ECE 3510 Gain, Phase, and Delay margins

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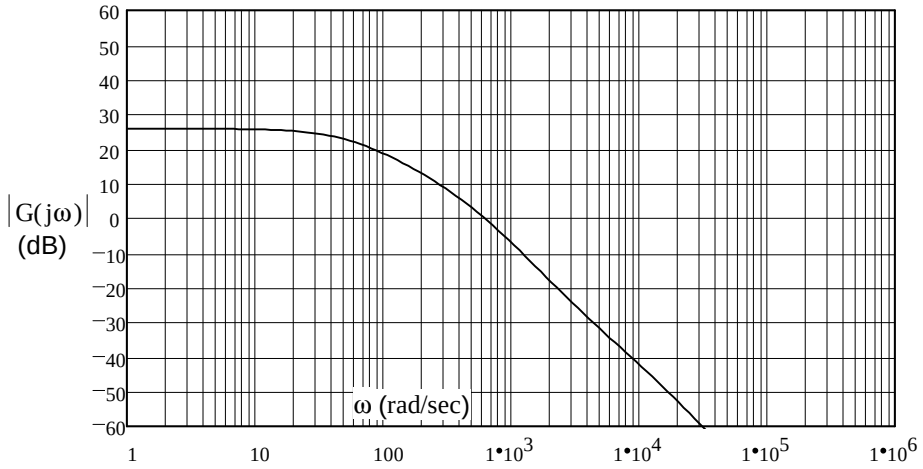
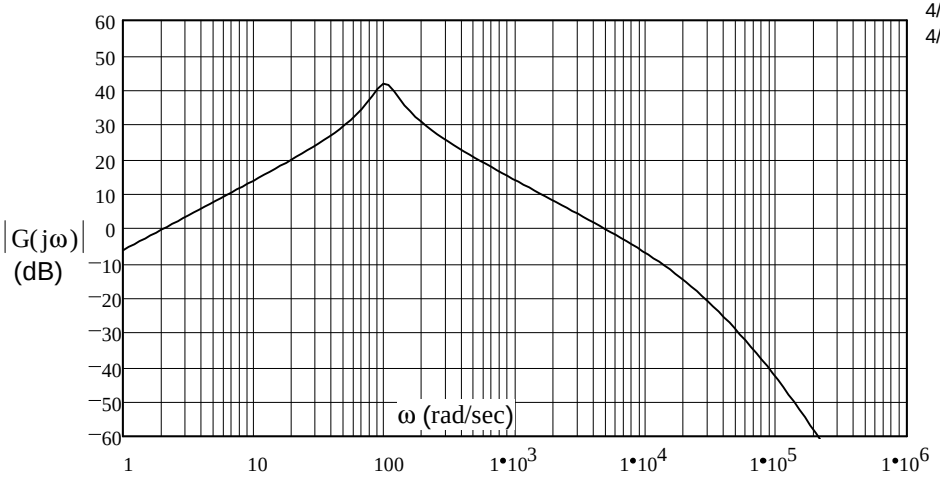
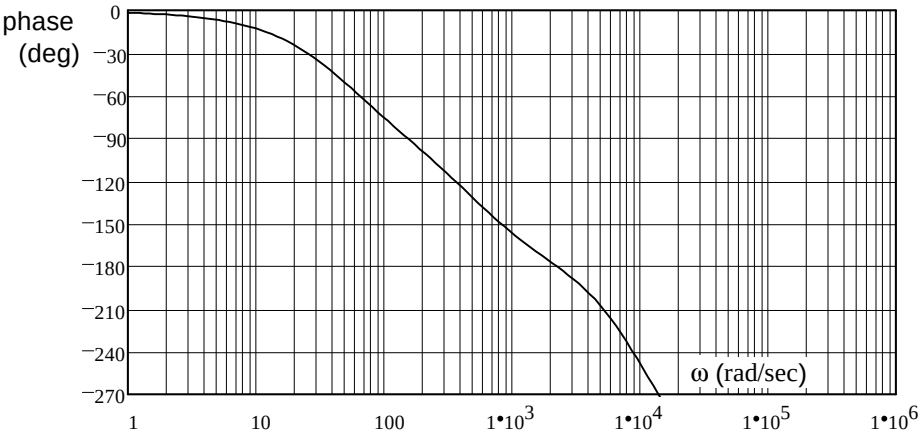
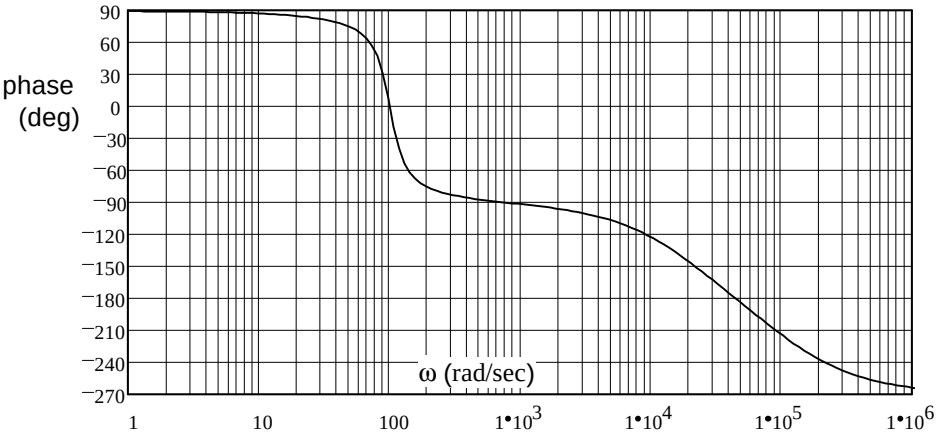
4/8/14
4/13/20









