

Example 2: Phase Margin

$$G(j\omega) = \frac{\omega_n^2}{(j\omega)^2 + 2\zeta\omega_n j\omega} = \frac{\omega_n}{2\zeta j\omega \left(\frac{j\omega}{2\zeta\omega_n} + 1 \right)}$$

Let's look at the magnitude plot:

- ▶ low-frequency asymptote slope -1 (Type 1 term, $n = -1$)
 - ▶ slope down by 1 past the breakpt. $\omega = 2\zeta\omega_n$ (Type 2 pole)
- \implies there is a finite crossover frequency ω_c !!

