C() — Make complex

Description Syntax Remarks and examples Conformability Diagnostics Also see

Description

C(A) returns A converted to complex. C(A) returns A if A is already complex. If A is real, C(A) returns A+0i—A cast up to complex. Coding C(A) is thus how you ensure that the matrix is treated as complex.

C(R, I) returns the complex matrix R+Ii and is faster than the alternative R+I:*1i.

Syntax

```
complex matrix C(numeric matrix A)
complex matrix C(real matrix R, real matrix I)
```

Remarks and examples

Many of Mata's functions are overloaded, meaning they return a real when given real arguments and a complex when given complex arguments. Given real arguments, if the result cannot be expressed as a real, missing value is returned. Thus sqrt(-1) evaluates to missing, whereas sqrt(-1+0i) is *Ii*.

C() is the fast way to make arguments that might be real into complex. You can code

```
result = sqrt(C(x))
```

If x already is complex, C() does nothing; if x is real, C(x) returns the complex equivalent.

The two-argument version of C() is less frequently used. C(R, I) is literally equivalent to R:+I*1i, meaning that R and I need only be c-conformable.

For instance, C(1, (1,2,3)) evaluates to (1+1i, 1+2i, 1+3i).

Conformability

```
C(A):

A: r \times c

result: r \times c

C(R, I):

R: r_1 \times c_1

I: r_2 \times c_2, R and I c-conformable

result: max(r_1, r_2) \times max(c_1, c_2)
```

Diagnostics

C(Z), if Z is complex, literally returns Z and not a copy of Z. This makes execution of C() applied to complex arguments instant.

In C(R, I), the i,j element of the result will be missing anywhere R[i, j] or I[i, j] is missing. For instance, C((1,3,.), (.,2,4)) results in (.,3+2i,.). If R[i,j] and I[i,j] are both missing, then the R[i, j] value will be used; for example, C(.a, .b) results in .a.

Also see

[M-5] **Re()** — Extract real or imaginary part

[M-4] Scalar — Scalar mathematical functions

[M-4] Utility — Matrix utility functions

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