

# Bode Plot - Gain & Phase Margins

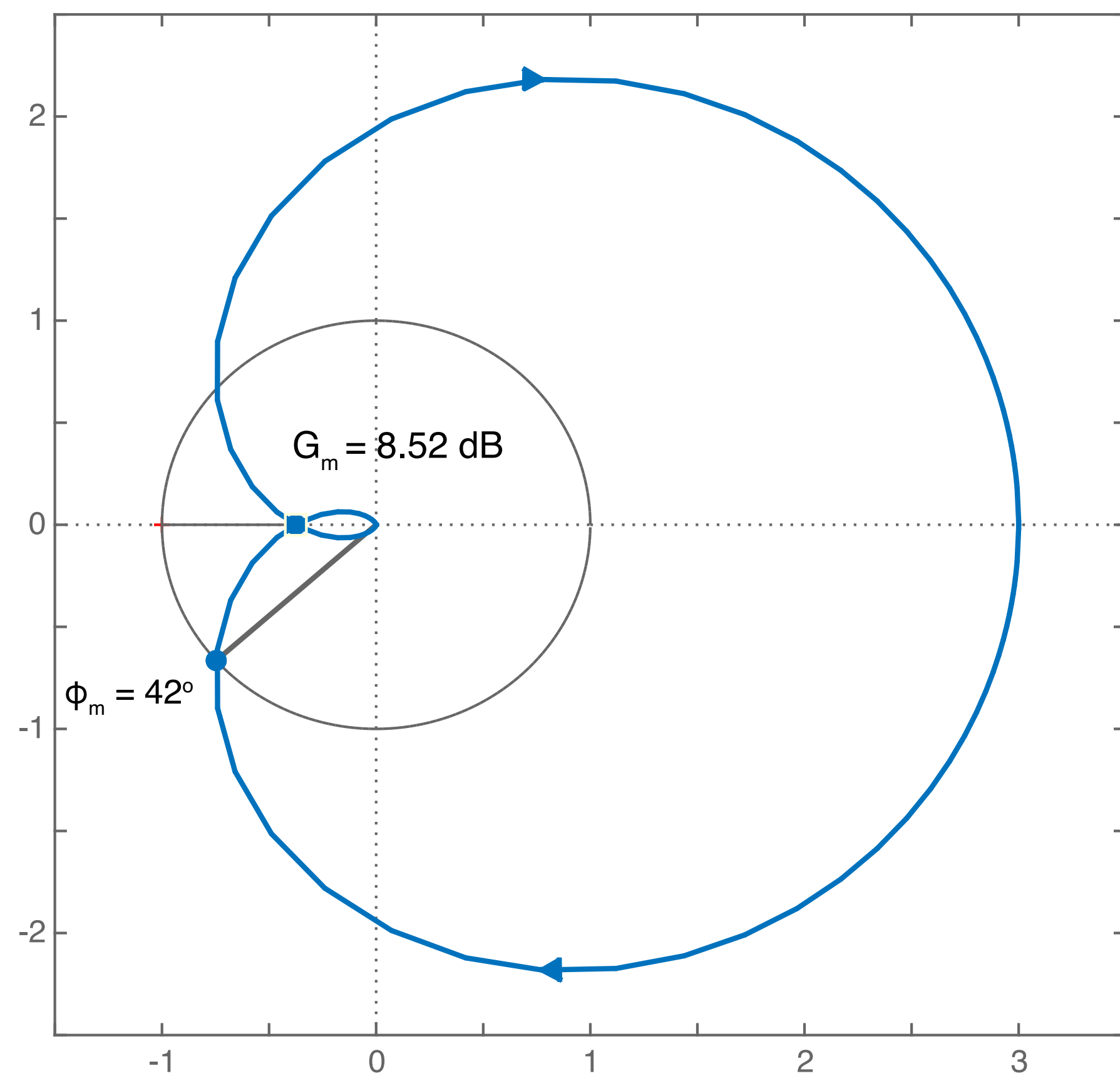
<https://github.com/mertankarali/Lecture-Notes/tree/master/METU-EE302/Lecture%2018>

