

ECE 461/661 Handout #36

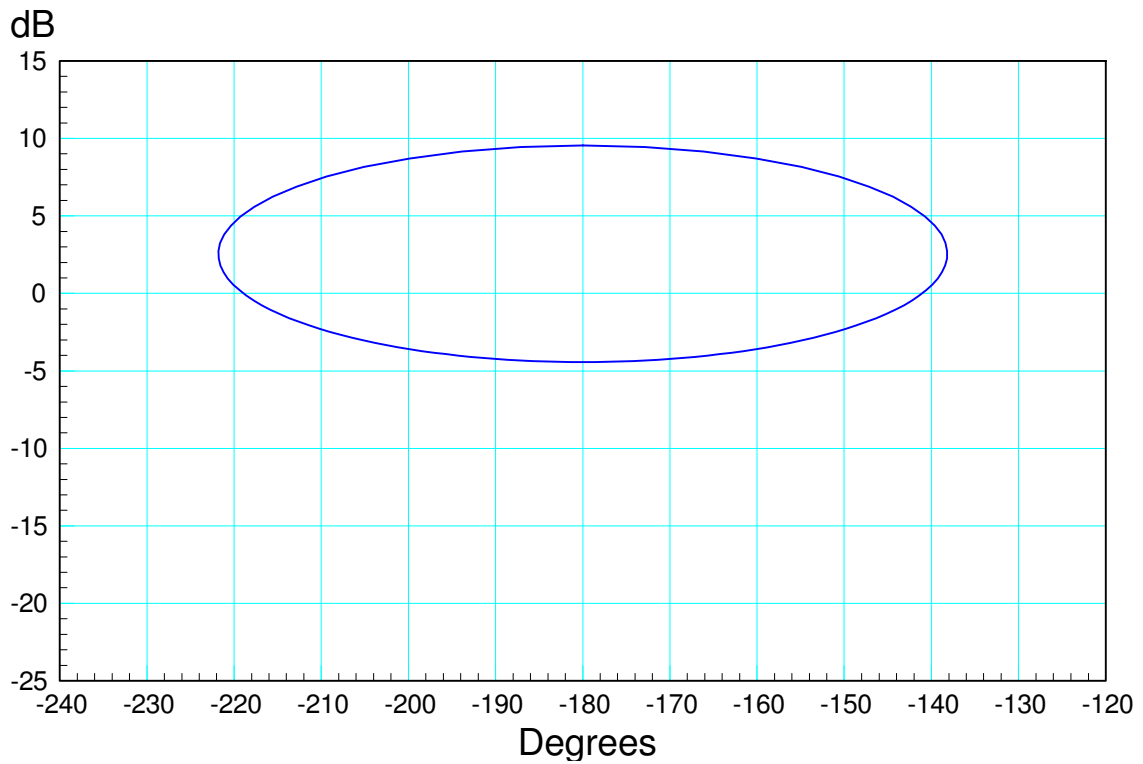
Nichols Charts

The gain vs. frequency for $G(j\omega)$ is measured:

rad/sec	0	5	6	7	8
Gain	15dB	10dB	0dB	-10dB	-20dB
degrees	0	-120	-150	-170	-190

Determine

Gain of M-circle	Maximum gain for stability	k so you are tangent to this M circle



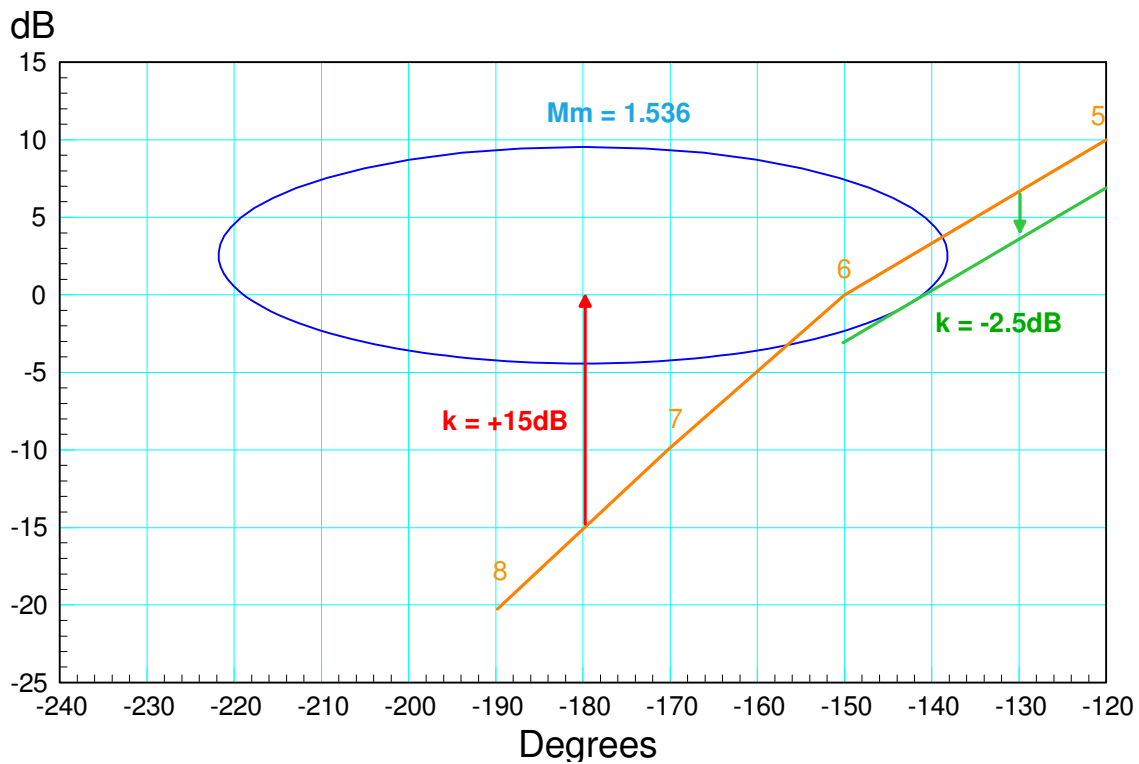
Solution

The gain vs. frequency for $G(j\omega)$ is measured:

rad/sec	0	5	6	7	8
Gain	15dB	10dB	0dB	-10dB	-20dB
degrees	0	-120	-150	-170	-190

Determine

Gain of M-circle	Maximum gain for stability	k so you are tangent to this M circle
Mm = 1.536	+15dB red arrow	-2.5dB green arrow



Mm: Pick any point on the M-circle, such as (0dB, -142 degrees)

$$G = 1 \angle -142^\circ$$

$$M_m = \left(\frac{G}{1+G} \right) = \left(\frac{1 \angle -142^\circ}{1 + 1 \angle -142^\circ} \right) = 1.536 \angle -71^\circ$$

Only the magnitude matters