Appendix 1: Significance Level of a Standard Normal Deviate

The significance level is based on a polynomial approximation.

Notation

The following notation is used in this appendix:

X	Value of the standard normal deviate
Q	One-sided significance level

Computation (Abramowitz and Stegun, 1965)

$$Q(X) = 0.5\left\{1 + Z\left(a_1 + Z\left(a_2 + Z\left(a_3 + Z\left(a_4 + Z\left(a_5 + Za_6\right)\right)\right)\right)\right)\right\}^{-16}$$

where

$$Z = \begin{cases} 0.7071067812|X| & \text{if } |X| \le 14.14 \\ 10 & \text{otherwise} \end{cases}$$

$a_1 = 0.070523078\ldots$ $a_4 = 0.0001520143$

$a_2 = 0.0422820123$ $a_5 = 0.0002765672$

$a_3 = 0.0092705272$ $a_6 = 0.0000430638$

References

Ling, R. E. 1978. A study of the accuracy of some approximations for *t*, χ^2 and *F* tail probabilities. *Journal of the American Statistical Association*, 73: 274–283.