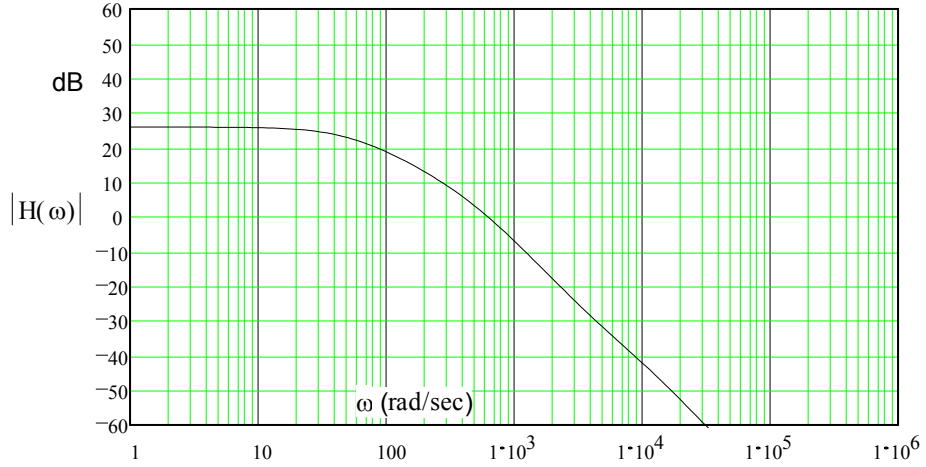
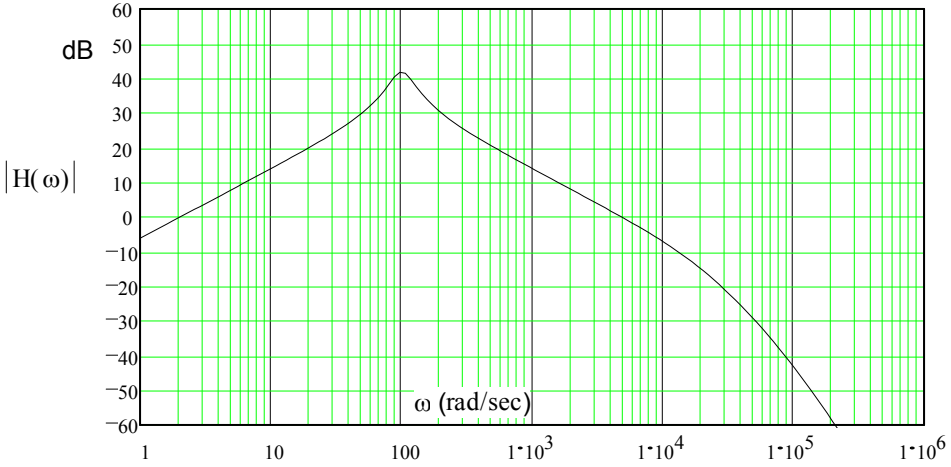
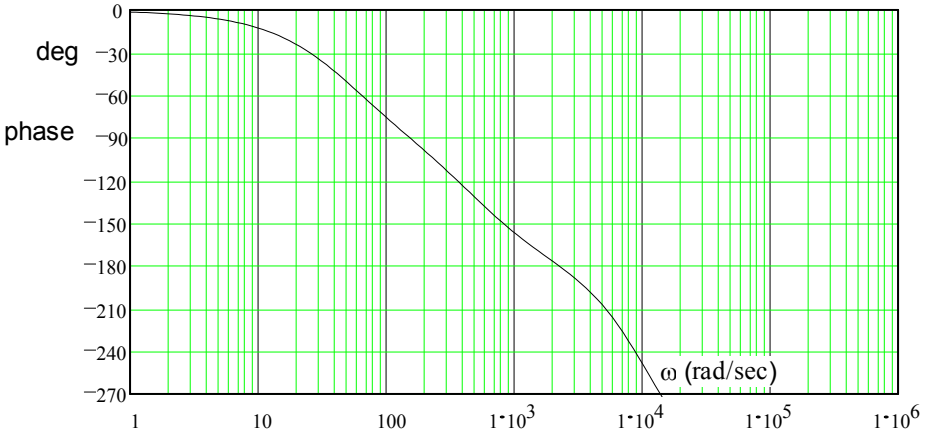
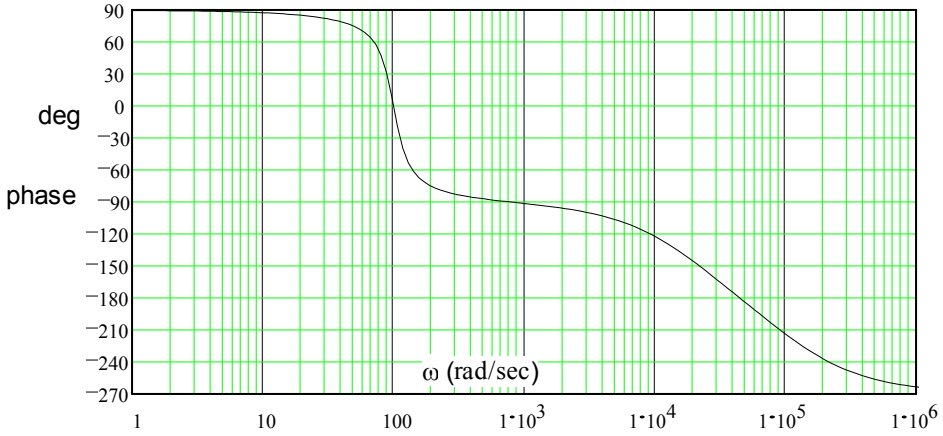
ECE 3510 Gain, Phase, and Delay margins