Lecture #18

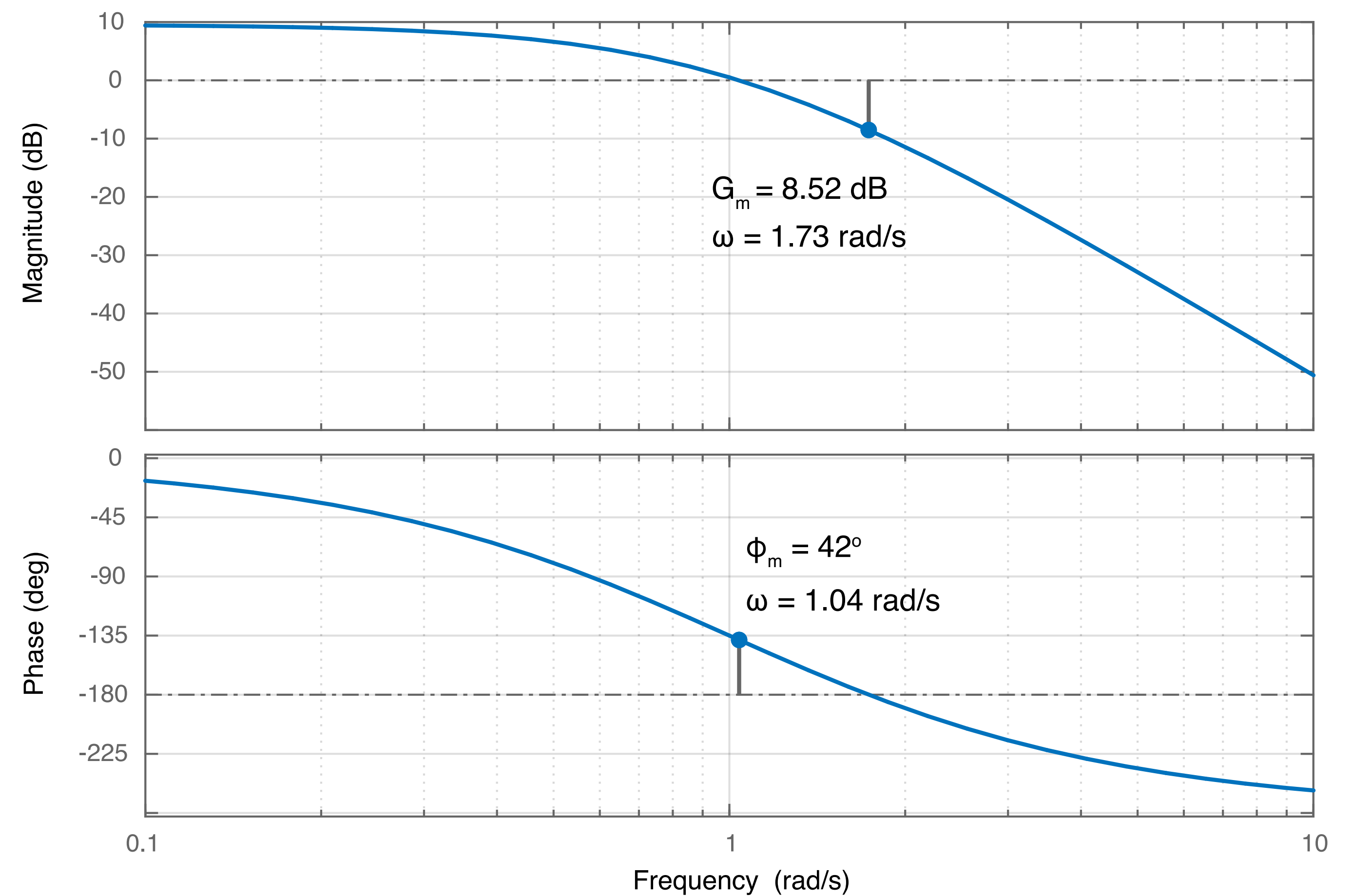
$$\angle[G_{OL}(j\omega_p)] = \pm -180^0 \quad \Rightarrow \quad g_m = \frac{1}{|G_{OL}(j\omega_{pc})|} \quad \text{or} \quad G_m = -20 \log_{10} |G_{OL}(j\omega_{pc})|$$

