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Language : Fortran **Revised:**

Gamma Function for Real Argument

Function subprograms GAMMF and DGAMMF calculate the gamma function

$$\Gamma(x) \;=\; \int_0^\infty e^{-t} t^{x-1} dt \qquad (x > 0), \qquad \Gamma(x) \;=\; \frac{\pi}{\Gamma(1-x)\,\sin \pi x} \qquad (x < 0)$$

for real argument $x \neq -n$, $(n = 0, 1, 2, \cdots)$.
On CDC and Cray computers, the double-precision version DGAMMF is not available.

Structure:

FUNCTION subprograms
User Entry Names: GAMMF, DGAMMF
Files Referenced: Unit 6
External References: MTLMTR (N002), ABEND (Z035)

Usage:

In any arithmetic expression,

GAMMF(X) or DGAMMF(X) has the value Γ(X),

where GAMMF is of type REAL, DGAMMF is of type DOUBLE PRECISION, and X has the same type as the function name.

Method:

Approximation by truncated Chebyshev series and functional relations.

Accuracy:

GAMMF (except on CDC and Cray computers) has full single-precision accuracy. DGAMMF (and of GAMMF on CDC and Cray computers) has an accuracy which is approximately one digit less than machine precision.

Error handling:

Error C303.1: X $= -n$, $(n = 0, 1, 2, \cdots)$. The function value is set equal to zero, and a message is written on Unit 6, unless subroutine MTLSET (N002) has been called.

References:

1. Y.L. Luke, Mathematical functions and their approximations, (Academic Press, New York 1975) 4.

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