An example of using LaTeX and Gnuplot: the exponential function

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The exponential function can be defined as the solution to the differential equaion,

$$y'(x) = y(x) \, , \tag{1}$$

with the boundary condition

$$y(0) = 1 \, . \tag{2}$$

The argument can be reduced to $x \in [0, 1]$ using identities,

$$\exp(x) = \exp\left(\frac{x}{2}\right) \exp\left(\frac{x}{2}\right) \, , \tag{3}$$

$$\exp(-x) = \frac{1}{\exp(x)} \, . \tag{4}$$

Once the argument is reduced, the differential equation (1) can be integrated numerically with sufficient accuracy.

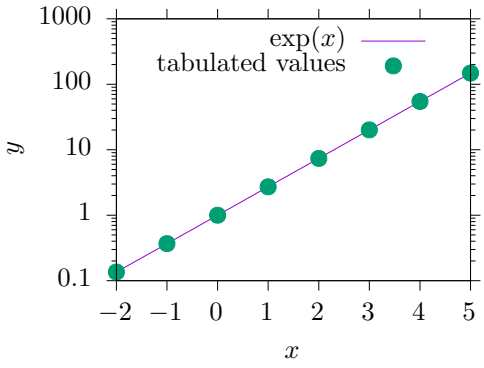

Figure 1: Illustration of the exponential function.