**Exp no: 2**

**Write a simple Python code to generate random values and then compute their sigmoid and tanh (hyperbolic tangent) values using NumPy. Plot the values.**

**AIM:**

To compute their sigmoid and tanh (hyperbolic tangent) values using NumPy and plot the

values

**INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) REQUIRED:**

JUPYTER NOTEBOOK

**REQUIRED LIBRARIES FOR PYTHON:**

∙ Numpy

∙ MatplotLib

**PROCEDURE:**

Step 1: Import required libraries

Step 2: Write code to define the sigmoid function Define the tanh function

Step 3: Write code to define the tanh function

Step 4: Generate a random array of values using numpy

Step 5: Calculate the sigmoid and tanh (hyperbolic tangent) of these random values

Step 5:Plot the values

**PROGRAM:**

import numpy as np

import matplotlib.pyplot as plt

# Define the sigmoid function

def sigmoid(x):

return 1 / (1 + np.exp(-x))

# Define the tanh function

def tanh(x):

return np.tanh(x)

# Generate a random array of values using numpy

random\_values = np.random.randn(10) # Generate 10 random values from a standard normal distribution

# Calculate the sigmoid and tanh (hyperbolic tangent) of these random values

sigmoid\_values = sigmoid(random\_values)

tanh\_values = tanh(random\_values)

# Generate indices for x-axis

indices = np.arange(len(random\_values))

# Plotting

plt.figure(figsize=(14,6))

# Plot for sigmoid values

plt.subplot(1, 2, 1)

plt.scatter(indices, sigmoid\_values, color='blue', label='Sigmoid Values')

plt.plot(indices, sigmoid\_values, color='lightblue', linestyle='--')

plt.title('Sigmoid Function')

plt.xlabel('Index')

plt.ylabel('Sigmoid Value')

plt.grid(True)

plt.legend()

# Plot for Tanh Values

plt.subplot(1, 2, 2)

plt.scatter(indices, tanh\_values, color='red', label='Tanh Values')

plt.plot(indices, tanh\_values, color='pink', linestyle='--')

plt.title('Tanh Function')

plt.xlabel('Index')

plt.ylabel('Tanh Value')

plt.grid(True)

plt.legend()

plt.tight\_layout()

plt.show()

