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Submitter :
Language : Fortran

Library: MATHLIB
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Inverse of Normal Frequency Function

Function subprograms `GAUSIN` and `DGAUSN` calculate the inverse $X(P)$ of the normal frequency function (Gaussian distribution)

$$P(X) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{X(P)} e^{-\frac{1}{2}t^2} dt$$

for real arguments P, where $0 < P < 1$.

Structure:

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

Usage:

In any arithmetic expression,

`GAUSIN(P)` has the value $X($`P`$)$,

where `GAUSIN` and `P` are of type `REAL`.

Method:

The method is described in Ref. 1.

Accuracy:

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`GAUSIN` (except on CDC and Cray computers) has an accuracy of about six digits. For most values of the argument `P`, `DGAUSN` (and `GAUSIN` on CDC and Cray computers) has an accuracy of approximately one significant digit less than the machine precision.

Error handling:

Error `G105.1`: `P` $\leq$ `0` or `P` $\geq$ `1`.
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. G.W. Hill and A.W. Davis, Algorithm 442, Normal Deviate, Collected Algorithms from CACM (1973)

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