

a)  $e_{ss} = 0$  to step requires Type 1, which we already have from  $G(s)$  ✓ (actually have Type 2)

b)  $t_r < 10 \Rightarrow \frac{2.2}{\omega_n} < 10 \Rightarrow \omega_n > 0.22$   
 $\Rightarrow \omega_c > 0.22$

$\%OS < 20\% \Rightarrow \zeta > 0.46$

$\Rightarrow \phi_{PM} > 46^\circ$