NAME

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

LIBRARY

Math library (*libm*, *−lm*)

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 jnf(int n, float x);

long double j0l(long double x);
long double j1l(long double x);
long double jnl(int n, long double x);
```

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

j0(), **j1**(), **jn**():

```
_XOPEN_SOURCE
    || /* Since glibc 2.19: */ _DEFAULT_SOURCE
    || /* glibc <= 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
    || /* glibc <= 2.19: */ _SVID_SOURCE || _BSD_SOURCE
```

DESCRIPTION

The **j0**() and **j1**() functions return Bessel functions of *x* of the first kind of orders 0 and 1, respectively. The **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* v alues. 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*.

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

STANDARDS

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 **j0**(), **j1**(), and **jn**() for values of *x* between −8 and 8.

SEE ALSO

y0(3)