NAME

cexp, **cexpf**, **cexpl** - complex exponential functions

LIBRARY

Math Library (libm, -lm)

SYNOPSIS

#include <complex.h>

double complex
cexp(*double complex z*);

float complex
cexpf(*float complex z*);

long double complex
cexpl(*long double complex z*);

DESCRIPTION

The **cexp**(), **cexpf**(), and **cexpl**() functions compute the complex exponential of *z*, also known as *cis*(*z*).

RETURN VALUES

For real numbers *x* and *y*, **cexp**() behaves according to Euler's formula:

cexp(*x* + *I***y*) = (**e*****x* * *cos*(*y*)) + (**I** * **e*****x* * *sin*(*y*))

Generally speaking, infinities, zeroes and NaNs are handled as would be expected from this identity given the usual rules of floating-point arithmetic. However, care is taken to avoid generating NaNs when they are not deserved. For example, mathematically we expect that **cimag**(**cexp**(*x* + *I*0*)) = 0 regardless of the value of *x*, and **cexp**() preserves this identity even if *x* is infinity or NaN. Likewise, **cexp**(-*infinity* + *I***y*) = 0 and **creal**(**cexp**(*infinity* + *I***y*)) = infinity for any *y* (even though the latter property is only mathematically true for representable *y*.) If *y* is not finite, the sign of the result is indeterminate.

SEE ALSO

complex(3), exp(3), math(3)

STANDARDS

The **cexp**(), **cexpf**(), and **cexpl**() functions conform to ISO/IEC 9899:1999 ("ISO C99").