$$\ddot{x} + 2\mu\dot{x} + \omega_0^2 x = c^{\omega t}\mathfrak{c}$$

$$\ddot{z} + 2\mu\dot{z} + \omega_0^2 z = ce^{i\omega t}$$

$$\text{no damping } \mu = 0 \Longrightarrow P(\lambda) = \lambda^2 + \omega_0^2$$

$$\lambda \neq \omega_0 \Longrightarrow P(\omega i) = \omega_0^2 - \omega^2 \neq 0 \Longrightarrow {}^t\psi^0 = \frac{c}{P(\omega i)} e^{i\omega t}$$

$$\Re\, {}^t\psi^0 = \frac{c}{P(\omega i)}\, {}^{\omega t}\mathfrak{c} = \frac{c^{\omega t}\mathfrak{c}}{\omega_0^2 - \omega^2}$$

$$\omega = \omega_0 \Longrightarrow P(\omega i) = \omega_0^2 - \omega^2 = 0 \Longrightarrow {}^t\psi^0 = t\frac{c}{2i\omega_0} e^{\omega_0 t}$$

$$\Re\, {}^t\psi^0 = \frac{c}{2\omega_0} t \sin \omega_0 t \nearrow +\infty$$

$$\underline{\underline{y}} + 4\underline{y} + 3y = e^{-x} + x^2\text{:} \quad \psi = Ax\, e^{-x} + B\, x^2 + Cx + D\text{:} \quad A = \frac{1}{2}\text{:} \quad B = \frac{1}{3}\text{:} \quad C = -\frac{8}{9}\text{:} \quad D = \frac{26}{27}$$

$$\underline{y} + y = 8\cos 2x - 4\sin x \begin{cases} {}^{\pi/2}y = -1 \\ {}^{\pi/2}\underline{y} = 0 \end{cases} \qquad y = -\pi\cos x - \frac{11}{3}\sin x - \frac{8}{3}\cos 2x + 2x\cos x$$

$$\underline{\underline{y}} + 9y = x + \sin 3x\text{:} \quad \psi = c_1 \cos 3x + c_2 \sin 3x + \frac{x}{9} - \frac{x}{6}\cos 3x$$