NAME

sinh, sinhf, sinhl − hyperbolic sine function

SYNOPSIS

#include <math.h>

double sinh(double *x*);
float sinhf(float *x*);
long double sinhl(long double *x*);

Link with *−lm*.

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

sinhf(), **sinhl**():
_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 sine of *x*, which is defined mathematically as:

sinh(x) = (exp(x) − exp(−x)) / 2

RETURN VALUE

On success, these functions return the hyperbolic sine 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), positive infinity (negative infinity) is returned.

If the result overflows, a range error occurs, and the functions return **HUGE_VAL**, **HUGE_VALF**, or **HUGE_VALL**, respectively, with the same sign as *x*.

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:

Range error: result overflow
errno is set to **ERANGE**. An overflow floating-point exception (**FE_OVERFLOW**) is raised.

ATTRIBUTES

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

Interface	Attribute	Value
sinh(), **sinhf**(), **sinhl**()	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), **csinh**(3), **tanh**(3)

COLOPHON

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