

NAME

tanh, tanhf, tanhl – hyperbolic tangent function

SYNOPSIS

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

```
double tanh(double x);
```

```
float tanhf(float x);
```

```
long double tanhl(long double x);
```

Link with `-lm`.

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

tanhf(), **tanh()**:

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

```
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
```

```
|| /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

DESCRIPTION

These functions return the hyperbolic tangent of x , which is defined mathematically as:

$$\tanh(x) = \sinh(x) / \cosh(x)$$

RETURN VALUE

On success, these functions return the 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 positive infinity (negative infinity), +1 (−1) is returned.

ERRORS

No errors occur.

ATTRIBUTES

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

| Interface | Attribute | Value |
|--|---------------|---------|
| tanh() , tanhf() , tanh() | Thread safety | MT-Safe |

CONFORMING TO

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

The variant returning *double* also conforms to SVr4, 4.3BSD, C89.

SEE ALSO

acosh(3), **asinh(3)**, **atanh(3)**, **cosh(3)**, **ctanh(3)**, **sinh(3)**

COLOPHON

This page is part of release 5.02 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/>.