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## *Red Hat Enterprise Linux Release 9.2 Manual Pages on 'tgamma.3p' command*

***$ man tgamma.3p***

TGAMMA(3P) POSIX Programmer's Manual TGAMMA(3P)

PROLOG

This manual page is part of the POSIX Programmer's Manual. The Linux implementation of this interface may differ (consult the corresponding Linux manual page for details of Linux behavior), or the interface may not be implemented on Linux.

NAME

tgamma, tgammaf, tgammal ? compute gamma() function

SYNOPSIS

#include <math.h>

double tgamma(double x);

float tgammaf(float x);

long double tgammal(long double x);

DESCRIPTION

The functionality described on this reference page is aligned with the ISO C standard. Any conflict between the requirements described here and the ISO C standard is unintentional. This volume of POSIX.1?2017 defers to the ISO C standard.

These functions shall compute ?(x) where ?(x) is defined as ?e^ ?tt^ x?1dt.

An application wishing to check for error situations should set errno to zero and call feclearexcept(FE_ALL_EXCEPT) before calling these functions. On return, if errno is non-zero or fetestexcept(FE_INVALID |

FE_DIVBYZERO | FE_OVERFLOW | FE_UNDERFLOW) is non-zero, an error has occurred.

RETURN VALUE

Upon successful completion, these functions shall return the gamma of x.

If x is a negative integer, a domain error may occur and either a NaN (if supported) or an implementation-defined value shall be returned.

On systems that support the IEC 60559 Floating-Point option, a domain error shall occur and a NaN shall be returned.

If x is ?0, tgamma(), tgammaf(), and tgammal() shall return ?HUGE_VAL, ?HUGE_VALF, and ?HUGE_VALL, respectively. On systems that support the IEC 60559 Floating-Point option, a pole error shall occur; otherwise, a pole error may occur.

If the correct value would cause overflow, a range error shall occur and tgamma(), tgammaf(), and tgammal() shall return ?HUGE_VAL, ?HUGE_VALF, or ?HUGE_VALL, respectively, with the same sign as the cor? rect value of the function.

If the correct value would cause underflow, and is not representable, a range error may occur, and tgamma(), tgammaf(), and tgammal() shall re? turn 0.0, or (if IEC 60559 Floating-Point is not supported) an imple? mentation-defined value no greater in magnitude than DBL_MIN, FLT_MIN, and LDBL_MIN, respectively.

If the correct value would cause underflow, and is representable, a range error may occur and the correct value shall be returned.

If x is subnormal and 1/x is representable, 1/x should be returned.

If x is NaN, a NaN shall be returned.

If x is +Inf, x shall be returned.

If x is -Inf, a domain error shall occur, and a NaN shall be returned.

ERRORS

These functions shall fail if:

Domain Error

The value of x is a negative integer, or x is -Inf.

If the integer expression (math_errhandling & MATH_ERRNO)

is non-zero, then errno shall be set to [EDOM]. If the in?
teger expression (math_errhandling & MATH_ERREXCEPT) is
non-zero, then the invalid floating-point exception shall
be raised.

Pole Error The value of x is zero.

If the integer expression (math_errhandling & MATH_ERRNO)
is non-zero, then errno shall be set to [ERANGE]. If the
integer expression (math_errhandling & MATH_ERREXCEPT) is
non-zero, then the divide-by-zero floating-point exception
shall be raised.

Range Error The value overflows.

If the integer expression (math_errhandling & MATH_ERRNO)
is non-zero, then errno shall be set to [ERANGE]. If the
integer expression (math_errhandling & MATH_ERREXCEPT) is
non-zero, then the overflow floating-point exception shall
be raised.

These functions may fail if:

Domain Error

The value of x is a negative integer.

If the integer expression (math_errhandling & MATH_ERRNO)
is non-zero, then errno shall be set to [EDOM]. If the in?
teger expression (math_errhandling & MATH_ERREXCEPT) is
non-zero, then the invalid floating-point exception shall
be raised.

Pole Error The value of x is zero.

If the integer expression (math_errhandling & MATH_ERRNO)
is non-zero, then errno shall be set to [ERANGE]. If the
integer expression (math_errhandling & MATH_ERREXCEPT) is
non-zero, then the divide-by-zero floating-point exception
shall be raised.

Range Error The result underflows.

If the integer expression (math_errhandling & MATH_ERRNO)
is non-zero, then errno shall be set to [ERANGE]. If the

integer expression (math_errhandling & MATH_ERREXCEPT) is non-zero, then the underflow floating-point exception shall be raised.

The following sections are informative.

## EXAMPLES

None.

## APPLICATION USAGE

On error, the expressions (math_errhandling & MATH_ERRNO) and (math_er?rhandling & MATH_ERREXCEPT) are independent of each other, but at least one of them must be non-zero.

## RATIONALE

This function is named tgamma() in order to avoid conflicts with the historical gamma() and lgamma() functions.

## FUTURE DIRECTIONS

It is possible that the error response for a negative integer argument may be changed to a pole error and a return value of ?Inf.

## SEE ALSO

feclearexcept(), fetestexcept(), lgamma()

The Base Definitions volume of POSIX.1?2017, Section 4.20, Treatment of Error Conditions for Mathematical Functions, <math.h>

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nel.org/doc/man-pages/reporting_bugs.html .