 1)/2 \times 1) \\
result: \quad n \times n
\]

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, \ldots\ rows.
Also see