Distributions

December 20, 2016

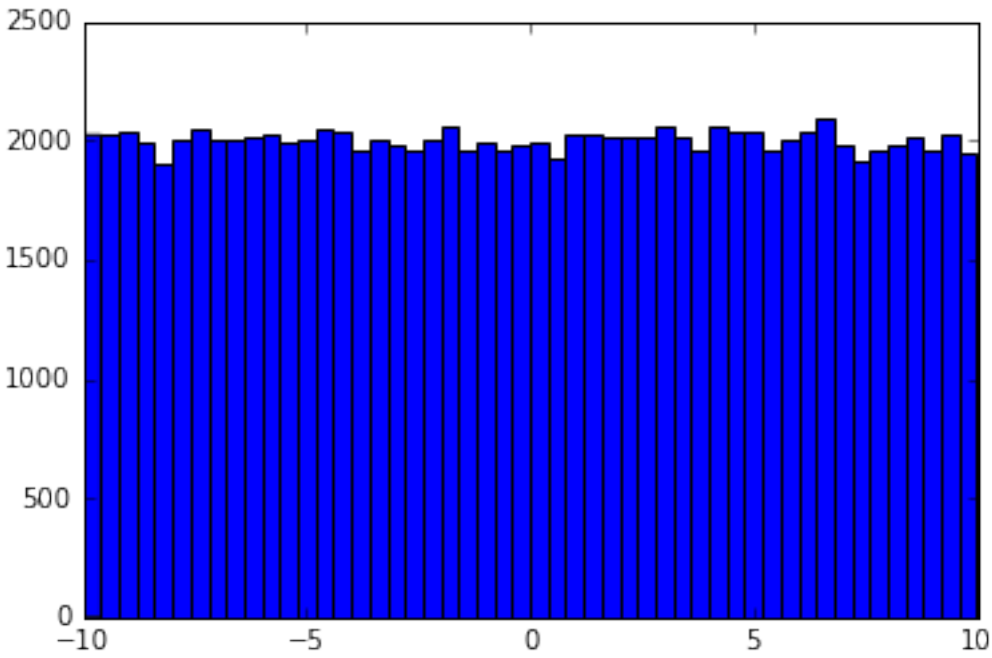
1 Examples of Data Distributions

1.1 Uniform Distribution

In [2]:
```
%matplotlib inline

import numpy as np
import matplotlib.pyplot as plt

values = np.random.uniform(-10.0, 10.0, 100000)
plt.hist(values, 50)
plt.show()
```



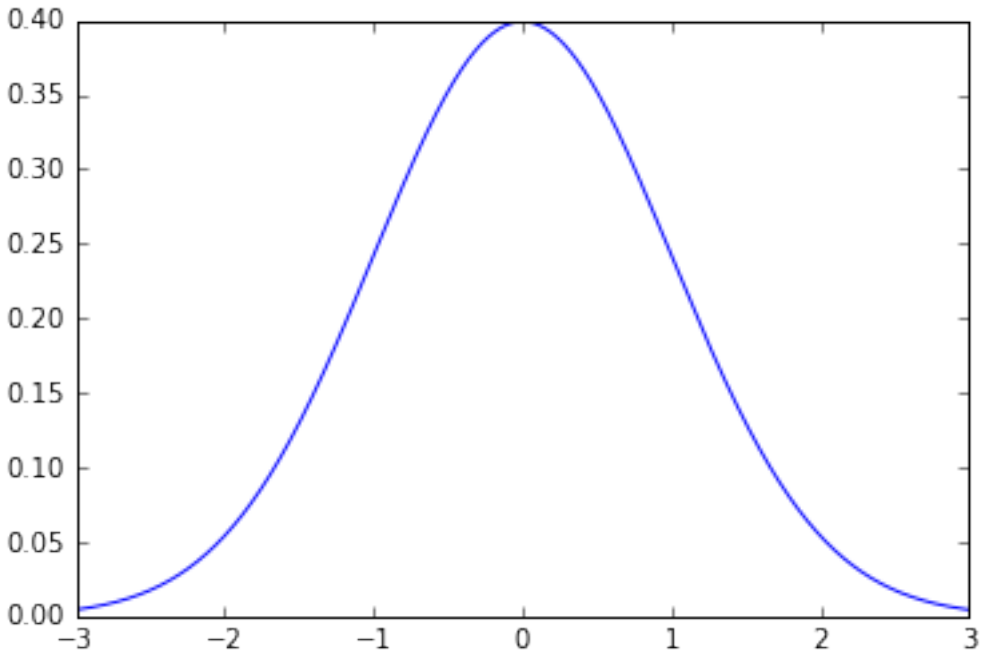
1.2 Normal / Gaussian

Visualize the probability density function:

```
In [3]: from scipy.stats import norm
        import matplotlib.pyplot as plt

        x = np.arange(-3, 3, 0.001)
        plt.plot(x, norm.pdf(x))
```

