Error function

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:

$$\operatorname{erf}(x) = \frac{1}{\sqrt{\pi}} \int_{-x}^{x} e^{-t^2}\, dt = \frac{2}{\sqrt{\pi}} \int_{0}^{x} e^{-t^2}\, dt. \tag{1}$$

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

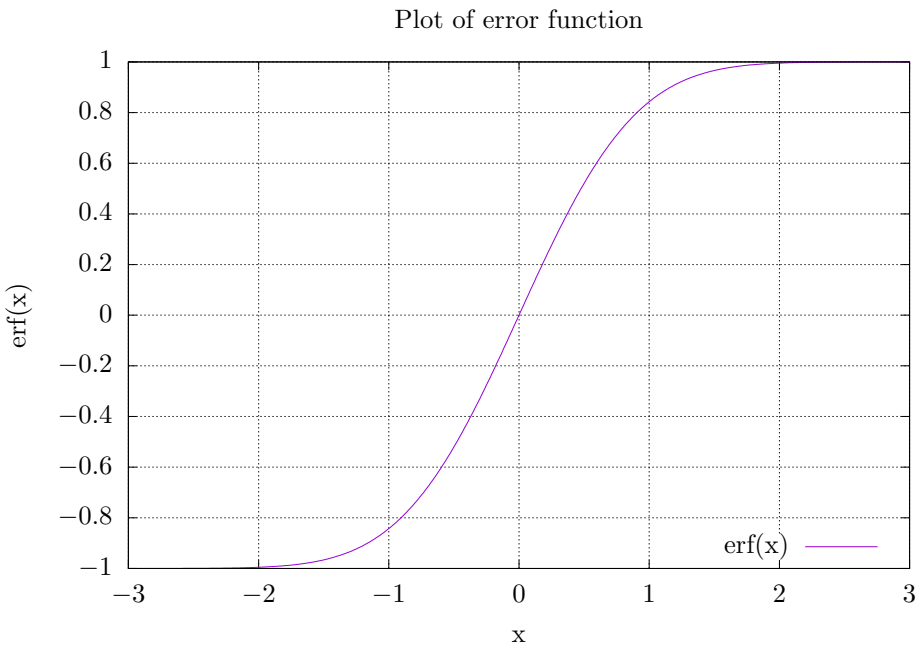

Figure 1: Plot of the error function