

ADVANCED DYNAMICS — PHY 4936

Solution 28:

$$\ddot{x} + \omega_1 x = 0, \quad \ddot{y} + \omega_2 y = 0,$$

Solution with $x_0 = y_0 = 0$;

$$\begin{aligned} x(t) &= A_1 \sin(\omega_1 t) \\ y(t) &= A_2 \sin(\omega_2 t) \end{aligned}$$

Now, $x(t_1) = y(t_1) = 0$ for some future time $t_1 > 0$ implies

$$\omega_1 t_1 = n \pi, \quad \omega_2 t_1 = m \pi \tag{1}$$

with n, m integers ≥ 1 . With n and m being the smallest integers, so that (1) holds, the time becomes

$$t_1 = \frac{n \pi}{\omega_1} = \frac{m \pi}{\omega_2} .$$