

How to plot a normal distribution in Python?

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To plot a normal distribution in Python, first import the necessary libraries such as NumPy and Matplotlib. Then, create a sample dataset using the `numpy.random.normal` function. Next, use the `matplotlib.pyplot.hist` function to plot a histogram of the dataset. Adjust the parameters of the histogram, such as the number of bins and range, to fit the desired shape of the distribution. Finally, use the `matplotlib.pyplot.plot` function to overlay a line representing the normal distribution curve on top of the histogram. This will result in a visual representation of the normal distribution in Python.

Plot a Normal Distribution in Python (With Examples)

To plot a in Python, you can use the following syntax:

#x-axis ranges from -3 and 3 with .001 steps

`x = np.arange(-3, 3, 0.001)`

#plot normal distribution with mean 0 and standard deviation 1

`plt.plot(x, norm.pdf(x, 0, 1))`

The `x` array defines the range for the x-axis and the `plt.plot()` produces the curve for the normal distribution with the specified mean and standard deviation.

The following examples show how to use these functions in practice.

Example 1: Plot a Single Normal Distribution

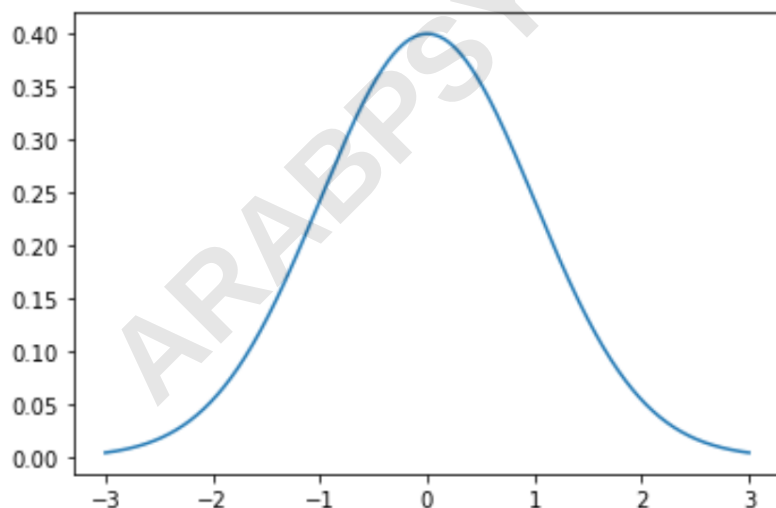
The following code shows how to plot a single normal

distribution curve with a mean of 0 and a standard deviation of 1:

```
import numpy as np  
import matplotlib.pyplot as plt  
from scipy.stats import norm
```

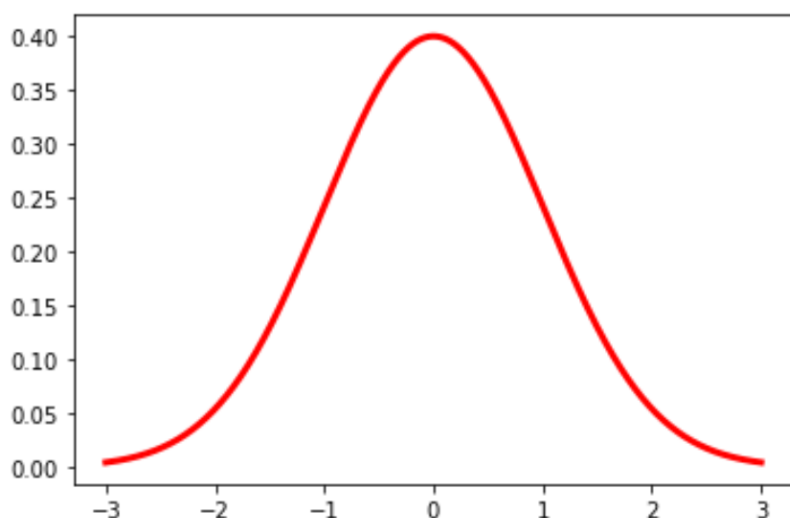
```
#x-axis ranges from -3 and 3 with .001 steps  
x = np.arange(-3, 3, 0.001)
```

```
#plot normal distribution with mean 0 and standard  
deviation 1  
plt.plot(x, norm.pdf(x, 0, 1))
```



You can also modify the color and the width of the line in the graph:

```
plt.plot(x, norm.pdf(x, 0, 1), color='red', linewidth=3)
```



