No.

Date

初期条件より

$x_1(0) = \frac{A_1}{\sqrt{2}}\sin\phi_1 + \frac{A_2}{\sqrt{2}}\sin\phi_2 = 0$ …①

$x_2(0) = \frac{A_1}{\sqrt{2}}\sin\phi_1 - \frac{A_2}{\sqrt{2}}\sin\phi_2 = 0$ …②

$\dot{x}_1(0) = \frac{A_1\omega_1}{\sqrt{2}}\cos\phi_1 + \frac{A_2\omega_2}{\sqrt{2}}\cos\phi_2 + \frac{rP}{2}\left(\frac{1}{\omega_1^2-P^2} + \frac{1}{\omega_2^2-P^2}\right) = 0$ …③

$\dot{x}_2(0) = \frac{A_1\omega_1}{\sqrt{2}}\cos\phi_1 - \frac{A_2\omega_2}{\sqrt{2}}\cos\phi_2 + \frac{rP}{2}\left(\frac{1}{\omega_1^2-P^2} - \frac{1}{\omega_2^2-P^2}\right) = 0$ …④

①+②より $\frac{2}{\sqrt{2}}A_1\sin\phi_1 = 0$ $\phi_1 = 0$

①−②より $\frac{2}{\sqrt{2}}A_2\sin\phi_2 = 0$ $\phi_2 = 0$

③+④より $\frac{2}{\sqrt{2}}A_1\omega_1\cos\phi_1 + rP\left(\frac{1}{\omega_1^2-P^2}\right) = 0$

$\phi_1 = 0$より $\sqrt{2}A_1\omega_1 + rP\left(\frac{1}{\omega_1^2-P^2}\right) = 0$

$$A_1 = \frac{rP}{\sqrt{2}\omega_1(P^2-\omega_1^2)}$$

③−④より $\frac{2}{\sqrt{2}}A_2\omega_2\cos\phi_2 + rP\left(\frac{1}{\omega_2^2-P^2}\right) = 0$

$\phi_2 = 0$より $\sqrt{2}A_2\omega_2 + rP\left(\frac{1}{\omega_2^2-P^2}\right) = 0$

$$A_2 = \frac{rP}{\sqrt{2}\omega_2(P^2-\omega_2^2)}$$

$x_1(t)$, $x_2(t)$ に代入すると

角振は

$$\begin{cases} x_1(t) = \frac{rP}{2\omega_1(P^2-\omega_1^2)}\sin\omega_1 t + \frac{rP}{2\omega_2(P^2-\omega_2^2)}\sin\omega_2 t + \frac{r}{2}\left(\frac{1}{\omega_1^2-P^2} + \frac{1}{\omega_2^2-P^2}\right)\sin Pt \\ x_2(t) = \frac{rP}{2\omega_1(P^2-\omega_1^2)}\sin\omega_1 t - \frac{rP}{2\omega_2(P^2-\omega_2^2)}\sin\omega_2 t + \frac{r}{2}\left(\frac{1}{\omega_1^2-P^2} - \frac{1}{\omega_2^2-P^2}\right)\sin Pt \end{cases}$$

またここで、$m=5$, $k=10$, $f_0=5$, $P=1$より $\omega_1^2 = \frac{k}{m} = 2$, $\omega_2^2 = \frac{3k}{m} = 6$, $r = \frac{f_0}{m} = 1$

$$\begin{cases} x_1(t) = -\frac{\sqrt{2}}{4}\sin\sqrt{2}t - \frac{\sqrt{6}}{60}\sin\sqrt{6}t + \frac{3}{5}\sin t \\ x_2(t) = -\frac{\sqrt{2}}{4}\sin\sqrt{2}t + \frac{\sqrt{6}}{60}\sin\sqrt{6}t + \frac{2}{5}\sin t \end{cases}$$

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となる。