Natalie Ko-Feriguo sesa 3030 Assignment 1 Q2

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$\frac{C}{R} = \frac{300}{s^2+10s+400}$ $G(s) = \frac{K\omega_n^2}{s^2+2\zeta\omega_n s+\omega_n^2}$

a) $\omega_n^2 = 400$ $\omega_n = 20$

$2\zeta\omega_n = 10$ $\zeta = 0.25$

b) $K\omega_n^2 = 300$ $K = 0.75$

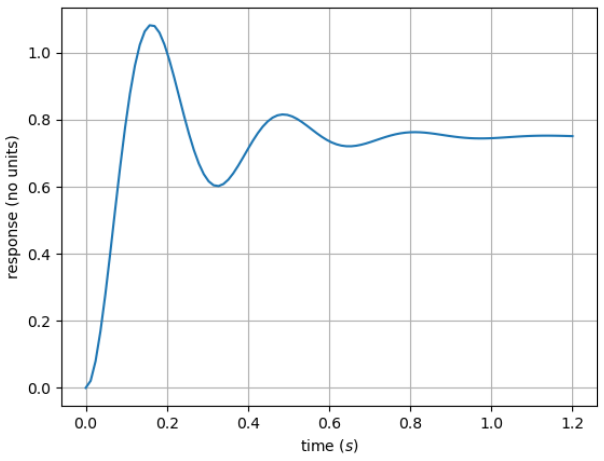
c) $T_s = \frac{3}{\omega\zeta}$ for 5% error of steady state value

$T_s = 0.6$

d) $P.O. = 100\exp\left(-\frac{\pi\zeta}{\sqrt{1-\zeta^2}}\right) \simeq 44.4\%$

e) $T_p = \frac{\pi}{\omega_n\sqrt{1-\zeta^2}} \simeq 0.16$

f)



$\phi = 14.48°$

g)