$G(s)$

Nyquist Plot



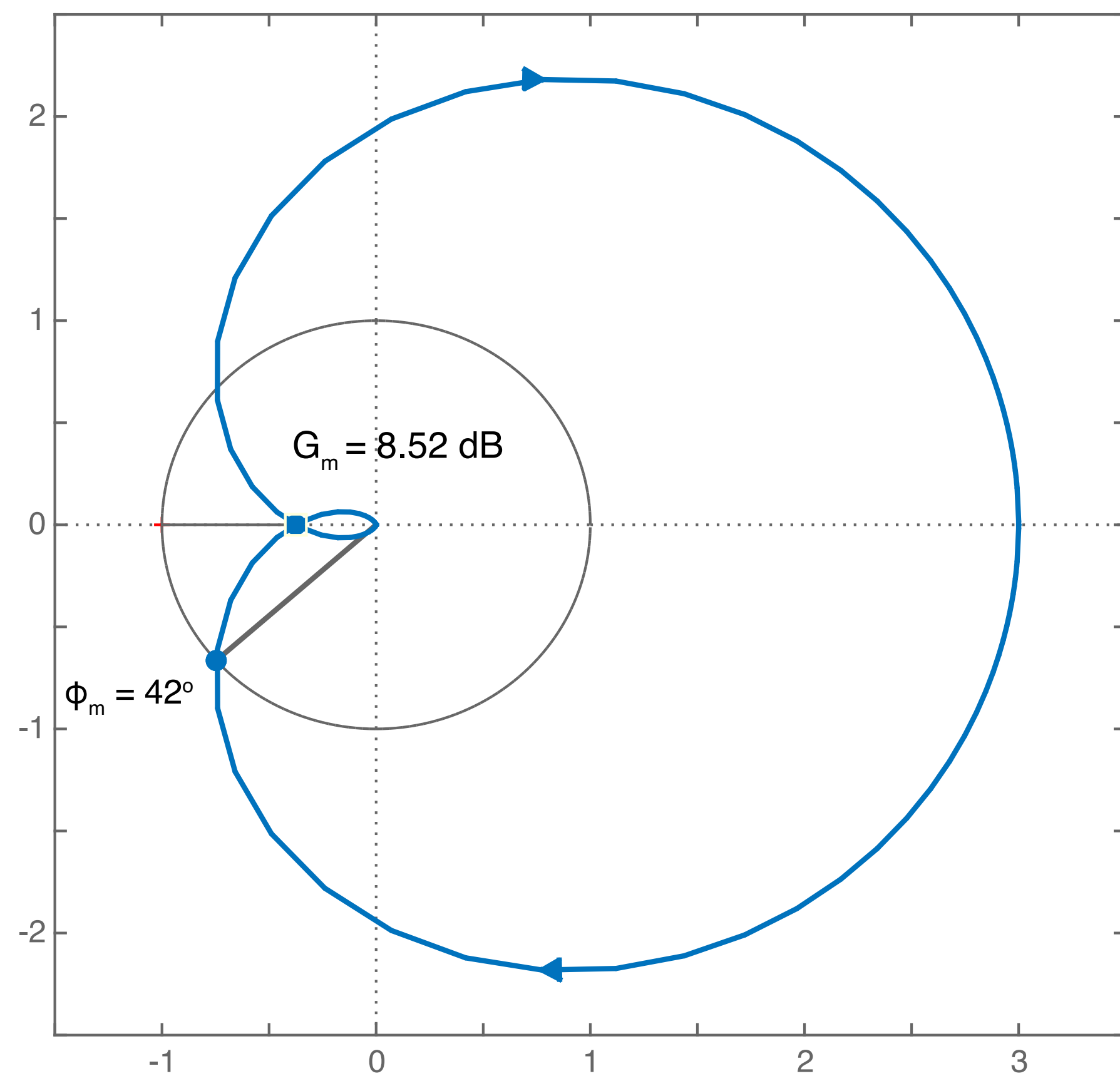
Bode Plot



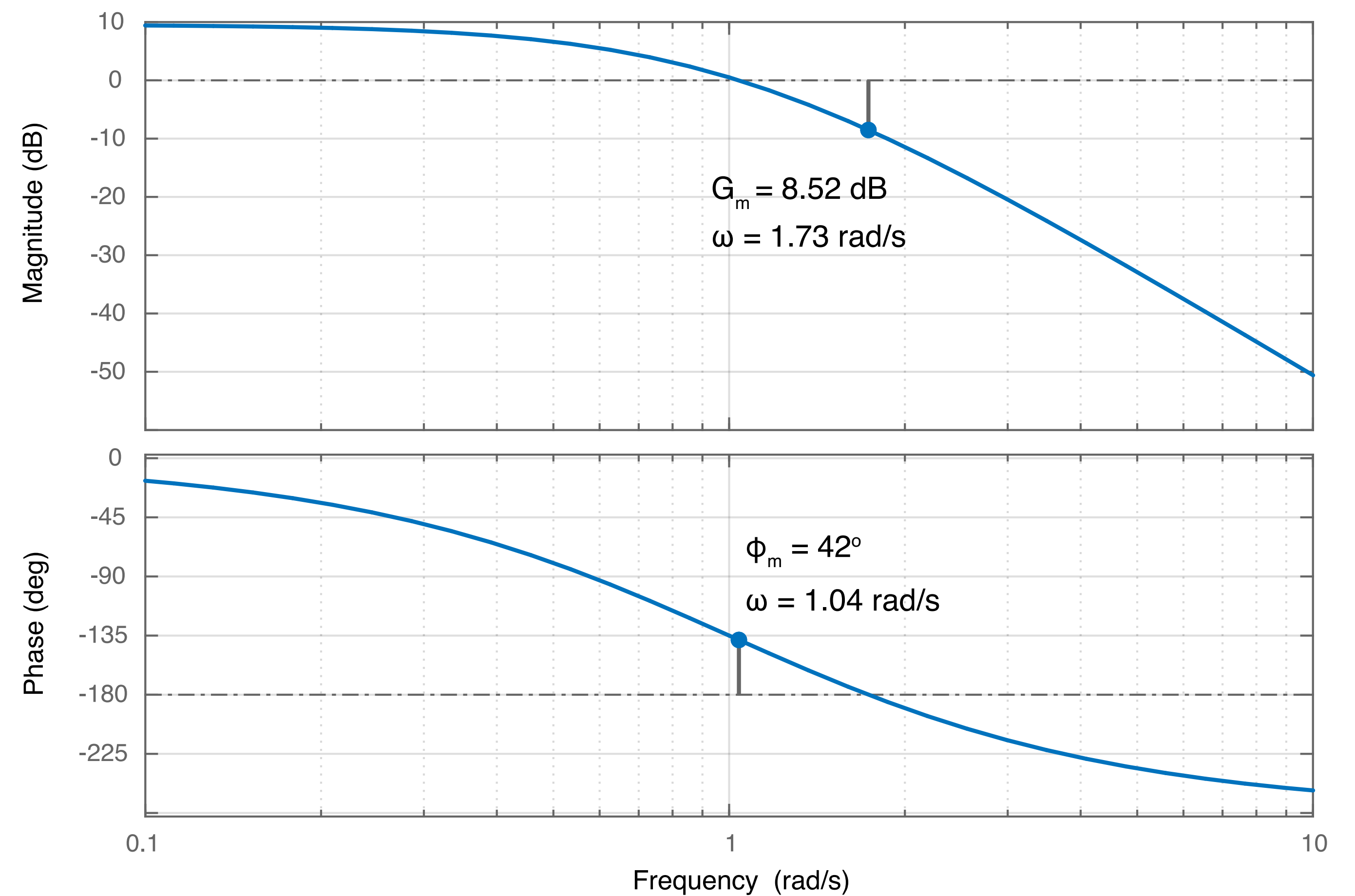
$$|G_{OL}(j\omega_{gc})| = 1 \quad \text{or} \quad M_{dB}\{G_{OL}(j\omega_{gc})\} = 0 \text{ dB} \quad \Rightarrow \quad \phi_m = \pi + \angle G_{OL}(j\omega_{gc})$$

