NAME

tanh, tanhf, tanhl − hyperbolic tangent function

LIBRARY

Math library (*libm*, *−lm*)

SYNOPSIS

```
#include <math.h>

double tanh(double x);
float tanhf(float x);
long double tanhl(long double x);
```

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

tanhf(), **tanhl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 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**(), **tanhl**()	Thread safety	MT-Safe

STANDARDS

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

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

SEE ALSO

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