Error Function

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In mathematics, the error function (also called the Gauss error function) is a special function (non-elementary) of sigmoid shape that occurs in probability, statistics, and partial differential equations describing diffusion. It is defined as:

$$\begin{aligned}\operatorname{erf}(x) &= \frac{1}{2\pi}\int_{-x}^{x} e^{-t^2}\,\mathrm{d}t \\ &= \frac{2}{\sqrt{\pi}}\int_{0}^{x} e^{-t^2}\,\mathrm{d}t\ .\end{aligned}$$

In statistics, for nonnegative values of x, the error function has the following interpretation: for a random variable X that is normally distributed with mean 0 and variance $1/2$, $\operatorname{erf}(x)$ describes the probability of X falling in the range $[x, x]$. [1]

A plot of the error function is shown in fig. 1.

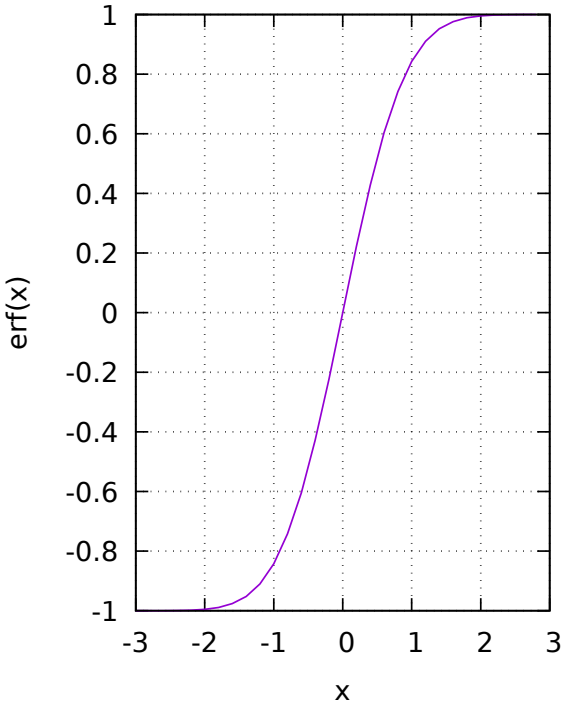

Figure 1: The error function.

References

[1] Wikipedia, the free encyclopedia, `https://en.wikipedia.org/wiki/Error_function`