Aishwarye Omer

EE 456 **Homework - 08** October 3, 2020

Question: Give a graph of Y as time varies from -1 to 1 for the network given

Solution: The source code followed by the graph:

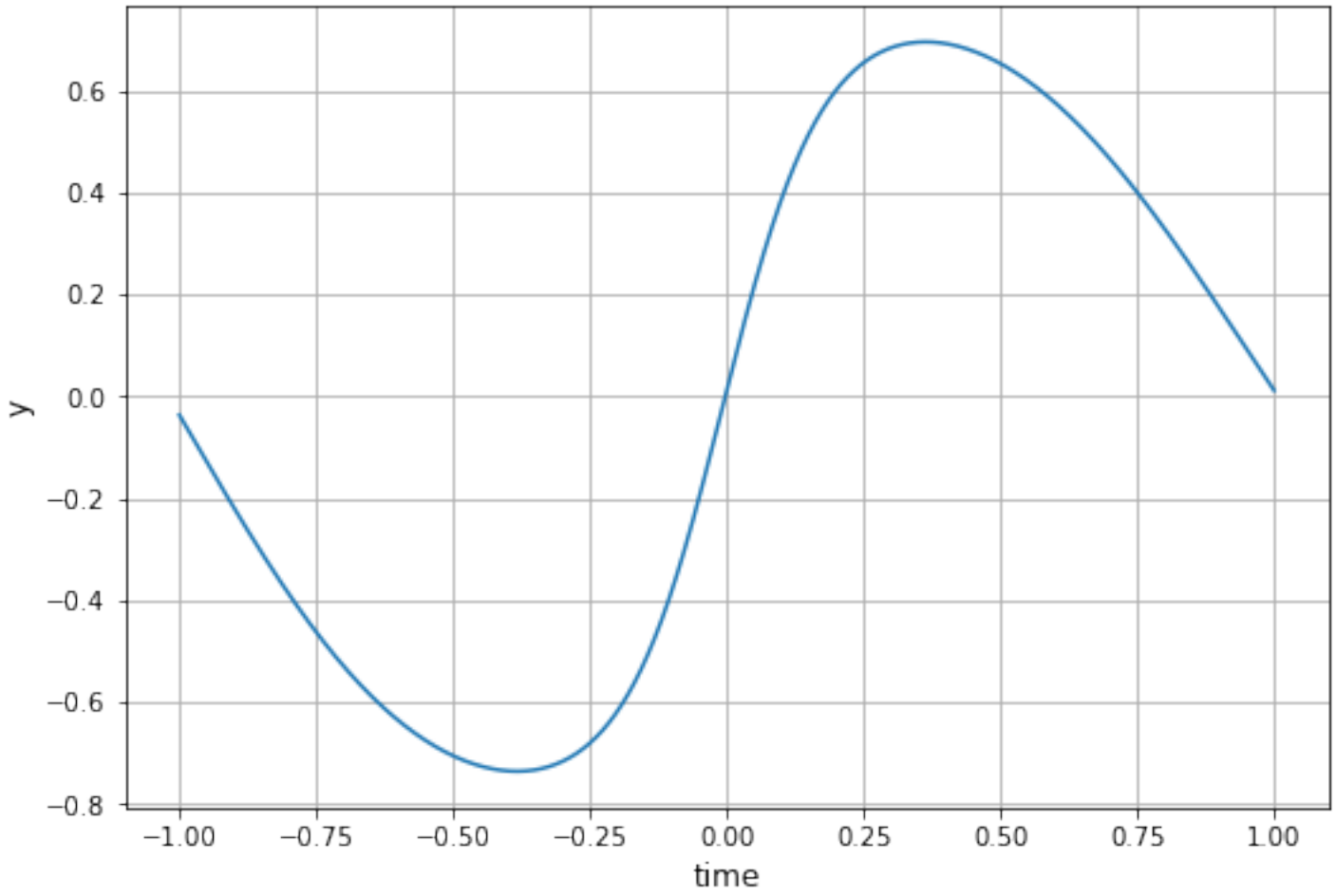
```
import numpy as np
import math
from matplotlib import pyplot as plt

v = np.asmatrix([[1.12, 0.36],[2.46, 0.27],[6.11, 0.09],[-1.08, 0.28],[0.96,
   0.24],[-1.03, -0.29],[-0.58, 0.12],[-1.11, -0.34],[1.13,0.05],[1.05,0.06]])
w = np.asmatrix
   ([[-1.35],[0.14],[4.26],[1.18],[-1.02],[1.20],[0.55],[1.37],[-1.27],[-1.20],[0.45]])
output = []
input = np.linspace(-1,1,10000)

for i in input:
  #calulating hidden output
  y=0
  hidden_output = []
    for item in v:
      h = i * item[0, 0] + item[0, 1]
      h = 2/(1+np.exp(-h))-1
      hidden_output.append(h)
    #calculating final output

    for j in range(0,10):
      y = y + hidden_output[j] * w.item(j)
      final_output = y + w.item(w.size-1)
      final_output = 2/(1+np.exp(-final_output))-1
  output.append(final_output)
```

```
fig = plt.figure()
axes = fig.add_axes([0.1,0.1,1.1,1.1])
plt.plot(input, output)
plt.grid()
plt.xlabel('time', fontsize=12)
plt.ylabel('y', fontsize=12)
plt.savefig('foo.png', bbox_inches='tight')
plt.show()
```


0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
y
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00
time