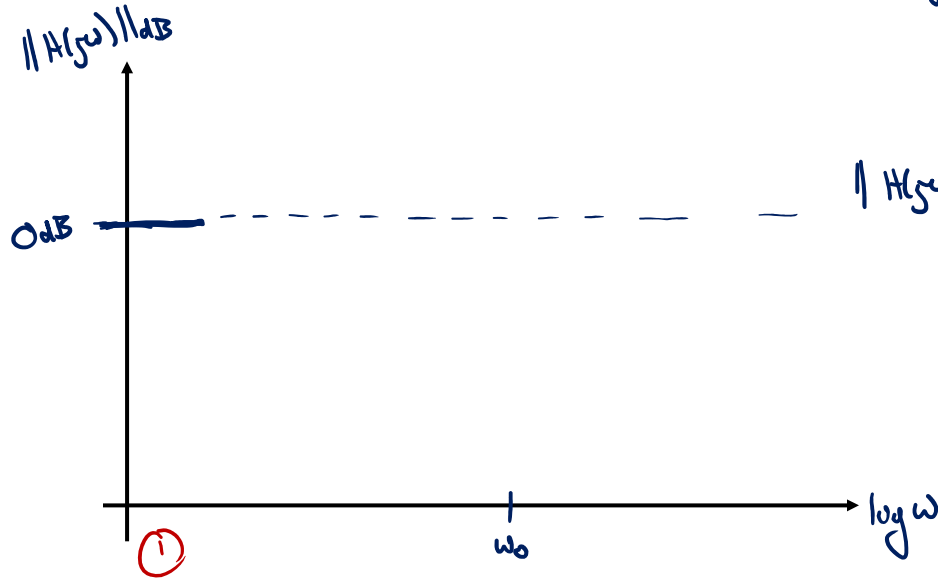


Asymptotic Behavior

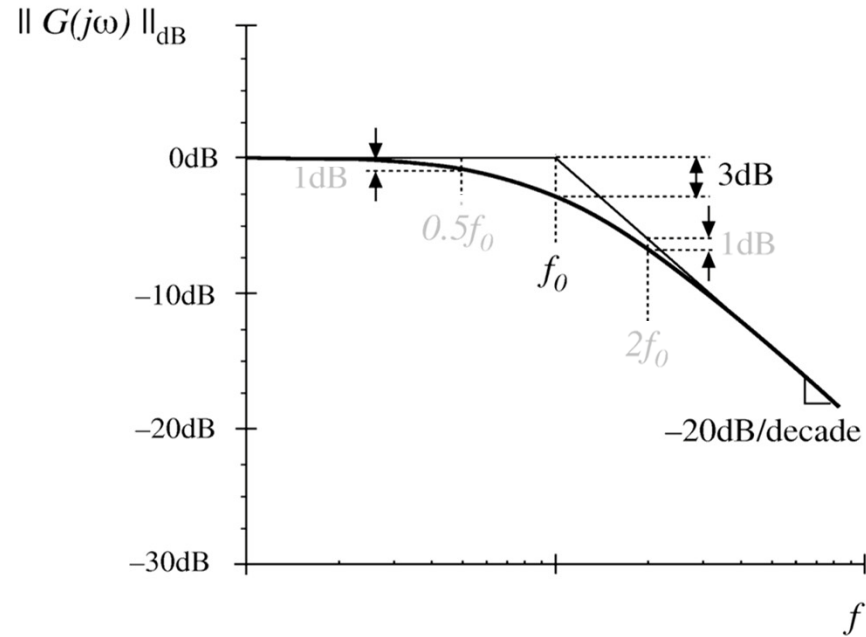


$$\|H(j\omega)\|_{dB} = -20 \log \sqrt{1 + \left(\frac{\omega}{\omega_0}\right)^2}$$

$$\|H(j\omega)\|_{dB} \approx \begin{cases} 0\text{ dB} & , \omega \ll \omega_0 \\ & , \omega = \omega_0 \\ & , \omega \gg \omega_0 \end{cases}$$

