ATANH(3)

NAME

atanh, atanhf, atanhl - inverse hyperbolic tangent function

SYNOPSIS

```
#include <math.h>

double atanh(double x);

float atanhf(float x);

long double atanhl(long double x);
```

Link with -lm.

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

atanh():

_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 500 || _XOPEN_SOURCE && _XOPEN_SOURCE_EXTENDED || _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L;

or cc -std=c99

atanhf(), **atanhl**():

_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L;

or cc -std=c99

DESCRIPTION

The **atanh**() function calculates the inverse hyperbolic tangent of x; that is the value whose hyperbolic tangent is x.

RETURN VALUE

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

If x is a NaN, a NaN is returned.

If x is +0 (-0), +0 (-0) is returned.

If x is +1 or -1, a pole error occurs, and the functions return **HUGE_VAL**, **HUGE_VALF**, or **HUGE_VALL**, respectively, with the mathematically correct sign.

If the absolute value of x is greater than 1, a domain error occurs, and a NaN is returned.

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 less than -1 or greater than +1 errno is set to **EDOM**.
An invalid floating-point exception (**FE_INVALID**) is raised.

Pole error: x is +1 or -1 errno is set to **ERANGE** (but see BUGS). A divide-by-zero floating-point exception (**FE_DIVBYZERO**) is raised.

CONFORMING TO

C99, POSIX.1-2001. The variant returning double also conforms to SVr4, 4.3BSD, C89.

BUGS

In glibc 2.9 and earlier, when a pole error occurs, errno as set to **EDOM** instead of the POSIX-mandated **ERANGE**. Since version 2.10, glibc does the right thing.

SEE ALSO

acosh(3), **asinh**(3), **catanh**(3), **cosh**(3), **sinh**(3), **tanh**(3)

COLOPHON

This page is part of release 3.54 of the Linux man-pages project. A description of the project, and information about reporting bugs, can be found at http://www.kernel.org/doc/man-pages/.

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