

PROBLEM:

Consider the signal

$$x(t) = 20 \cos(\omega_1 t + \pi/3) + 10 \cos(\omega_2 t)$$

- (a) Sketch the (two-sided) spectrum of the signal for the case where $0 < \omega_1 < \omega_2$. Indicate the size of the complex phasors for each frequency.
- (b) How should ω_1 and ω_2 be chosen so that $x(t)$ can be expressed in the form

$$x(t) = A \cos(300\pi t + \phi)$$

(You only need to find ω_1 and ω_2 ; you do not have to find A and ϕ .)

- (c) If $0 < \omega_1 < \omega_2$, how should ω_1 and ω_2 be chosen so that $x(t)$ is periodic with period $T = .1$; i.e., so that $x(t + 0.1) = x(t)$ for all t ?