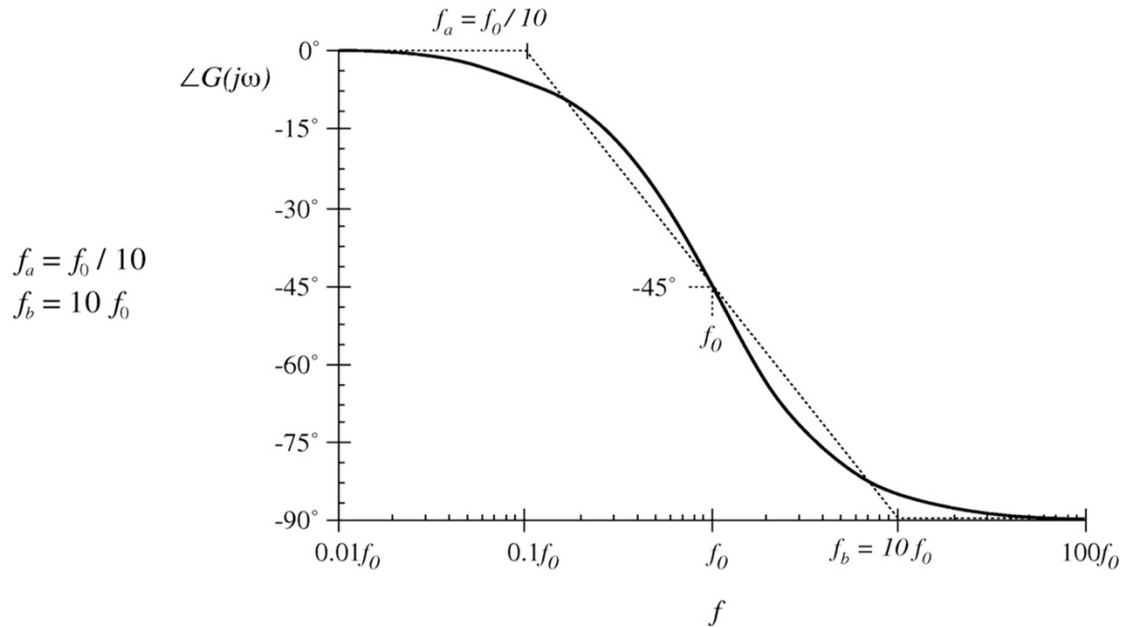
① $\omega \ll \omega_0$: $\|H(j\omega)\|_{dB} \approx -20 \log \sqrt{1} = 0\text{ dB}$

