

© cont.

$$\left. \begin{aligned} 5\%OS &\Rightarrow \zeta = \frac{-\ln(0.05)}{\sqrt{\ln(0.05)^2 + \pi^2}} = 0.6901 \\ f_s = 1s &\Rightarrow \frac{4.6}{\zeta \omega_n} = 1 \Rightarrow \zeta \omega_n = 4.6 \end{aligned} \right\} \omega_n = \frac{4.6}{0.69} = 6.67$$

from characteristic;

$$\frac{1}{2} k_d + \frac{1}{4} = 2(4.6) \Rightarrow \underline{k_d = 17.9}$$

$$\frac{1}{2} k_p = (6.67)^2 \Rightarrow \underline{k_p = 89.0}$$