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

\$ man ldexp.3p

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

ldexp, ldexpf, ldexpl ? load exponent of a floating-point number

SYNOPSIS

```
#include <math.h>

double ldexp(double x, int exp);

float ldexpf(float x, int exp);

long double ldexpl(long double x, int exp);
```

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.

These functions shall compute the quantity $x * 2^{exp}$.

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 x multiplied by 2, raised to the power exp .

If these functions would cause overflow, a range error shall occur and `ldexp()`, `ldexpf()`, and `ldexpl()` shall return `?HUGE_VAL`, `?HUGE_VALF`, and `?HUGE_VALL` (according to the sign of x), respectively.

If the correct value would cause underflow, and is not representable, a range error may occur, and `ldexp()`, `ldexpf()`, and `ldexpl()` shall return 0.0, or (if IEC 60559 Floating-Point is not supported) an implementation-defined value no greater in magnitude than `DBL_MIN`, `FLT_MIN`, and `LDBL_MIN`, respectively.

If x is NaN, a NaN shall be returned.

If x is `?0` or `?Inf`, x shall be returned.

If exp is 0, x shall be returned.

If the correct value would cause underflow, and is representable, a range error may occur and the correct value shall be returned.

ERRORS

These functions shall fail if:

Range Error The result 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.

These functions may fail if:

Range Error The result 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.

RATIONALE

None.

FUTURE DIRECTIONS

None.

SEE ALSO

`feclearexcept()`, `fetestexcept()`, `frexp()`, `isnan()`

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

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