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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'nextafter.3p' command

\$ man nextafter.3p

NEXTAFTER(3P) POSIX Programmer's Manual NEXTAFTER(3P)

PROLOG

This manual page is part of the POSIX Programmer's Manual. The Linux implementation of this interface may differ (consult the corresponding Linux manual page for details of Linux behavior), or the interface may not be implemented on Linux.

NAME

nextafter, nextafterf, nextafterl, nexttoward, nexttowardf, nexttowardl
? next representable floating-point number

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);
```

DESCRIPTION

The functionality described on this reference page is aligned with the ISO C standard. Any conflict between the requirements described here and the ISO C standard is unintentional. This volume of POSIX.1?2017 defers to the ISO C standard.

The nextafter(), nextafterf(), and nextafterl() functions shall compute

the next representable floating-point value following x in the direction of y. Thus, if y is less than x, `nextafter()` shall return the largest representable floating-point number less than x. The `nextafter()`, `nextafterf()`, and `nextafterl()` functions shall return y if x equals y.

The `nexttoward()`, `nexttowardf()`, and `nexttowardl()` functions shall be equivalent to the corresponding `nextafter()` functions, except that the second parameter shall have type long double and the functions shall return y converted to the type of the function if x equals y.

An application wishing to check for error situations should set `errno` to zero and call `feclearexcept(FE_ALL_EXCEPT)` before calling these functions. On return, if `errno` is non-zero or `fetestexcept(FE_INVALID | FE_DIVBYZERO | FE_OVERFLOW | FE_UNDERFLOW)` is non-zero, an error has occurred.

RETURN VALUE

Upon successful completion, these functions shall return the next representable floating-point value following x in the direction of y.

If `x==y`, y (of the type x) shall be returned.

If x is finite and the correct function value would overflow, a range error shall occur and `?HUGE_VAL`, `?HUGE_VALF`, and `?HUGE_VALL` (with the same sign as x) shall be returned as appropriate for the return type of the function.

If x or y is NaN, a NaN shall be returned.

If `x!=y` and the correct function value is subnormal, zero, or underflows, a range error shall occur, and the correct function value (if representable) or 0.0 shall be returned.

ERRORS

These functions shall fail if:

Range Error The correct value overflows.

If the integer expression `(math_errhandling & MATH_ERRNO)` is non-zero, then `errno` shall be set to `[ERANGE]`. If the integer expression `(math_errhandling & MATH_ERREXCEPT)` is

non-zero, then the overflow floating-point exception shall be raised.

Range Error The correct value is subnormal or underflows.

If the integer expression `(math_errhandling & MATH_ERRNO)` is non-zero, then `errno` shall be set to `[ERANGE]`. If the integer expression `(math_errhandling & MATH_ERREXCEPT)` is non-zero, then the underflow floating-point exception shall be raised.

The following sections are informative.

EXAMPLES

None.

APPLICATION USAGE

On error, the expressions `(math_errhandling & MATH_ERRNO)` and `(math_errhandling & MATH_ERREXCEPT)` are independent of each other, but at least one of them must be non-zero.

When `<tgmath.h>` is included, note that the return type of `nextafter()` depends on the generic typing deduced from both arguments, while the return type of `nexttoward()` depends only on the generic typing of the first argument.

RATIONALE

None.

FUTURE DIRECTIONS

None.

SEE ALSO

`feclearexcept()`, `fetestexcept()`

The Base Definitions volume of POSIX.1-2017, Section 4.20, Treatment of Error Conditions for Mathematical Functions, `<math.h>`, `<tgmath.h>`

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