The Normal Distribution

A variable which is *normally distributed* has probability density function

\[
p(x) = \frac{1}{\sigma \sqrt{2\pi}} \exp\left(-\frac{(x - \mu)^2}{2\sigma^2}\right), \tag{1}
\]

where \(\mu\) is the mean and \(\sigma\) is the standard deviation. A graph with time-varying \(\sigma\) is shown below. Note that as time evolves, the peak of probability around \(x = 0\) spreads out and decreases.

Graph of (1) for \(\mu = 0, \sigma = 0.1, 0.5, 1\) (in increasing order of thickness).