Principles of communication systems

EET3202, CUNY City Tech, Fall 2023

Homework #04 (Due on Sep 28)

S. M. Farzaneh | Sep 22, 2023

Problem 1

Rewrite the following signals in the cosine form $A\cos(2\pi ft+\theta)$

Determine the amplitude, frequency, and phase

* Note: A should be positive.

a) $v(t) = 2$

b) $v(t) = -3$

c) $v(t) = \sin(2\pi t)$

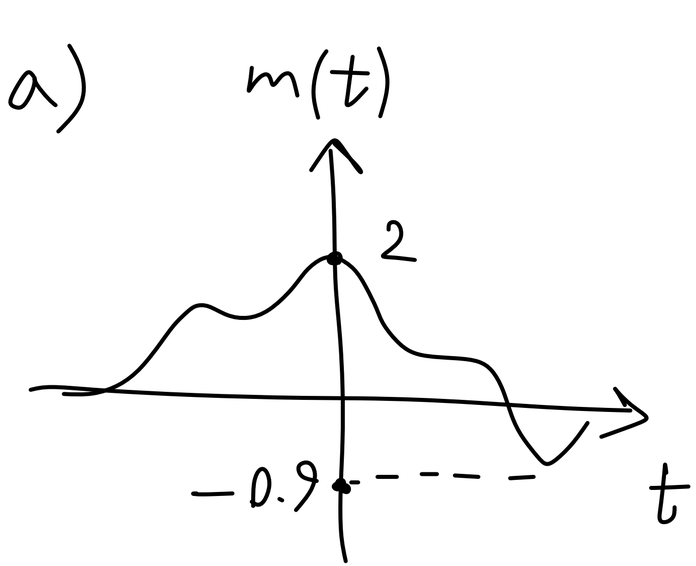
d) $v(t) = -\sin(2\pi t)$

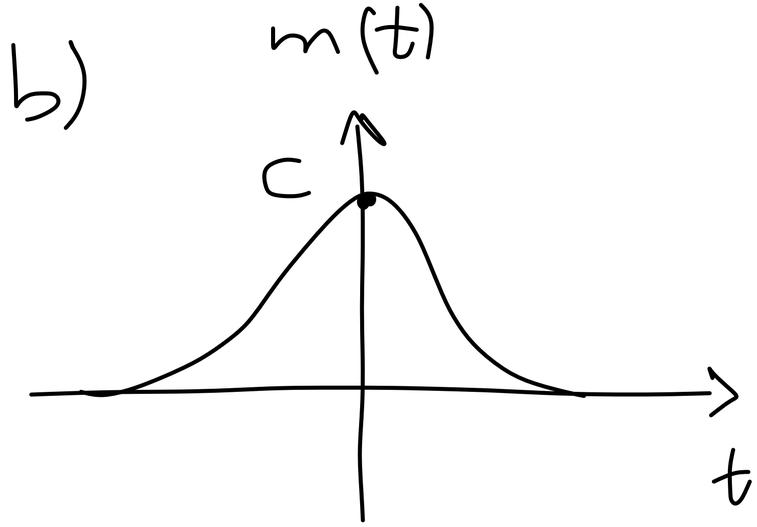
e) $v(t) = -0.5\cos(120\pi t + 45^\circ)$

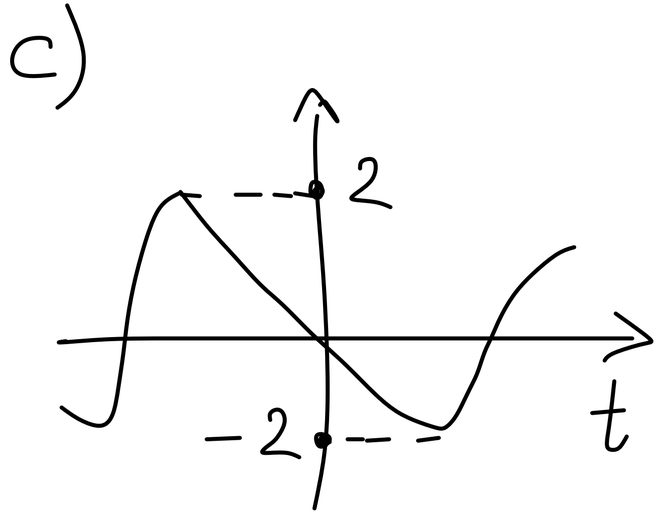
Problem 2

Amplitude modulation

For each of the following message signals calculate the modulation index if a DC signal of 1 volt is to be added to the message.