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

Phase Margin $PM_a := 40\cdot deg$ At about: $\omega_{PMa} := 650\cdot\frac{rad}{sec}$

Delay Margin $f_1 := \frac{\omega_{PMa}}{2\cdot\pi}$ $T_a := \frac{2\cdot\pi}{\omega_{PMa}}$

$DM_a := \left(\frac{40\cdot deg}{360\cdot deg}\right)\cdot T_a$ $DM_a = 1.07\ ms$ $1.1\cdot ms$

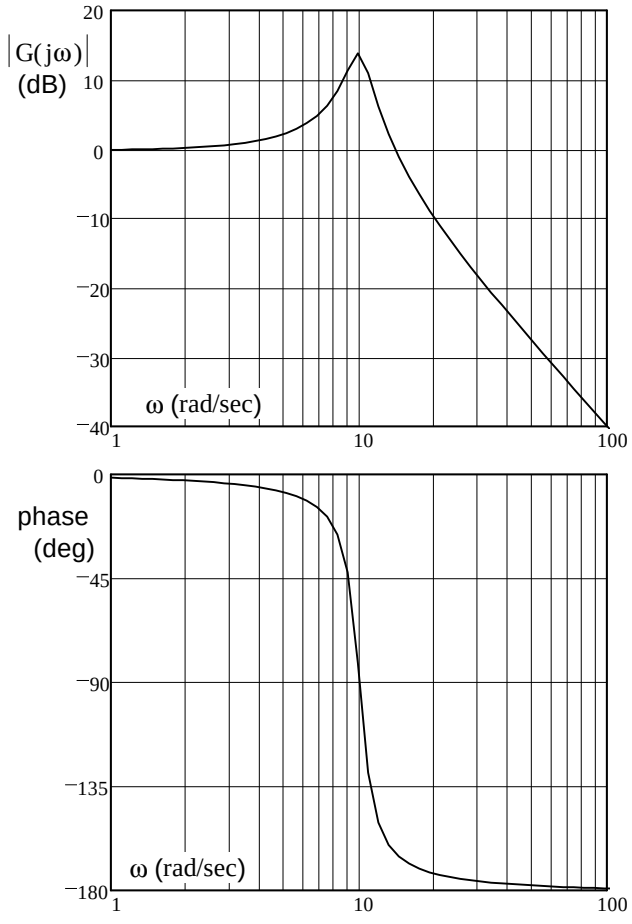
Gain Margin $GM := 27\cdot dB$ occurs at about: $43000\cdot\frac{rad}{sec}$

