

Data Visualization Assignment Using Matplotlib

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September 15, 2024

Task 1: Basic Line Plot

Objective: Understand how to create a basic line plot using `Matplotlib`.

Task Description

In this task, you will plot two trigonometric functions, sine and cosine, on the same plot. You will learn how to create a line plot and understand how data is represented in the plot.

Task

- Import the required libraries.
- Create a NumPy array of 100 values for x using `np.linspace(0, 10, 100)`.
- Plot $y = \sin(x)$ and $y = \cos(x)$ on the same plot.

Example Output

A plot showing $y = \sin(x)$ and $y = \cos(x)$ on the same graph.

Task 2: Customizing Line Styles and Colors

Objective: Learn how to customize line colors and styles in plots.

Task Description

In this task, you will customize the appearance of lines by changing their styles and colors.

Task

- Plot the following functions with different line styles and colors:
 - $y_1 = \sin(x)$ (solid blue line)
 - $y_2 = \sin(x - 1)$ (dashed green line)
 - $y_3 = \sin(x - 2)$ (dashdot black line)
 - $y_4 = \sin(x - 3)$ (dotted red line)

Example Output

A plot with four lines: each having different styles and colors.

Task 3: Subplots

Objective: Create multiple subplots in a single figure.

Task Description

In this task, you will create two subplots, one showing the sine function and the other showing the cosine function.

Task

- Create a 2x1 grid of subplots.
- In the first subplot, plot $y = \sin(x)$.
- In the second subplot, plot $y = \cos(x)$.

Example Output

Two subplots: one for $y = \sin(x)$ and the other for $y = \cos(x)$.