

Homework # 2 Solution (Exercises 5.1, 3 & 6)

B-5-1.

Time constant = 0.25 min. The steady state error is 2.5 degrees.

B-5-3.

The maximum overshoot of 5% corresponds to $\zeta = 0.69$.

Hence
$$w_n = \frac{2}{\zeta} = \frac{2}{0.69} 2.90 \text{ rad/sec}$$

B-5-6.

For a unit-impulse input

$$c(t) = -te^{-t} + 2e^{-t} \quad (t \geq 0)$$

For a unit-step input

$$c(t) = 1 + te^{-t} - e^{-t} \quad (t \geq 0)$$