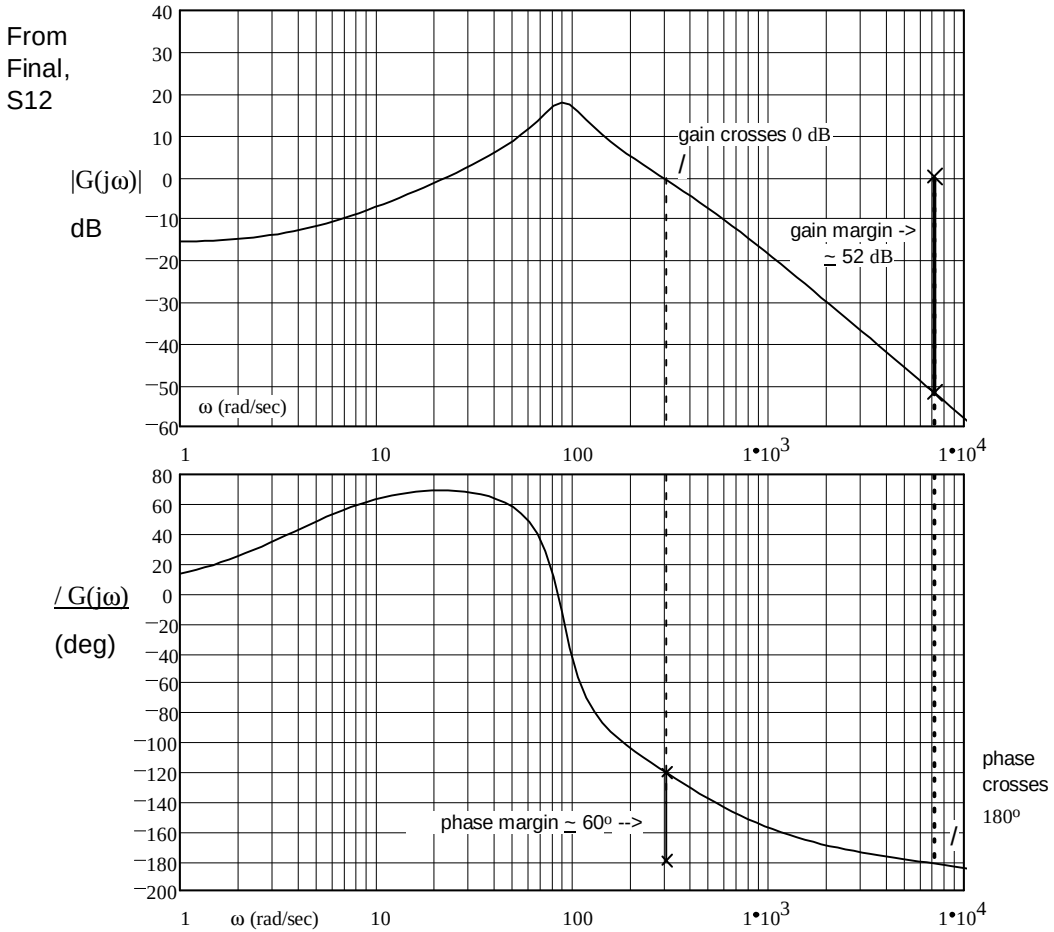
Phase Margin $PM_b := 180\cdot deg - 105\cdot deg$

$PM_b = 75\ deg$ occurs at about: $\omega_{PMb} := 5000\cdot\frac{rad}{sec}$

Delay Margin $f_b := \frac{\omega_{PMb}}{2\cdot\pi}$ $T_b := \frac{2\cdot\pi}{\omega_{PMb}}$ $DM_b := \left(\frac{75\cdot deg}{360\cdot deg}\right)\cdot T_b$

$DM_b = 0.262\ ms$
$0.26\cdot ms$





Gain Margin Doesn't apply

Phase Margin $PM_c := 180\cdot deg - 164\cdot deg$

$PM_c = 16\cdot deg$

occurs at about: $\omega_{PMc} := 14\cdot\frac{rad}{sec}$

Delay Margin $f_c := \frac{\omega_{PMc}}{2\cdot\pi}$ $T_c := \frac{2\cdot\pi}{\omega_{PMc}}$ $DM_c := \left(\frac{16\cdot deg}{360\cdot deg}\right)\cdot T_c$

$DM_c = 20\cdot ms$

Gain Margin $GM := 52\cdot dB$

Phase Margin $180 - 120 = 60$ $PM_d := 60\cdot deg$

occurs at about: $300\cdot\frac{rad}{sec}$

Delay Margin $f_d := \frac{300}{2\cdot\pi}$ $T_d := \frac{2\cdot\pi}{300\cdot\frac{rad}{sec}}$ $T_d = 0.021\cdot sec$

$DM_d := \left(\frac{60\cdot deg}{360\cdot deg}\right)\cdot T_d$ $DM_d = 3.49\cdot ms$

$3.5\cdot ms$