

**NAME**

**cacos**, **cacosf**, **cacosl**, **cacosh**, **cacoshf**, **cacoshl**, **casin**, **casinf**, **casinl**, **casinh**, **casinhf**, **casinhl**, **catan**, **catanf**, **catanl**, **catanh**, **catanhf**, **catanhl** - complex inverse trigonometric and hyperbolic functions

**LIBRARY**

Math Library (libm, -lm)

**SYNOPSIS**

**#include <complex.h>**

*double complex*

**cacos**(*double complex* z);

*float complex*

**cacosf**(*float complex* z);

*long double complex*

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

*double complex*

**cacosh**(*double complex* z);

*float complex*

**cacoshf**(*float complex* z);

*long double complex*

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

*double complex*

**casin**(*double complex* z);

*float complex*

**casinf**(*float complex* z);

*long double complex*

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

*double complex*

**casinh**(*double complex* z);

*float complex*

**casinhf**(*float complex* z);

*long double complex*

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

*double complex*

**catan**(*double complex* z);

*float complex*

**catanf**(*float complex* z);

*long double complex*

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

*double complex*

**catanh**(*double complex* z);

*float complex*

**catanhf**(*float complex* z);

*long double complex*

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

## DESCRIPTION

The **cacos**(), **casin**(), and **catan**() functions compute the principal value of the inverse cosine, sine, and tangent of the complex number  $z$ , respectively. The **cacosh**(), **casinh**(), and **catanh**() functions compute the principal value of the inverse hyperbolic cosine, sine, and tangent. The **cacosf**(), **casinf**(), **catanf**() **cacoshf**(), **casinhf**(), and **catanhf**() functions perform the same operations in *float* precision. The **cacosl**(), **casinl**(), **catanl**() **cacoshl**(), **casinhl**(), and **catanhl**() functions perform the same operations in *long double* precision.

There is no universal convention for defining the principal values of these functions. The following table gives the branch cuts, and the corresponding ranges for the return values, adopted by the C language.

Function	Branch Cut(s)	Range
cacos	(-infinity, -1) <union> (1, infinity)	[0, pi]
casin	(-infinity, -1) <union> (1, infinity)	[-pi/2, pi/2]
catan	(-infinity*I, -I) <union> (I, infinity*I)	[-pi/2, pi/2]

cacosh	(-infinity, 1)	$[-\pi * I, \pi * I]$
casinh	(-infinity*I, -1) <union> (1, infinity*I)	$[-\pi/2 * I, \pi/2 * I]$
catanh	(-infinity, -1) <union> (1, infinity)	$[-\pi/2 * I, \pi/2 * I]$

**SEE ALSO**

ccos(3), ccosh(3), complex(3), cos(3), math(3), sin(3), tan(3)

**STANDARDS**

These functions conform to ISO/IEC 9899:1999 ("ISO C99").