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Library: MATHLIB
Submitter :
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Inverse of Chi-Square Distribution

Function subprogram CHISIN calculates $\chi^2(P,N)$ for a given probability $P(\chi^2)$ and a given degree of freedom N, where

$$P(\chi^2|N) = \frac{1}{\sqrt{2^N}\Gamma(\frac{1}{2}N)} \int_0^{\chi^2(P,N)} e^{-\frac{1}{2}t} t^{\frac{1}{2}N-1}\, dt$$

and $N \geq 1$ and $0 \leq P(\chi^2) < 1$.

Structure:

FUNCTION subprogram
User Entry Name: CHISIN
Files Referenced: Unit 6
External References: GAUSIN (G105), MTLMTR (N002), ABEND (Z035)

Usage:

In any arithmetic expression,

CHISIN(P,N) has the value χ^2(P,N),

where CHISIN and P are of type REAL, and N is of type INTEGER.

Method:

The method is described in Ref. 1. Note that there the complementary integral is taken.

Accuracy:

Approximately three to six digits are correct. The case $N = 3$ is the least accurate.

Error handling:

Error G101.1: P $<$ 0 or P $\geq$ 1.
Error G101.2: N $<$ 1.
In both cases, the function value is set equal to zero, and a message is written on Unit 6, unless subroutine MTLSET (N002) has been called.

Source:

This subprogram is based on an Algol60 procedure published in Ref. 1.

References:

1. R.B. Goldstein, Algorithm 451, Chi-Square Quantiles, Collected Algorithms from CACM (1972)

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