NAME

acosh, acoshf, acoshl − inverse hyperbolic cosine function

LIBRARY

Math library (*libm*, *−lm*)

SYNOPSIS

```
#include <math.h>

double acosh(double x);
float acoshf(float x);
long double acoshl(long double x);
```

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 <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

acoshf(), **acoshl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 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

STANDARDS

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)