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").