

**NAME**

ctanh, ctanhf, ctanhl – complex hyperbolic tangent

**SYNOPSIS**

```
#include <complex.h>
```

```
double complex ctanh(double complex z);
```

```
float complex ctanhf(float complex z);
```

```
long double complex ctanhl(long double complex z);
```

Link with `-lm`.

**DESCRIPTION**

These functions calculate the complex hyperbolic tangent of  $z$ .

The complex hyperbolic tangent function is defined mathematically as:

$$\operatorname{ctanh}(z) = \operatorname{csinh}(z) / \operatorname{ccosh}(z)$$

**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
ctanh(), ctanhf(), ctanhl()	Thread safety	MT-Safe

**CONFORMING TO**

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

**SEE ALSO**

[cabs\(3\)](#), [catanh\(3\)](#), [ccosh\(3\)](#), [csinh\(3\)](#), [complex\(7\)](#)

**COLOPHON**

This page is part of release 4.16 of the Linux *man-pages* project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at <https://www.kernel.org/doc/man-pages/>.