



MITx CSE.0002x

Introduction to Computational Science and Engineering

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15.2.9 Normal distribution

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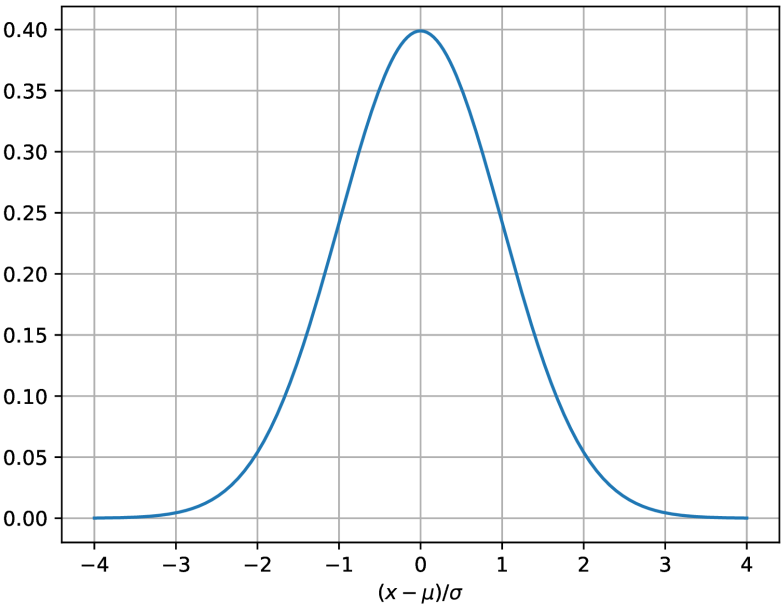
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Perhaps the most famous distribution is the normal distribution, also known as the Gaussian distribution. The PDF of the normal distribution is shown in Figure 15.6 and is commonly referred to as $\mathcal{N}(\mu, \sigma^2)$ given by,

$$\mathcal{N} = \frac{1}{\sigma\sqrt{2\pi}}\exp\left[-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right]$$

(15.12)



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Figure 15.6: Normal distribution

Numpy can be used to generate random numbers with a normal distribution by calling the `normal` method in the Numpy default random number generator class:



```
import numpy as np

# xmu, xsigma must be defined!

rng = np.random.default_rng()
X = rng.normal(xmu, xsigma, shape)
```

where `shape` again is an integer or tuple giving the shape of the returned array of normal distributed numbers.

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