Summary: Single Pole Magnitude

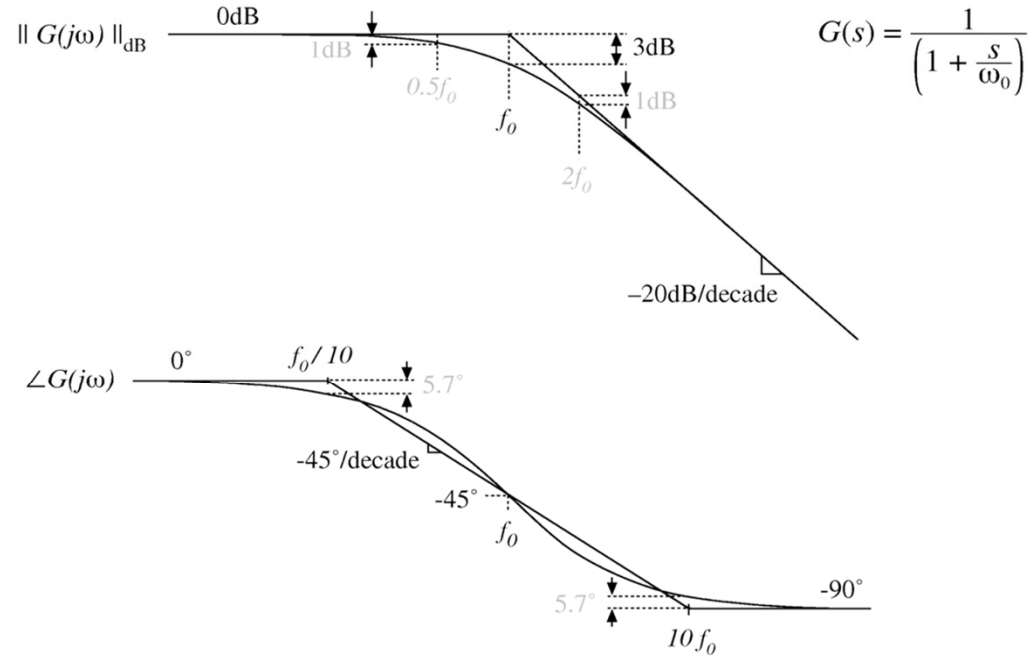


Phase of Single Pole

Phase Asymptotes

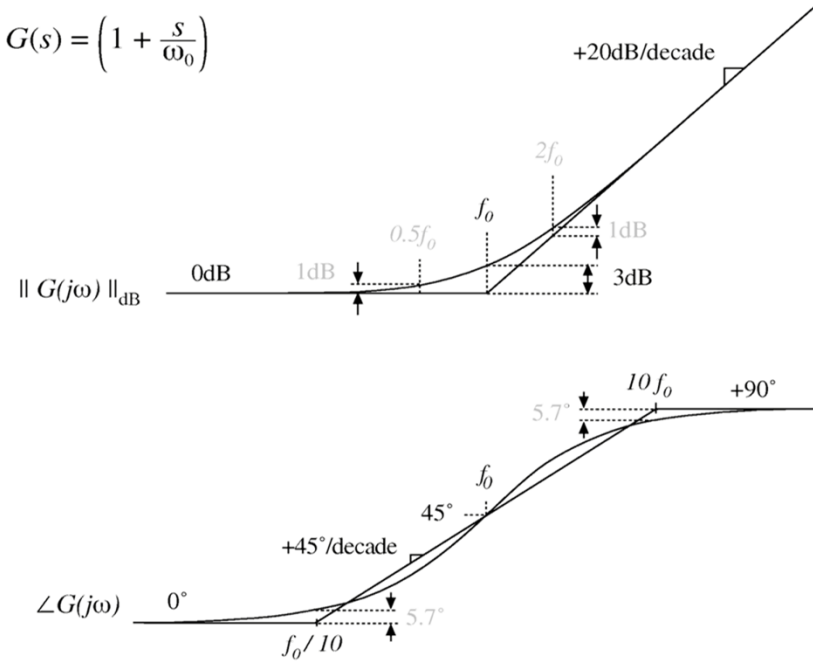


Summary: Single Real Pole



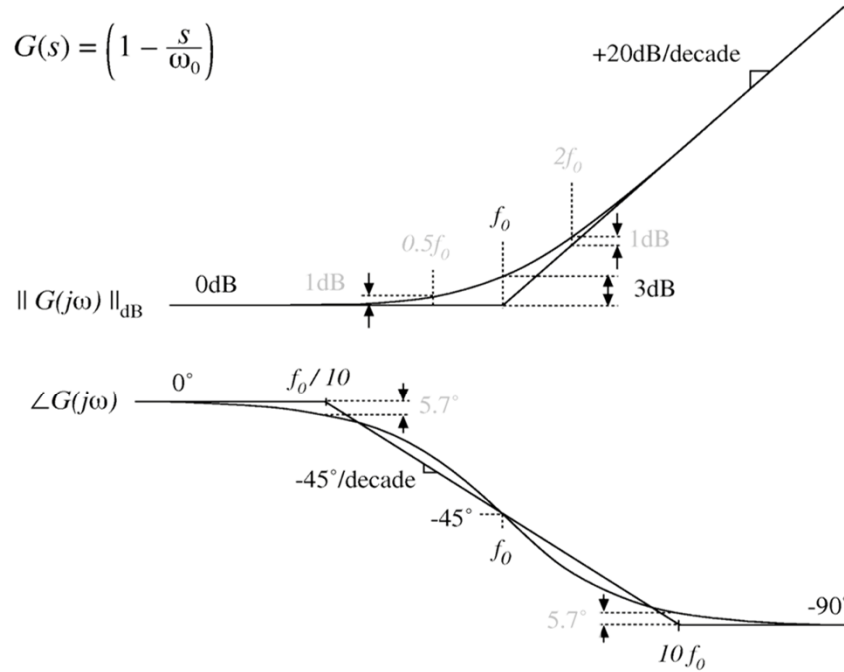
Bode Plot: Real Zero

$$G(s) = \left(1 + \frac{s}{\omega_0}\right)$$



RHP Zero

$$G(s) = \left(1 - \frac{s}{\omega_0}\right)$$