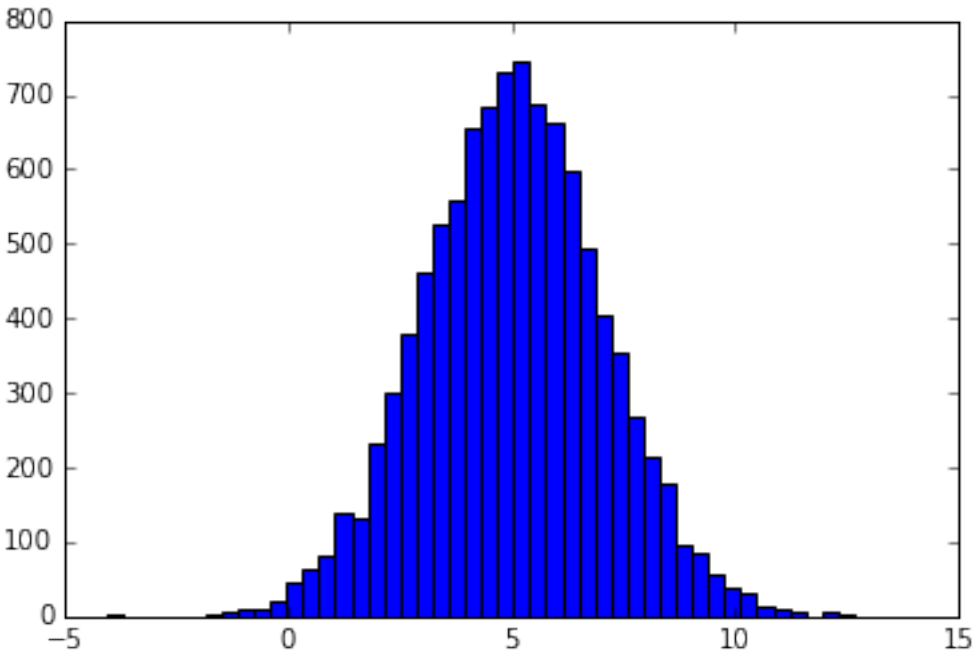
```
Out[3]: [<matplotlib.lines.Line2D at 0xde514e0>]
```



Generate some random numbers with a normal distribution. "mu" is the desired mean, "sigma" is the standard deviation:

```
In [4]: import numpy as np
        import matplotlib.pyplot as plt

        mu = 5.0
        sigma = 2.0
        values = np.random.normal(mu, sigma, 10000)
        plt.hist(values, 50)
        plt.show()
```

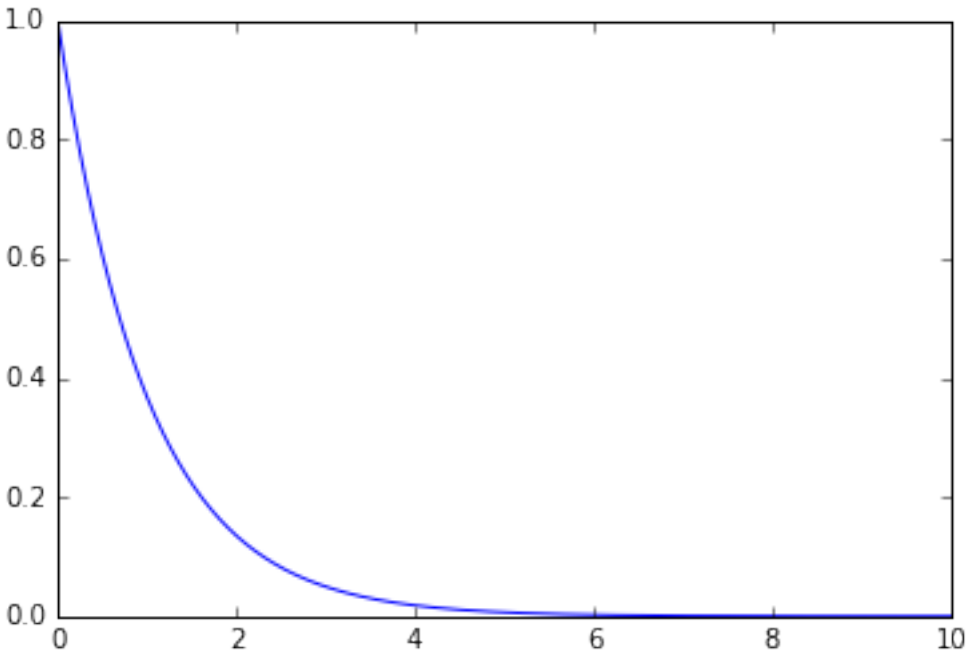


1.3 Exponential PDF / "Power Law"

```
In [5]: from scipy.stats import expon
        import matplotlib.pyplot as plt

        x = np.arange(0, 10, 0.001)
        plt.plot(x, expon.pdf(x))
```

```
Out[5]: [<matplotlib.lines.Line2D at 0xe3304e0>]
```

