**Description**

`conj(Z)` returns the elementwise complex conjugate of Z, that is, $\text{conj}(a+bi) = a - bi$. `conj()` may be used with real or complex matrices. If Z is real, Z is returned unmodified.

`_conj(A)` replaces A with `conj(A)`. Coding `_conj(A)` is equivalent to coding $A = \text{conj}(A)$, except that less memory is used.

**Syntax**

```plaintext
cnumeric matrix conj(numeric matrix Z)

void _conj(numeric matrix A)
```

**Remarks and examples**

Given $m \times n$ matrix Z, `conj(Z)` returns an $m \times n$ matrix; it does not return the transpose. To obtain the conjugate transpose matrix, also known as the adjoint matrix, adjugate matrix, Hermitian adjoin, or Hermitian transpose, code

$Z'$

See [M-2] op_transpose.

A matrix equal to its conjugate transpose is called Hermitian or self-adjoint, although in this manual, we often use the term symmetric.

**Conformability**

`conj(Z)`:  
- $Z$: $r \times c$
- result: $r \times c$

`_conj(A)`:  
- input: $A$: $r \times c$
- output: $A$: $r \times c$
Diagnoses

\( \text{conj}(Z) \) returns a real matrix if \( Z \) is real and a complex matrix if \( Z \) is complex.

\( \text{conj}(Z) \), if \( Z \) is real, returns \( Z \) itself and not a copy. This makes \( \text{conj}() \) execute instantly when applied to real matrices.

\( \text{conj}(A) \) does nothing if \( A \) is real (and hence, does not abort if \( A \) is a view).

Also see

[M-5] \_transpose() — Transposition in place

[M-4] Scalar — Scalar mathematical functions