Example 2: Plot Multiple Normal Distributions

The following code shows how to plot multiple normal distribution curves with different means and standard deviations:

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm
```

```
#x-axis ranges from -5 and 5 with .001 steps
```

```
x = np.arange(-5, 5, 0.001)
```

```
#define multiple normal distributions
```

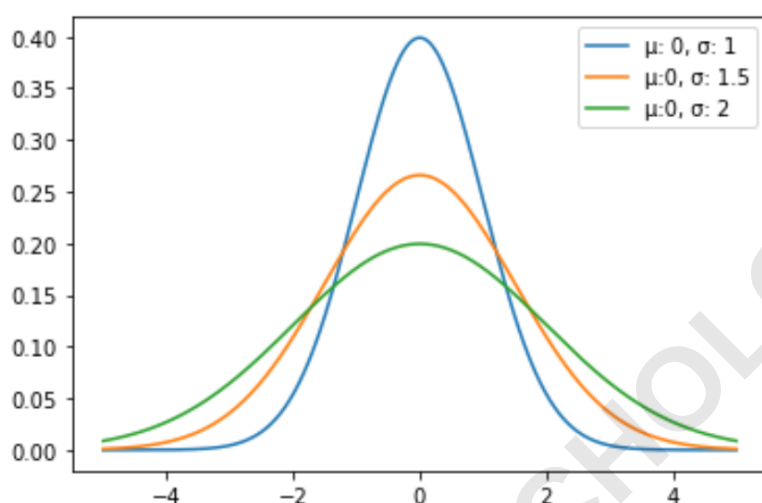
```
plt.plot(x, norm.pdf(x, 0, 1), label='μ: 0, σ: 1')
```

```
plt.plot(x, norm.pdf(x, 0, 1.5), label='μ:0, σ: 1.5')
```

```
plt.plot(x, norm.pdf(x, 0, 2), label='μ:0, σ: 2')
```

```
#add legend to plot
```

```
plt.legend()
```



Feel free to modify the colors of the lines and add a title and axes labels to make the chart complete:

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

```
from scipy.stats import norm
```

```
#x-axis ranges from -5 and 5 with .001 steps
```

```
x = np.arange(-5, 5, 0.001)
```

#define multiple normal distributions

```
plt.plot(x, norm.pdf(x, 0, 1), label='μ: 0, σ: 1',  
color='gold')
```

```
plt.plot(x, norm.pdf(x, 0, 1.5), label='μ:0, σ: 1.5',  
color='red')
```

```
plt.plot(x, norm.pdf(x, 0, 2), label='μ:0, σ: 2', color='pink')
```

#add legend to plot

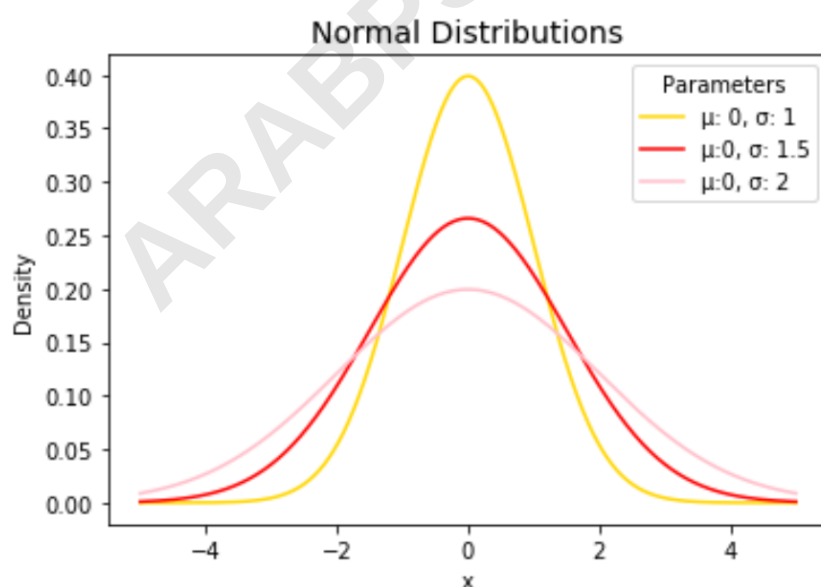
```
plt.legend(title='Parameters')
```

#add axes labels and a title

```
plt.ylabel('Density')
```

```
plt.xlabel('x')
```

```
plt.title('Normal Distributions', fontsize=14)
```



Refer to the for an in-depth explanation of the `plt.plot()` function.

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