

Cheatsheet 05: NumPy and Matplotlib

NumPy

Installation

pip

```
pip install numpy
```

conda

```
conda install numpy
```

Importing NumPy

```
import numpy as np
```

Creating arrays

```
a = np.array([1, 2, 3])
b = np.zeros((3, 3))
c = np.ones((3, 3))
d = np.eye(3)
e = np.arange(0, 10, 2)
f = np.linspace(0, 1, 5)
```

Array operations

```
sum = a + b
difference = a - b
product = a * b
division = a / b
dot_product = np.dot(a, b)
```

Array manipulation

```
reshape = a.reshape((3, 1))  
transpose = a.T  
concatenate = np.concatenate((a, b), axis=0)
```

Array indexing and slicing

```
element = a[0]  
slice = a[1:3]
```

Basic statistics

```
mean = np.mean(a)  
median = np.median(a)  
std_dev = np.std(a)
```

Linear algebra:python

```
determinant = np.linalg.det(a)  
inverse = np.linalg.inv(a)  
eigenvalues, eigenvectors = np.linalg.eig(a)
```

Matplotlib

Installation

pip

```
pip install matplotlib
```

conda

```
conda install matplotlib
```

Importing Matplotlib

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

Basic plotting

```
plt.plot(x, y)  
plt.show()
```

Scatter plot

```
plt.scatter(x, y)  
plt.show()
```

Histogram

```
plt.hist(data, bins=10)  
plt.show()
```

Bar chart

```
plt.bar(x, height)  
plt.show()
```

Customizing plots

```
plt.title("Plot Title")  
plt.xlabel("x-axis Label")  
plt.ylabel("y-axis Label")  
plt.xlim(min_x, max_x)  
plt.ylim(min_y, max_y)  
plt.xticks(np.arange(min_x, max_x, step))  
plt.yticks(np.arange(min_y, max_y, step))
```

Legends and labels

```
plt.plot(x, y, label='Line Label')  
plt.legend()
```

Saving plots

```
plt.savefig('filename.png', dpi=300)
```

Remember to combine the appropriate customizations and plot types to create the desired visualization.