NtBk_Project0

January 25, 2023

```python
[ ]: import pandas as pd
     import numpy as np
     import matplotlib.pyplot as plt
     import os
     os.getlogin()
     os.getcwd()
```
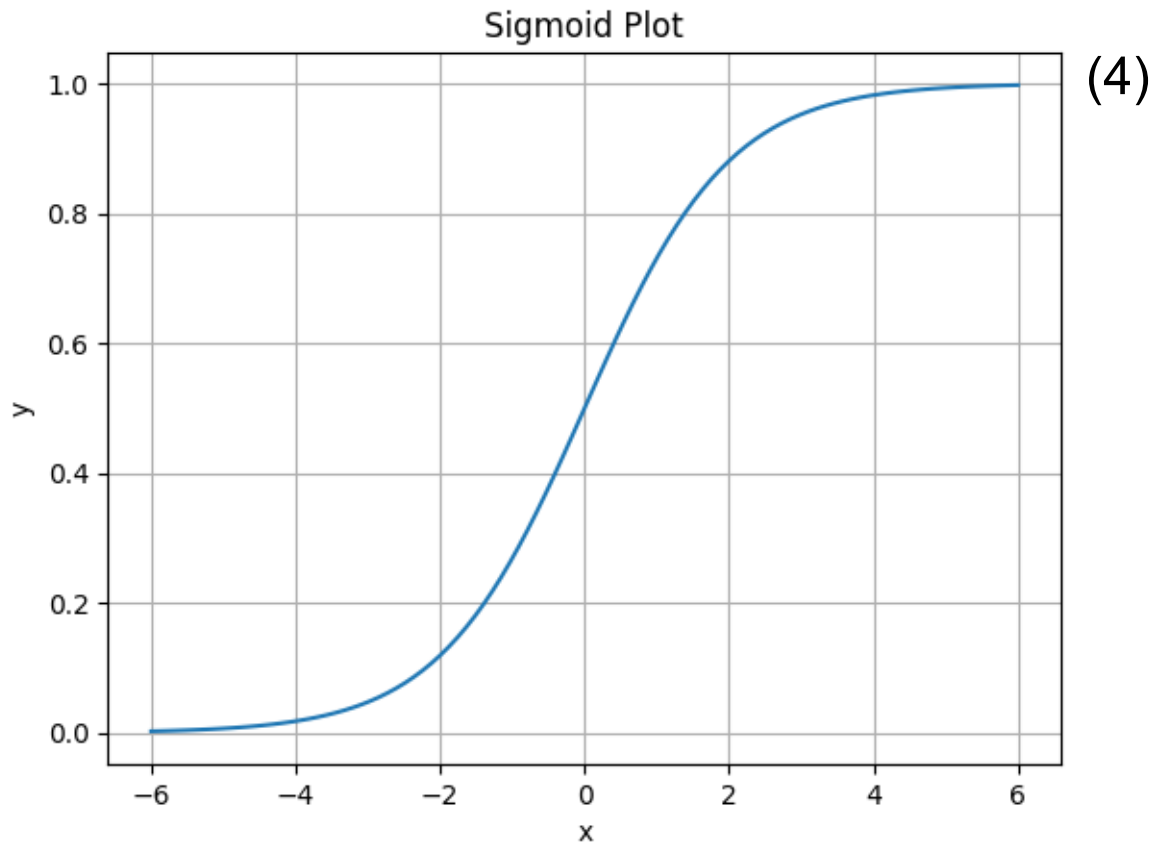
(2)

```python
[ ]: '/Users/arturogalofre/Desktop/IIT/2nd Term/ECE563_AISmartGrid/Code'
```

```python
[ ]: def sigmoid(x):
         return 1 / (1 + np.exp(-x))


     x = np.linspace(-6, 6, 100)
     y = sigmoid(x)

     plt.plot(x, y)
     plt.xlabel('x')
     plt.ylabel('y')
     plt.title('Sigmoid Plot')
     plt.grid()
     plt.show()
```

(3)

Sigmoid Plot

(4)

