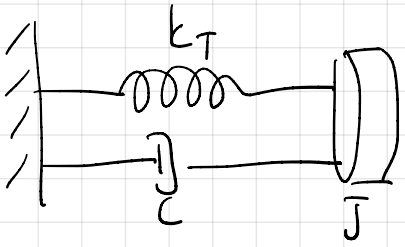
Damping Constant Calculation of SDOF Torsional System



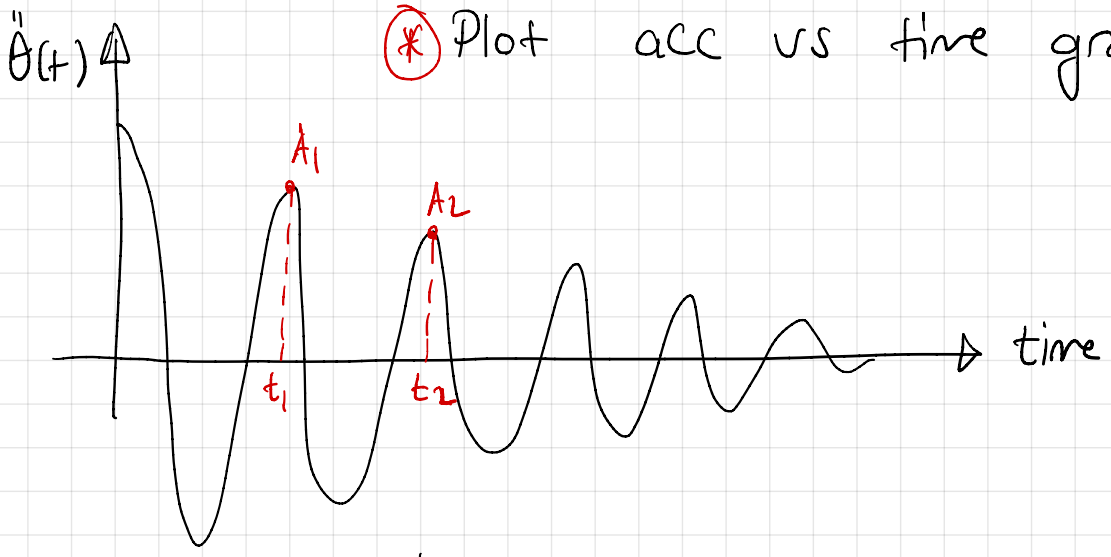
$$J\ddot{\theta}(t) + c\dot{\theta}(t) + k\theta(t) = 0$$

$$\ddot{\theta}(t) + \frac{c}{J}\dot{\theta}(t) + \frac{k}{J}\theta(t) = 0$$

$$\ddot{\theta}(t) + 2\zeta\omega_n\dot{\theta}(t) + \omega_n^2\theta(t)$$

$$\frac{c}{J} = 2\zeta\omega_n \qquad \frac{k}{J} = \omega_n^2$$

(*) Plot acc vs time graph for System 1.



1- $\delta = \ln\left|\frac{A_1}{A_2}\right|$

2- $\zeta = \frac{\delta}{\sqrt{4\pi^2 + \delta^2}}$

3- $T_d = t_2 - t_1$

4- $f_d = \frac{1}{T_d}$

5- $\omega_d = 2\pi f_d$

6- $\omega_d = \omega_n\sqrt{1-\zeta^2}$

Find ω_n

7- $c = 2\zeta\omega_n J$

Calculate c.