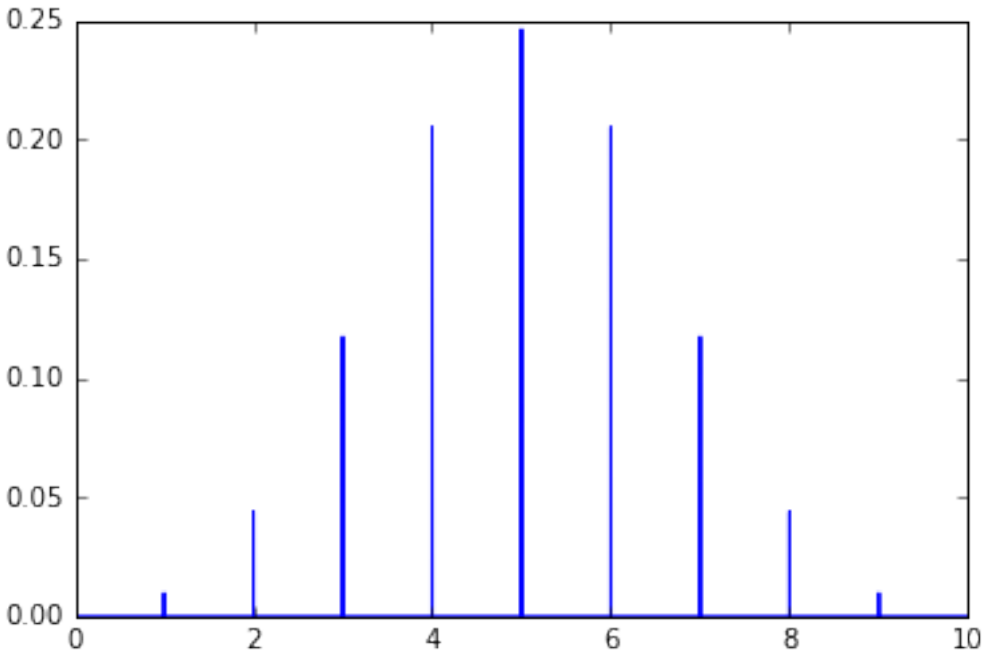


1.4 Binomial Probability Mass Function

```
In [6]: from scipy.stats import binom
        import matplotlib.pyplot as plt

        n, p = 10, 0.5
        x = np.arange(0, 10, 0.001)
        plt.plot(x, binom.pmf(x, n, p))
```

```
Out[6]: [<matplotlib.lines.Line2D at 0xe57ea20>]
```



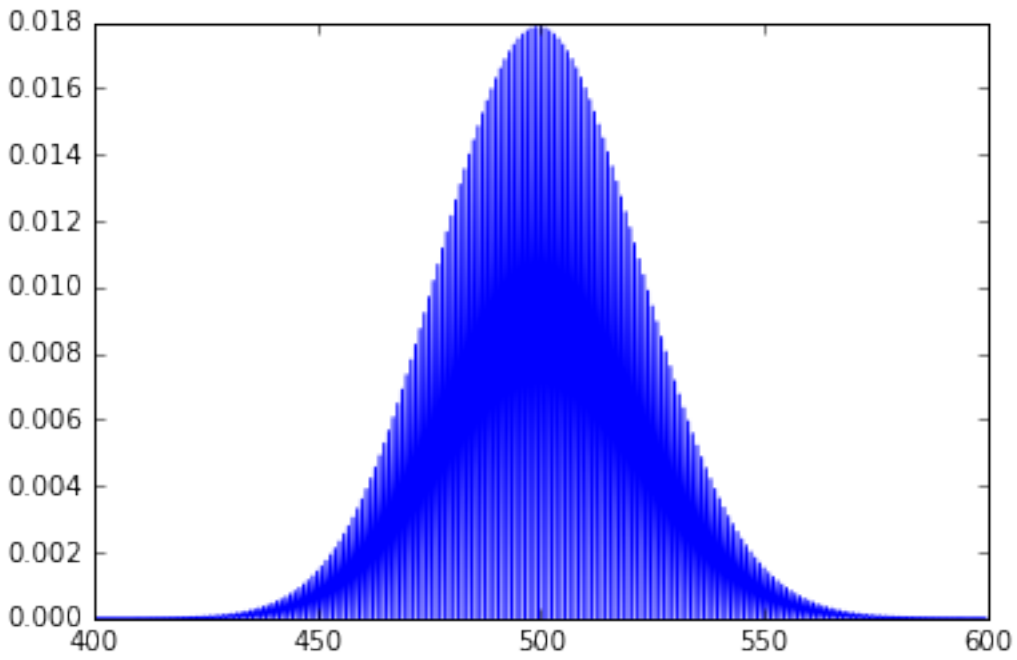
1.5 Poisson Probability Mass Function

Example: My website gets on average 500 visits per day. What's the odds of getting 550?

```
In [7]: from scipy.stats import poisson
        import matplotlib.pyplot as plt

        mu = 500
        x = np.arange(400, 600, 0.5)
        plt.plot(x, poisson.pmf(x, mu))
```

```
Out[7]: [<matplotlib.lines.Line2D at 0xe742e48>]
```



1.6 Pop Quiz!

What's the equivalent of a probability distribution function when using discrete instead of continuous data?

In [ ]: