Sheet 2

Vibration Signals

1- Determine the difference between the two motions of a particle

$x_1 = 3.6 \cos \omega t$

$x_2 = 7.4 \cos(\omega t + \frac{\pi}{4})$

Find the resultant amplitude and the phase angle both graphically and analytically.

2- Add the harmonic motions angle both graphically and analytically:

$x_1 = 4 \cos(\omega t + 32)$

$x_2 = 6.5 \sin(\omega t + 40)$

3- Plot the resultant motion of

$x_1 = 2.5 \cos 10\pi t$

$x_2 = 2 \cos 8\pi t$ against t for 1 second

4- Find the velocity and acceleration of the two harmonic motions

$x_1 = 2.5 \cos 10\pi t$

$x_2 = 2 \cos 8\pi t$

5- Find the solution of the following equations of motion of mechanical systems:

$m \ddot{x} + kx = 0$

$m \ddot{x} + c\dot{x} + kx = 0$

$m \ddot{x} + kx = F_o \cos \omega t$

$m \ddot{x} + c\dot{x} + kx = F_o \cos \omega t$