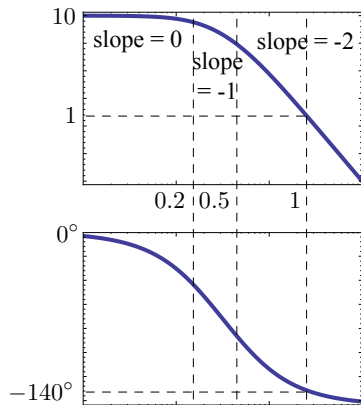


Step 1: Choose K to Shape PM

Check Bode plot of $G(s)$ to see how much PM it already has:



► from Matlab, $\omega_c \approx 1$

► PM $\approx 40^\circ$

► we want PM = 60°

$$\phi = -120^\circ \quad \text{at } \omega \approx 0.573$$

$$M = 2.16$$

— need to decrease K to $1/2.16$

A conservative choice (to allow some slack) is $K = 1/2.5 = 0.4$, gives $\omega_c \approx 0.52$, PM $\approx 65^\circ$