Multiplying Transfer Functions



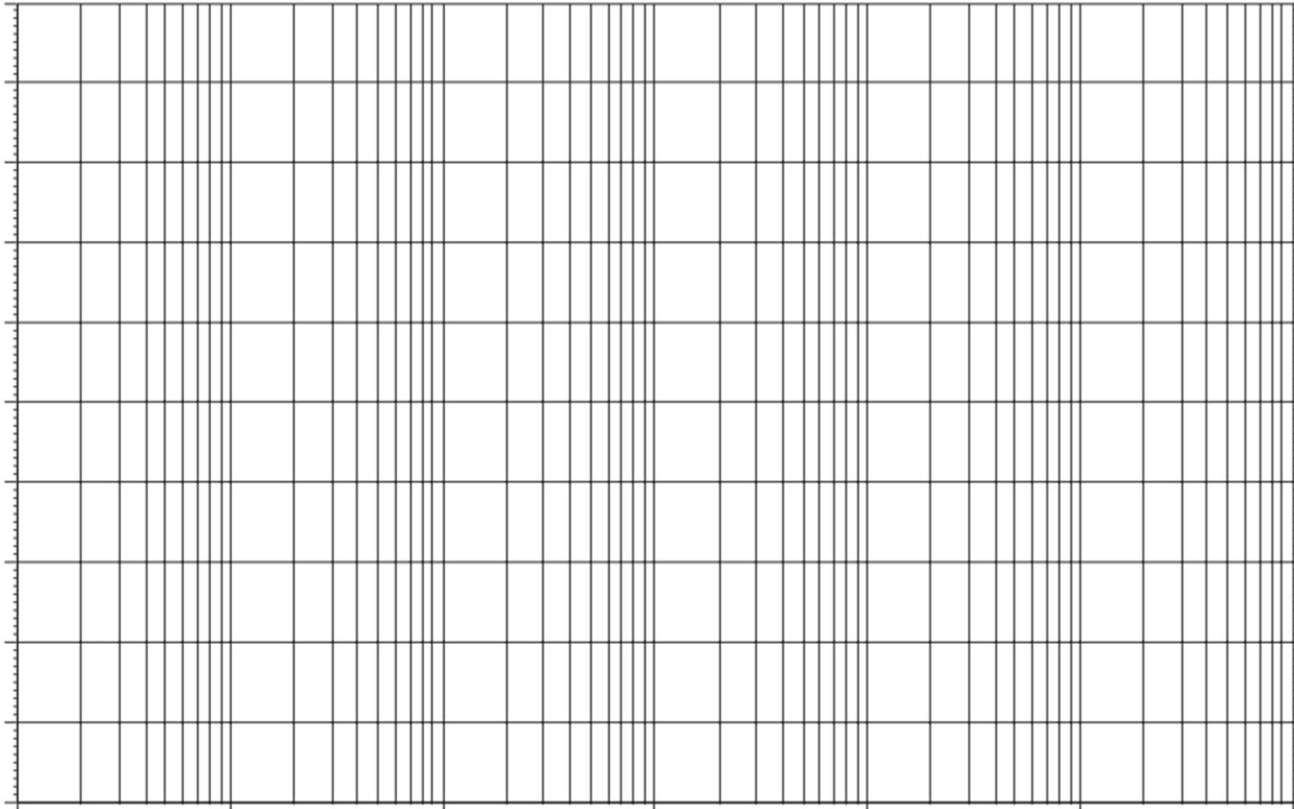
Example 1

$$H(s) = \frac{H_0}{\left(1 + \frac{s}{\omega_1}\right)\left(1 + \frac{s}{\omega_2}\right)}$$

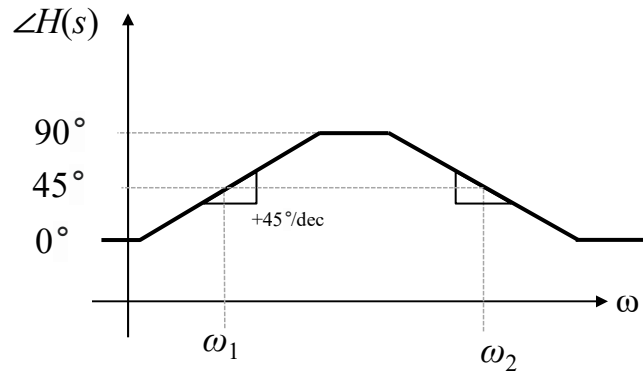
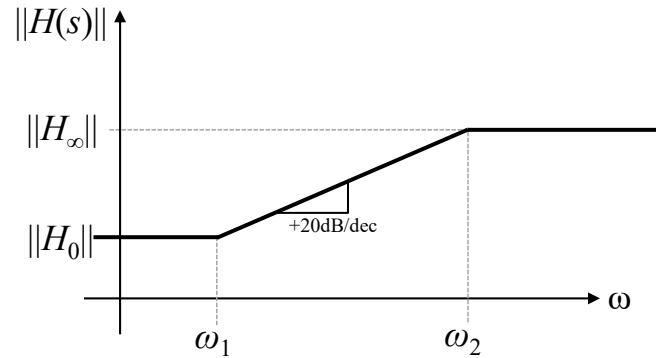
$$H_0 = 40$$

$$f_1 = 100\text{Hz}$$

$$f_2 = 2\text{kHz}$$



Example 2



Example 3

