NAME

```
j0, j0f, j0l, j1, j1f, j1l, jn, jnf, jnl - Bessel functions of the first kind
```

SYNOPSIS

```
#include <math.h>
    double j0(double x);
    double j1(double x);
    double jn(int n, double x);
    float j0f(float x);
    float j1f(float x);
    float \inf(\inf n, \operatorname{float} x);
    long double j0l(long double x);
    long double j1l(long double x);
    long double jnl(int n, long double x);
    Link with -lm.
Feature Test Macro Requirements for glibc (see feature_test_macros(7)):
    j0(), j1(), jn():
         _XOPEN_SOURCE
           /* Since glibc 2.19: */ _DEFAULT_SOURCE
           | /* Glibc versions <= 2.19: */_SVID_SOURCE | _BSD_SOURCE
    j0f(), j0l(), j1f(), j1l(), jnf(), jnl():
         _XOPEN_SOURCE >= 600
           || (_ISOC99_SOURCE && _XOPEN_SOURCE)
           | /* Since glibc 2.19: */ DEFAULT SOURCE
```

DESCRIPTION

The $\mathbf{j0}()$ and $\mathbf{j1}()$ functions return Bessel functions of x of the first kind of orders 0 and 1, respectively. The $\mathbf{jn}()$ function returns the Bessel function of x of the first kind of order n.

The **j0f**(), **j1f**(), and **jnf**(), functions are versions that take and return *float* values. The **j0l**(), **j1l**(), and **jnl**() functions are versions that take and return *long double* values.

RETURN VALUE

On success, these functions return the appropriate Bessel value of the first kind for x.

| /* Glibc versions <= 2.19: */_SVID_SOURCE | _BSD_SOURCE

If x is a NaN, a NaN is returned.

If x is too large in magnitude, or the result underflows, a range error occurs, and the return value is 0.

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 underflow, or *x* is too large in magnitude *errno* is set to **ERANGE**.

These functions do not raise exceptions for **fetestexcept**(3).

ATTRIBUTES

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

Interface	Attribute	Value
j0(), j0f(), j0l()	Thread safety	MT-Safe
j1(), j1f(), j1l()	Thread safety	MT-Safe
jn (), jnf (), jnl ()	Thread safety	MT-Safe

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CONFORMING TO

The functions returning *double* conform to SVr4, 4.3BSD, POSIX.1-2001, and POSIX.1-2008. The others are nonstandard functions that also exist on the BSDs.

BUGS

There are errors of up to 2e-16 in the values returned by $\mathbf{j0}()$, $\mathbf{j1}()$ and $\mathbf{jn}()$ for values of x between -8 and 8.

SEE ALSO

y0(3)

COLOPHON

This page is part of release 5.02 of the Linux *man-pages* project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man-pages/.

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