

NAME

acosh, acoshf, acoshl – inverse hyperbolic cosine function

SYNOPSIS

```
#include <math.h>
```

```
double acosh(double x);
```

```
float acoshf(float x);
```

```
long double acoshl(long double x);
```

Link with `-lm`.

Feature Test Macro Requirements for glibc (see **feature_test_macros(7)**):

acosh():

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| _XOPEN_SOURCE >= 500
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

acoshf(), acoshl():

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

DESCRIPTION

These functions calculate the inverse hyperbolic cosine of x ; that is the value whose hyperbolic cosine is x .

RETURN VALUE

On success, these functions return the inverse hyperbolic cosine of x .

If x is a NaN, a NaN is returned.

If x is $+1$, $+0$ is returned.

If x is positive infinity, positive infinity is returned.

If x is less than -1 , a domain error occurs, and the functions return a NaN.

ERRORS

See **math_error(7)** for information on how to determine whether an error has occurred when calling these functions.

The following errors can occur:

Domain error: x is less than -1

`errno` is set to **EDOM**. An invalid floating-point exception (**FE_INVALID**) is raised.

ATTRIBUTES

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

| Interface | Attribute | Value |
|--|---------------|---------|
| acosh() , acoshf() , acoshl() | Thread safety | MT-Safe |

CONFORMING TO

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

The variant returning *double* also conforms to SVr4, 4.3BSD.

SEE ALSO

asinh(3), **atanh(3)**, **cacosh(3)**, **cosh(3)**, **sinh(3)**, **tanh(3)**

COLOPHON

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