Code (also answers question 3)

#######################

#Willard Wider

#7/19/18

#ELEC4400

#HW4

#######################

import matplotlib.pyplot as plt

import numpy as np

#specify the stype of the plot to use

plt.style.use('ggplot')

#problem 1

x\_index = np.linspace(-10,10,500)

HW\_1\_sine\_part = np.sin(x\_index\*5)\*(25\*(x\_index\*x\_index)-2)

HW\_1\_cos\_part = np.cos(x\_index\*5)\*(10\*x\_index)

HW\_1\_combo = HW\_1\_cos\_part+HW\_1\_sine\_part

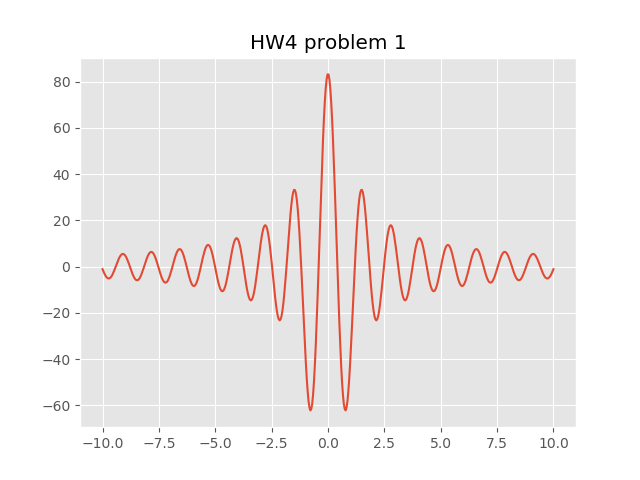
HW\_1\_coef = 2/(np.power(x\_index,3))

HW\_1 = HW\_1\_coef\*HW\_1\_combo

plt.plot(x\_index,HW\_1)

plt.title('HW4 problem 1')

plt.show()



plt.close()

#problem 2

#uses same x index...

#used a=2

HW\_2\_P1\_1 = 1/(2-x\_index)

HW\_2\_P1\_2 = np.sin(8\*np.pi - 4\*x\_index\*np.pi)

HW\_2\_P2\_1 = 1/(2+x\_index)

HW\_2\_P2\_2 = np.sin(8\*np.pi + x\_index\*4\*np.pi)

HW\_2 = (HW\_2\_P1\_1\*HW\_2\_P1\_2) + (HW\_2\_P2\_1\*HW\_2\_P2\_2)

plt.plot(x\_index,HW\_2)

plt.title('HW4 problem 2')

plt.show()



plt.close()

#3 - modify a

#let's try it...

HW\_2\_P1\_1 = 1/(6-x\_index)

HW\_2\_P1\_2 = np.sin(24\*np.pi - 4\*x\_index\*np.pi)

HW\_2\_P2\_1 = 1/(6+x\_index)

HW\_2\_P2\_2 = np.sin(24\*np.pi + x\_index\*4\*np.pi)

HW\_2 = (HW\_2\_P1\_1\*HW\_2\_P1\_2) + (HW\_2\_P2\_1\*HW\_2\_P2\_2)

plt.plot(x\_index,HW\_2)

plt.title('HW4 problem 2: new a = 6')

plt.show()



plt.close()

#modifying the a (frequency) paremeter changes where the frequency of the function is

#therefore, on a function on frequency to amplitude, changing the frequency changes where the amplitude is on the x axis

#the sampling time does matter, if you don't sample fast enough, you may loose the original function