#### NAME

hypot, hypotf, hypotl, cabs, cabsf, cabsl - Euclidean distance and complex absolute value functions

# LIBRARY

Math Library (libm, -lm)

### SYNOPSIS

#include <math.h>

double
hypot(double x, double y);

float
hypotf(float x, float y);

long double
hypotl(long double x, long double y);

#### #include <complex.h>

double
cabs(double complex z);

float
cabsf(float complex z);

long double
cabsl(long double complex z);

#### DESCRIPTION

The **hypot**(), **hypotf**() and **hypotl**() functions compute the sqrt(x\*x+y\*y) in such a way that underflow will not happen, and overflow occurs only if the final result deserves it. The **cabs**(), **cabsf**() and **cabsl**() functions compute the complex absolute value of *z*.

**hypot**(*infinity*, *v*) = **hypot**(*v*, *infinity*) = +infinity for all *v*, including NaN.

# ERROR (due to Roundoff, etc.)

Below 0.97 *ulps*. Consequently **hypot**(5.0, 12.0) = 13.0 exactly; in general, hypot and cabs return an integer whenever an integer might be expected.

# NOTES

As might be expected, **hypot**(v, NaN) and **hypot**(NaN, v) are NaN for all *finite* v. But programmers might be surprised at first to discover that **hypot**(+-*infinity*, NaN) = +infinity. This is intentional; it happens because **hypot**(*infinity*, v) = +infinity for *all* v, finite or infinite. Hence **hypot**(*infinity*, v) is independent of v. Unlike the reserved operand fault on a VAX, the IEEE NaN is designed to disappear when it turns out to be irrelevant, as it does in **hypot**(*infinity*, NaN).

### SEE ALSO

carg(3), math(3), sqrt(3)

#### STANDARDS

The **hypot(**), **hypotf(**), **hypotl(**), **cabs(**), **cabsf(**), and **cabsl(**) functions conform to ISO/IEC 9899:1999 ("ISO C99").

# HISTORY

Both a **hypot**() function and a **cabs**() function appeared in Version 7 AT&T UNIX.