NAME

lgamma, **lgamma_r**, **lgammaf**, **lgammaf_r**, **lgammal**, **lgammal_r**, **gamma**, **gamma_r**, **gammaf**, **gammaf_r**, **tgamma**, **tgammaf**, **tgammal**, - log gamma functions, gamma function

LIBRARY

Math Library (libm, -lm)

SYNOPSIS

#include <math.h>

extern int signgam;

double
lgamma(*double x*);

double
lgamma_r(*double x, int *signgamp*);

float
lgammaf(*float x*);

float
lgammaf_r(*float x, int *signgamp*);

long double
lgammal(*long double x*);

long double
lgammal_r(*long double x, int *signgamp*);

double
gamma(*double x*);

double
gamma_r(*double x, int *signgamp*);

float
gammaf(*float x*);

float

gammaf_r(*float x, int *signgamp*);

long double
tgamma(*double x*);

float
tgammaf(*float x*);

long double
tgammal(*long double x*);

DESCRIPTION

lgamma(*x*), **lgammaf**(*x*), and **lgammal**(*x*) return ln|<Gamma>(x)|. The external integer *signgam* returns the sign of <Gamma>(x).

lgamma_r(*x, signgamp*), **lgammaf_r**(*x, signgamp*), and **lgammal_r**(*x, signgamp*) provide the same functionality as **lgamma**(*x*), **lgammaf**(*x*), and **lgammal**(*x*), but the caller must provide an integer to store the sign of <Gamma>(x).

The **tgamma**(*x*), **tgammaf**(*x*), and **tgammal**(*x*) functions return <Gamma>(x), with no effect on *signgam*.

gamma(), **gammaf**(), **gamma_r**(), and **gammaf_r**() are deprecated aliases for **lgamma**(), **lgammaf**(), **lgamma_r**(), and **lgammaf_r**(), respectively.

IDIOSYNCRASIES

Do not use the expression "signgam*exp(lgamma(x))" to compute g := <Gamma>(x). Instead use a program like this (in C):

```
lg = lgamma(x); g = signgam*exp(lg);
```

Only after **lgamma**() or **lgammaf**() has returned can signgam be correct.

For arguments in its range, **tgamma**() is preferred, as for positive arguments it is accurate to within one unit in the last place. Exponentiation of **lgamma**() will lose up to 10 significant bits.

RETURN VALUES

gamma(), **gammaf**(), **gammal**(), **gamma_r**(), **gammaf_r**(), **gammal_r**(), **lgamma**(), **lgammaf**(), **lgammal**(), **lgamma_r**(), **lgammaf_r**(), and **lgammal_r**() return appropriate values unless an argument is out of range. Overflow will occur for sufficiently large positive values, and non-positive integers. For large non-integer negative values, **tgamma**() will underflow.

BUGS

To conform with newer C/C++ standards, a stub implementation for **tgammal** was committed to the math library, where **tgammal** is mapped to **tgamma**. Thus, the numerical accuracy is at most that of the 53-bit double precision implementation.

SEE ALSO

math(3)

STANDARDS

The **lgamma**(), **lgammaf**(), **lgammal**(), **tgamma**(), **tgammaf**(), and **tgammal**() functions are expected to conform to ISO/IEC 9899:1999 ("ISO C99").

HISTORY

The **lgamma**() function appeared in 4.3BSD. The **gamma**() function appeared in 4.4BSD as a function which computed <Gamma>(x). This version was used in FreeBSD 1.1. The name **gamma**() was originally dedicated to the **lgamma**() function, and that usage was restored by switching to Sun’s fdlibm in FreeBSD 1.1.5. The **tgamma**() function appeared in FreeBSD 5.0.