Gain Margin $GM := 20 \cdot dB$ At about: $2200 \cdot \frac{rad}{sec}$

Phase Margin $PM := 40 \cdot deg$ At about: $\omega_{PM} := 620 \cdot \frac{rad}{sec}$

Delay Margin $f := \frac{\omega_{PM}}{2 \cdot \pi}$ $T := \frac{2 \cdot \pi}{\omega_{PM}}$

$DM := \left(\frac{40 \cdot deg}{360 \cdot deg} \right) \cdot T$ $DM = 0.12 \cdot ms$

Gain Margin $GM := 27 \cdot dB$ occurs at about: $43000 \cdot \frac{rad}{sec}$

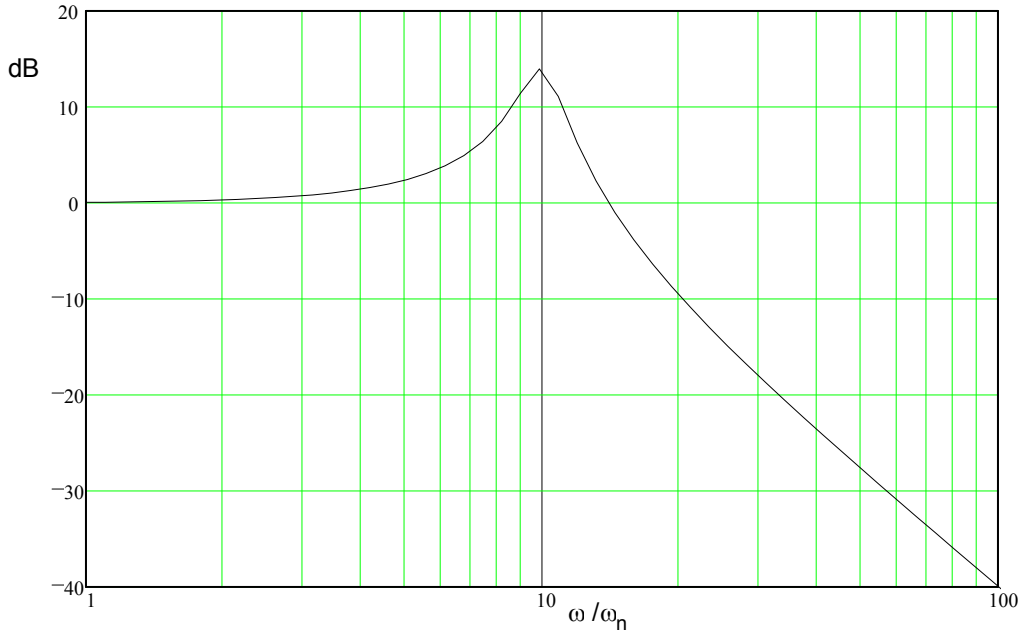
Phase Margin $PM := 180 \cdot deg - 105 \cdot deg$

