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CN Lab 1: Modulation and Demodulation

Code:

import numpy as np import matplotlib.pyplot as plt

#Carrier wave c(t)=A\_c\*cos(2\*pi\*f\_c\*t)

#Modulating wave m(t)=A\_m\*cos(2\*pi\*f\_m\*t)

#Modulated wave s(t)=A\_c[1+mu\*cos(2\*pi\*f\_m\*t)]cos(2\*pi\*f\_c\*t)

A\_c = float(input('Enter carrier amplitude: ')) f\_c = float(input('Enter carrier frquency: ')) A\_m = float(input('Enter message amplitude: ')) f\_m = float(input('Enter message frquency: ')) modulation\_index = float(input('Enter modulation index: ')) t = np.linspace(0, 1, 1000)

carrier = A\_c\*np.cos(2\*np.pi\*f\_c\*t) modulator = A\_m\*np.cos(2\*np.pi\*f\_m\*t) product = A\_c\*(1+modulation\_index\*np.cos(2\*np.pi\*f\_m\*t))\*np.cos(2\*np.pi\*f\_c\*t)

plt.subplot(3,1,1) plt.title('Amplitude Modulation') plt.plot(modulator,'g') plt.ylabel('Amplitude') plt.xlabel('Message signal')

plt.subplot(3,1,2) plt.plot(carrier, 'r') plt.ylabel('Amplitude') plt.xlabel('Carrier signal')

plt.subplot(3,1,3) plt.plot(product, color="purple") plt.ylabel('Amplitude') plt.xlabel('AM signal')

plt.subplots\_adjust(hspace=1) plt.rc('font', size=15) fig = plt.gcf() fig.set\_size\_inches(16, 9) fig.savefig('Amplitude Modulation.png', dpi=100)

Output:



