3.1 Time Domain Analysis Equations

$$\zeta = \frac{-\ln\left(\frac{P.O.}{100}\right)}{\sqrt{\pi^2 + \ln\left(\frac{P.O.}{100}\right)^2}}$$

$$\omega_n = \frac{\pi}{T_p\sqrt{1-\zeta^2}}$$

3.2 Frequency Domain Analysis Equations

$$\zeta = \pm\sqrt{\frac{1 \pm \sqrt{1 - \frac{1}{{M_p}^2}}}{2}}$$

$$\omega_n = \frac{\omega_p}{\sqrt{1-2\zeta^2}}$$

Plant Parameter Identification Equations

$$A = \frac{{\omega_n}^2\tau_m}{K}$$

$$\tau_m = \frac{1}{2\omega_n\zeta}$$

Notes:

- Remember to convert units of degrees to radians and Hz to rad/sec.
- M_p is a gain value, so it is defined as the ratio of the output signal over the input signal