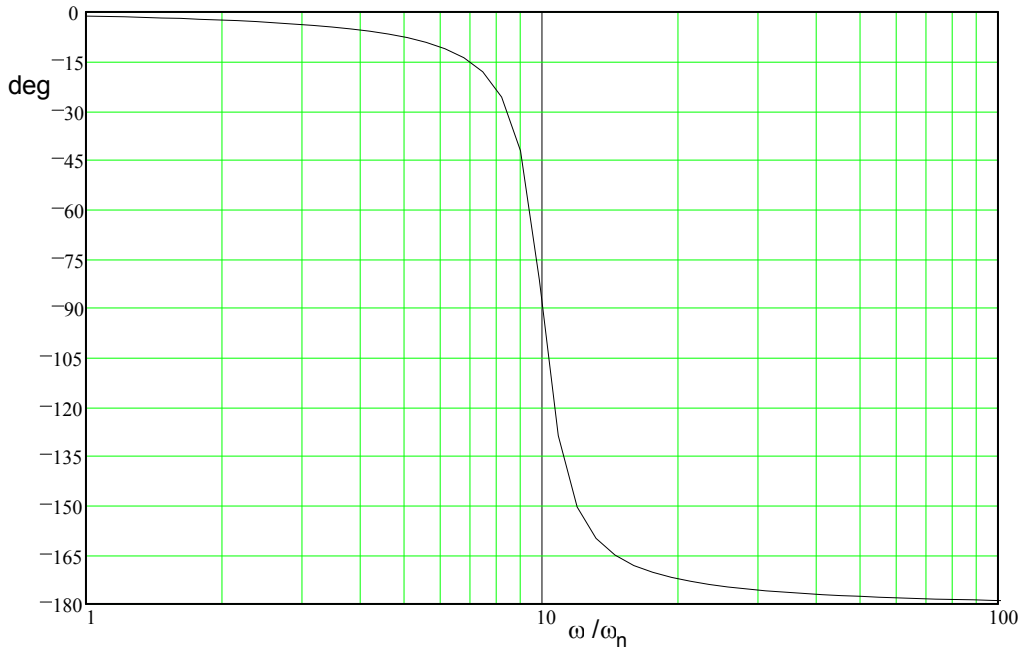
$PM = 75 \cdot deg$ occurs at about: $\omega_{PM} := 5800 \cdot \frac{rad}{sec}$

Delay Margin $f := \frac{\omega_{PM}}{2 \cdot \pi}$ $T := \frac{2 \cdot \pi}{\omega_{PM}}$ $DM := \left(\frac{75 \cdot deg}{360 \cdot deg} \right) \cdot T$

$DM = 0.226 \cdot ms$

$\zeta = 0.1$





Gain Margin Doesn't apply

Phase Margin $PM := 180 \cdot deg - 162 \cdot deg$ $PM = 18 \cdot deg$ occurs at about: $\omega_{PM} := 13 \cdot \frac{rad}{sec}$

Delay Margin $f := \frac{\omega_{PM}}{2 \cdot \pi}$ $T := \frac{2 \cdot \pi}{\omega_{PM}}$ $DM := \left(\frac{18 \cdot deg}{360 \cdot deg} \right) \cdot T$ $DM = 24 \cdot ms$