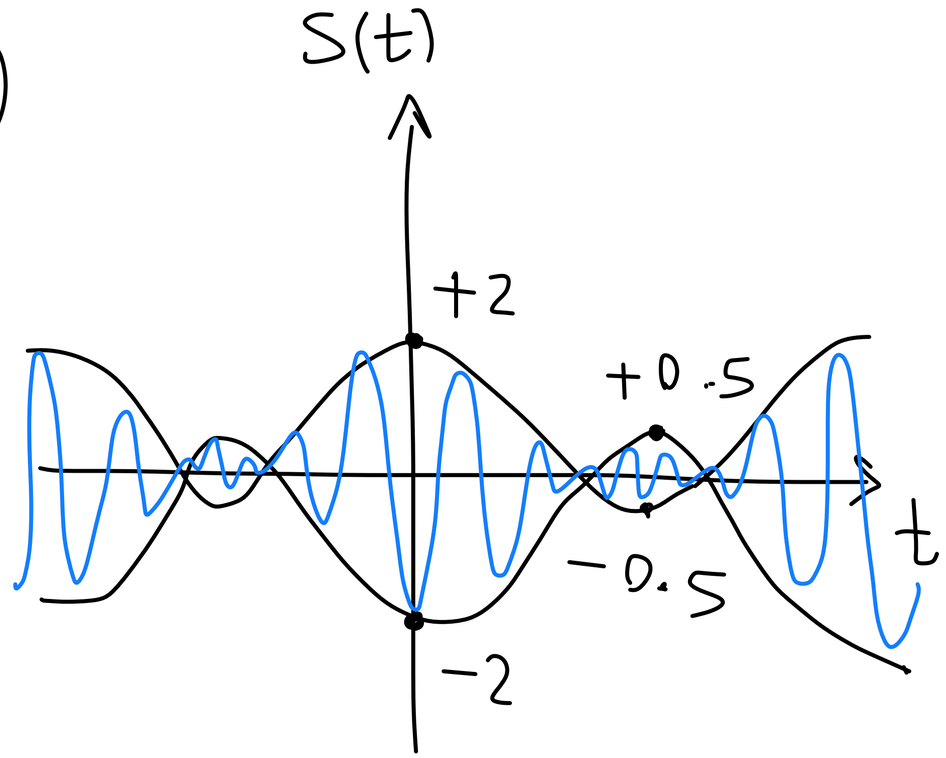


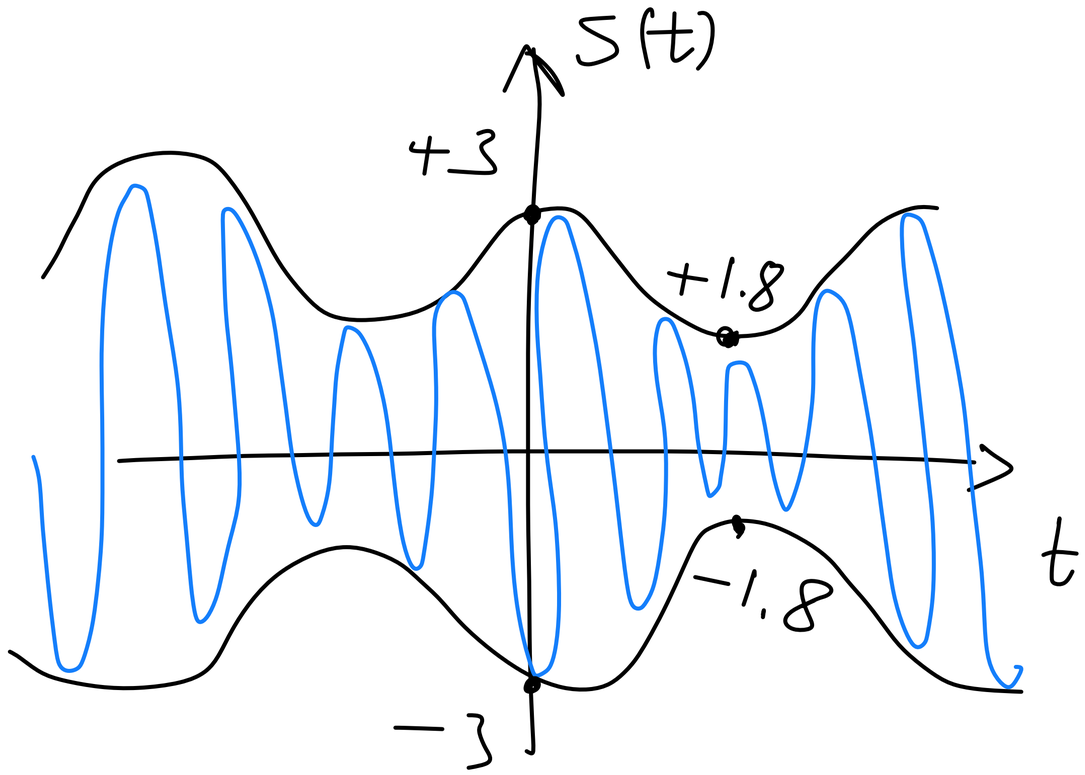


Problem 3

For each modulated signals below calculate the modulation index.

a)





Problem 4

Calculate the carrier power, the sideband power, and the power efficiency of the following AM signals.

a) $v(t) = 2\cos(\omega_c t) + 1.8\cos(\omega_m t)\cos(\omega_c t)$

b) $v(t) = (0.5 + 2\cos(\omega_m t))\cos(\omega_c t)$