NAME

catanh, catanhf, catanhl − complex arc tangents hyperbolic

SYNOPSIS

#include <complex.h>

double complex catanh(double complex *z***);**
float complex catanhf(float complex *z***);**
long double complex catanhl(long double complex *z***);**

Link with *−lm*.

DESCRIPTION

These functions calculate the complex arc hyperbolic tangent of *z*. If *y* = *catanh(z)*, then *z* = *ctanh(y)*. The imaginary part of *y* is chosen in the interval [−pi/2,pi/2].

One has:

catanh(z) = 0.5 * (clog(1 + z) − clog(1 − z))

VERSIONS

These functions first appeared in glibc in version 2.1.

ATTRIBUTES

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

Interface	Attribute	Value
catanh(), **catanhf**(), **catanhl**()	Thread safety	MT-Safe

CONFORMING TO

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

EXAMPLE

```
/* Link with "-lm" */

#include <complex.h>
#include <stdlib.h>
#include <unistd.h>
#include <stdio.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 = catanh(z);
    printf("catanh() = %6.3f %6.3f*i\n", creal(c), cimag(c));

    f = 0.5 * (clog(1 + z) - clog(1 - z));
    printf("formula  = %6.3f %6.3f*i\n", creal(f2), cimag(f2));

    exit(EXIT_SUCCESS);
}
```

SEE ALSO

atanh(3), **cabs**(3), **cimag**(3), **ctanh**(3), **complex**(7)

COLOPHON

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