

PROBLEM:

Solve the following simultaneous equations via the complex amplitude (phasor) method. Are the answers for A_1 , A_2 , A_3 , ϕ_1 , ϕ_2 , ϕ_3 unique?

$$2 \cos(\omega_0 t + \pi/2) = A_1 \cos(\omega_0 t + \phi_1) + 2A_2 \cos(\omega_0 t + \phi_2 - \pi/2)$$

$$4 \cos(\omega_0 t + \pi/3) = 4A_2 \cos(\omega_0 t + \phi_2) + A_3 \cos(\omega_0 t + \phi_3 - \pi/2)$$

$$4 \cos(\omega_0 t + 7\pi/6) = 2A_1 \cos(\omega_0 t + \phi_1) - A_3 \cos(\omega_0 t + \phi_3)$$

Use MATLAB as much as possible to do the numerical calculations, but explain how to set up the problem using the complex amplitude (phasor) representation of sinusoids.