(5)

```python
# Define the Gaussian function

def gaussian(x, mu, sigma):
    return 1/(sigma * np.sqrt(2 * np.pi)) * np.exp(- (x - mu)**2 / (2 *
    ↪sigma**2))


# Generate x values
x = np.linspace(-10, 10, 100)

# Calculate y values for the two different standard deviation values
y1 = gaussian(x, 0, 1)
y2 = gaussian(x, 0, 2)

# Plot the two curves
plt.plot(x, y1, marker='.', linestyle='-', label='Std. Dev = 1')
plt.plot(x, y2, marker='.', linestyle='-', label='Std. Dev = 2')

# Add grid, title and labels
plt.grid()
```
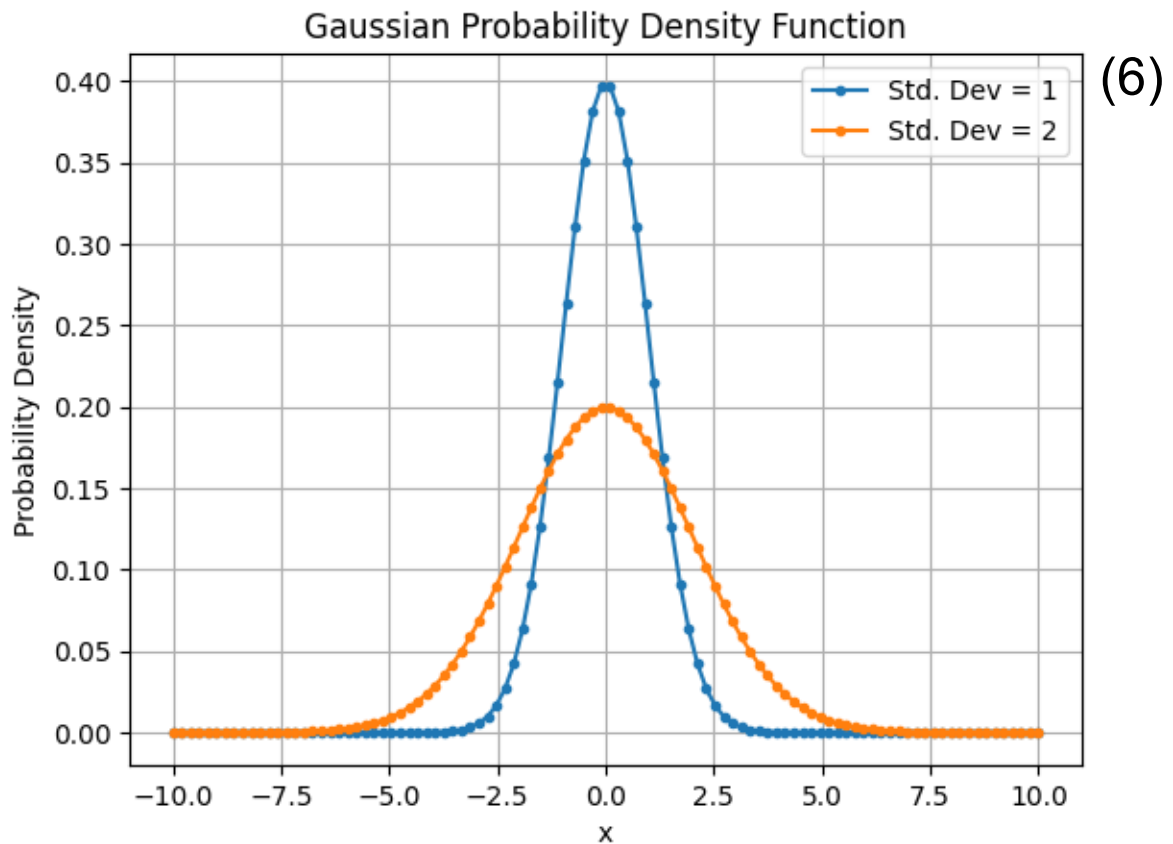
```
plt.title('Gaussian Probability Density Function')
plt.xlabel('x')
plt.ylabel('Probability Density')
plt.legend()

# Show the plot
plt.show()
```


(6)

```
[ ]: # Load the data from csv
     df = pd.read_csv("PMU01_140701.csv")

     # Select the rows where 'VCLPM:Magnitude' is less than 199000
     df_filtered = df[df['VCLPM:Magnitude'] < 199000]

     # Select the columns 'Timestamp', 'VALPM:Magnitude', 'VBLPM:Magnitude', 'VCLPM:
      ↪Magnitude'
     df_selected = df_filtered[[
         'Timestamp', 'VALPM:Magnitude', 'VBLPM:Magnitude', 'VCLPM:Magnitude']]

     # Print the data
```

```
print(df_selected)
```

$$
\begin{array}{lllll}
 & \text{Timestamp} & \text{VALPM:Magnitude} & \text{VBLPM:Magnitude} & \backslash \\
11315 & 2014/07/01\ 02:42:08.966 & 206117.2188 & 197712.6875 & \\
11476 & 2014/07/01\ 02:42:14.333 & 205979.9063 & 197424.2969 & \\
11477 & 2014/07/01\ 02:42:14.366 & 206323.2344 & 199758.8906 & \\
48926 & 2014/07/01\ 03:03:05.133 & 205595.3906 & 206446.8281 & \\
48927 & 2014/07/01\ 03:03:05.166 & 204551.6875 & 206062.2969 & \\
56064 & 2014/07/01\ 03:07:03.600 & 190640.2500 & 204277.0313 & \\
56065 & 2014/07/01\ 03:07:03.633 & 168283.0625 & 199415.5781 & \\
56066 & 2014/07/01\ 03:07:03.666 & 185916.1250 & 199470.5000 & \\
\end{array}
\tag{8}
$$

```
       VCLPM:Magnitude
11315      198948.6563
11476      198701.4688
11477      198509.2031
48926      198797.5938
48927      198179.6094
56064      198440.5313
56065      195103.4375
56066      196888.7188
```