Problem Solving Sessions notes

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Begin with

$$\ddot{x} + 2\beta\dot{x} + \omega_0^2 x = A\cos(\omega t)$$

For the case of $\beta = 0$, we have

$$\delta = 0$$

$$D = \frac{a}{|\omega_0^2 - \omega^2|}$$

$$r_{1,2} = -\beta \pm \sqrt{\beta^2 - \omega_0^2}$$

$$r_{1,2} = \pm i\omega_0$$

$$x(t) = D\cos\omega t + C_1 e^{i\omega_0 t} + C_2 e^{-i\omega_0 t}$$

$$D = \frac{A}{2\beta\omega} \quad \delta = \frac{\pi}{2}$$

$$x(t) = D\sin(\omega t) + C_1 e^{r_1 t} + C_2 e^{r_2 t}$$

$$v(t) = D\omega_0\cos(\omega t) + C_1 r_1 e^{r_1 t} + C_2 r_2 e^{r_2 t}$$