

**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 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);
```

Link with `-lm`.

Feature Test Macro Requirements for glibc (see [feature\\_test\\_macros\(7\)](#)):

```
j0(), j1(), jn():
    _SVID_SOURCE || _BSD_SOURCE || _XOPEN_SOURCE
j0f(), j0l(), j1f(), j1l(), jnf(), jnl():
    _SVID_SOURCE || _BSD_SOURCE || _XOPEN_SOURCE >= 600
```

**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* 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  $x$ .

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\(3\)](#).

**CONFORMING TO**

The functions returning *double* conform to SVr4, 4.3BSD, POSIX.1-2001. The others are non-standard 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\(3\)](#)

**COLOPHON**

This page is part of release 3.74 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 <http://www.kernel.org/doc/man-pages/>.