

[1.6절]

1.94 그래프로부터  $T = 4 \text{ s}$ ,  $x_1 = 0.75 \text{ cm}$ ,  $x_2 = 0.21 \text{ cm}$

$$\omega_d = \frac{2\pi \text{ rad}}{4 \text{ s}} = \frac{\pi}{2} \text{ rad/s} = 1.571 \text{ rad/s} \quad \Rightarrow \quad \omega_d = 1.571 \text{ rad/s}$$

$$\delta = \ln \frac{x_1}{x_2} = \ln \frac{0.75}{0.21} = \ln 3.571 = 1.273$$

$$\zeta = \frac{\delta}{\sqrt{4\pi^2 + \delta^2}} = \frac{(1.273)}{\sqrt{4\pi^2 + (1.273)^2}} = 0.19856 \quad \Rightarrow \quad \zeta = 0.1986$$

$$\omega_n = \frac{\omega_d}{\sqrt{1 - \zeta^2}} = \frac{1.571 \text{ rad/s}}{\sqrt{1 - 0.19856^2}} = 1.6027 \text{ rad/s} \quad \Rightarrow \quad \omega_n = 1.603 \text{ rad/s}$$