NAME

nextafter, nextafterf, nextafterl, nexttoward, nexttowardf, nexttowardl − floating-point number manipulation

LIBRARY

Math library (*libm*, *−lm*)

SYNOPSIS

```
#include <math.h>

double nextafter(double x, double y);
float nextafterf(float x, float y);
long double nextafterl(long double x, long double y);

double nexttoward(double x, long double y);
float nexttowardf(float x, long double y);
long double nexttowardl(long double x, long double y);
```

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

nextafter():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| _XOPEN_SOURCE >= 500
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

nextafterf(), **nextafterl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

nexttoward(), **nexttowardf**(), **nexttowardl**():
_XOPEN_SOURCE >= 600 || _ISOC99_SOURCE
|| _POSIX_C_SOURCE >= 200112L

DESCRIPTION

The **nextafter**(), **nextafterf**(), and **nextafterl**() functions return the next representable floating-point value following *x* in the direction of *y*. If*y* is less than *x*, these functions will return the lar gest representable number less than *x*.

If *x* equals *y*, the functions return *y*.

The **nexttoward**(), **nexttowardf**(), and **nexttowardl**() functions do the same as the corresponding **nextafter**() functions, except that they have a *long double* second argument.

RETURN VALUE

On success, these functions return the next representable floating-point value after *x* in the direction of *y*.

If *x* equals *y*, then *y* (cast to the same type as *x*) is returned.

If *x* or *y* is a NaN, a NaN is returned.

If *x* is finite, and the result would overflow, a range error occurs, and the functions return **HUGE_VAL**, **HUGE_VALF**, or **HUGE_VALL**, respectively, with the correct mathematical sign.

If *x* is not equal to *y*, and the correct function result would be subnormal, zero, or underflow, a range error occurs, and either the correct value (if it can be represented), or 0.0, 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:

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

Range error: result is subnormal or underflows
errno is set to **ERANGE**. An underflow floating-point exception (**FE_UNDERFLOW**) is raised.

ATTRIBUTES

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

Interface	Attribute	Value
nextafter(), **nextafterf**(), **nextafterl**(), **nexttoward**(), **nexttowardf**(), **nexttowardl**()	Thread safety	MT-Safe

STANDARDS

C99, POSIX.1-2001, POSIX.1-2008. This function is defined in IEC 559 (and the appendix with recommended functions in IEEE 754/IEEE 854).

BUGS

In glibc 2.5 and earlier, these functions do not raise an underflow floating-point (**FE_UNDERFLOW**) exception when an underflow occurs.

Before glibc 2.23 these functions did not set *errno*.

SEE ALSO

nearbyint(3)