NAME

cacosh, cacoshf, cacoshl − complex arc hyperbolic cosine

LIBRARY

Math library (*libm*, *−lm*)

SYNOPSIS

#include <complex.h>

double complex cacosh(double complex *z***);**
float complex cacoshf(float complex *z***);**
long double complex cacoshl(long double complex *z***);**

DESCRIPTION

These functions calculate the complex arc hyperbolic cosine of *z*. If *y = cacosh(z)*, then *z = ccosh(y)*. The imaginary part of *y* is chosen in the interval [−pi,pi]. The real part of *y* is chosen nonnegative.

One has:

cacosh(z) = 2 * clog(csqrt((z + 1) / 2) + csqrt((z − 1) / 2))

VERSIONS

These functions were added in glibc 2.1.

ATTRIBUTES

For an explanation of the terms used in this section, see **attributes**(7).

Interface	Attribute	Value
cacosh(), **cacoshf**(), **cacoshl**()	Thread safety	MT-Safe

STANDARDS

C99, POSIX.1-2001, POSIX.1-2008.

EXAMPLES

```
/* Link with "−lm" */

#include <complex.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int
main(int argc, char *argv[])
{
    double complex z, c, f;

    if (argc != 3) {
        fprintf(stderr, "Usage: %s <real> <imag>\n", argv[0]);
        exit(EXIT_FAILURE);
    }

    z = atof(argv[1]) + atof(argv[2]) * I;

    c = cacosh(z);
    printf("cacosh() = %6.3f %6.3f*i\n", creal(c), cimag(c));

    f = 2 * clog(csqrt((z + 1)/2) + csqrt((z − 1)/2));
    printf("formula  = %6.3f %6.3f*i\n", creal(f), cimag(f));

    exit(EXIT_SUCCESS);
```

```
}
```

SEE ALSO

acosh(3), **cabs**(3), **ccosh**(3), **cimag**(3), **complex**(7)