

Introduction to Matplotlib

Matplotlib is a powerful plotting library in Python used for creating static, animated, and interactive visualizations. Matplotlib's primary purpose is to provide users with the tools and functionality to represent data graphically, making it easier to analyze and understand

Core Features:

1)Wide Range of Plot Types: Matplotlib supports various types of plots, including line plots, scatter plots, bar plots, histograms, pie charts, contour plots, surface plots, and more.

2)Customization: It provides extensive options for customising plot elements such as colours, line styles, markers, labels, annotations, and axis properties.

3)Publication-Quality Output: Matplotlib is designed to produce high-quality plots suitable for publication in scientific papers, presentations, and reports.

4)Support for Multiple Backends: It offers different rendering backends, allowing plots to be displayed in different environments, including interactive environments like Jupyter notebooks, and saved in various file formats such as PNG, PDF, SVG, and more.

5)Integration with NumPy: Matplotlib seamlessly integrates with NumPy, making it easy to visualise data stored in NumPy arrays.

6)Compatible with Python GUI Toolkits: Matplotlib can be integrated with various Python GUI toolkits such as Tkinter, PyQt, and wxPython, enabling the creation of interactive graphical applications.

7)Extensive Documentation: It provides comprehensive documentation, tutorials, and examples to help users get started with plotting and customization

Components:

Matplotlib.pyplot: This submodule provides a MATLAB-like interface for creating and customising plots quickly. It's commonly imported as plt in Python scripts and interactive sessions.

Figure and Axes: A Matplotlib figure represents the entire figure or window, while axes are the individual plotting areas within the figure where data is visualised.

Artists: Matplotlib uses a hierarchical structure of artists to represent plot elements such as lines, markers, text, and patches.

Styles and Colormaps: Matplotlib includes predefined styles and colormaps to control the appearance of plots, and users can also create custom styles and colormaps.

Usage:

Matplotlib is widely used for **data visualisation** tasks in various fields such as scientific computing, data analysis, machine learning, finance, and more.

It's used in research, education, and industry for visualising data, exploring trends, identifying patterns, and communicating insights.

In summary, Matplotlib is a powerful and versatile plotting library for Python, offering a wide range of plot types, customization options, and compatibility with other libraries and tools. Its ease of use and extensive capabilities make it a go-to choice for data visualisation tasks in Python.

Different Types of Plots in Matplotlib

Matplotlib offers a wide range of plot types to suit various data visualisation needs.

Here are some of the most commonly used types of plots in Matplotlib:

- 1)Line Graph
- 2)Stem Plot
- 3)Bar chart
- 4)Histograms
- 5)Scatter Plot
- 6)Stack Plot
- 7)Box Plot
- 8)Pie Chart
- 9>Error Plot
- 10)Violin Plot
- 11)3D Plots

For creating line graph(python code)

```
import matplotlib.pyplot as plt

# Sample data
x = [1, 2, 3, 4, 5]
y = [2, 3, 5, 7, 11]

# Create a new figure
plt.figure()

# Plot the data
plt.plot(x, y, marker='o', linestyle='-')

# Add labels and title
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Simple Line Plot')

# Add grid
plt.grid(True)

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

output->