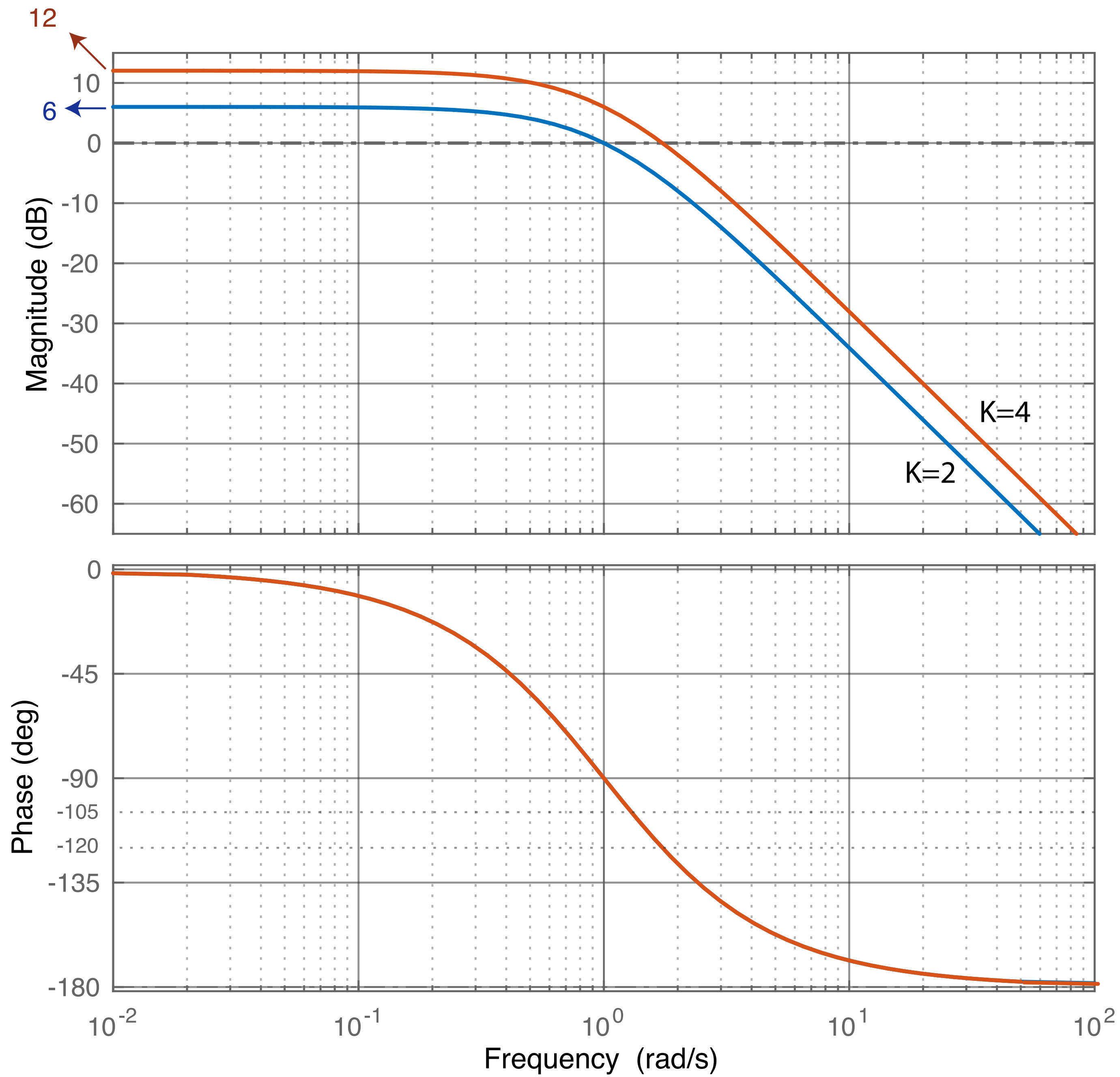
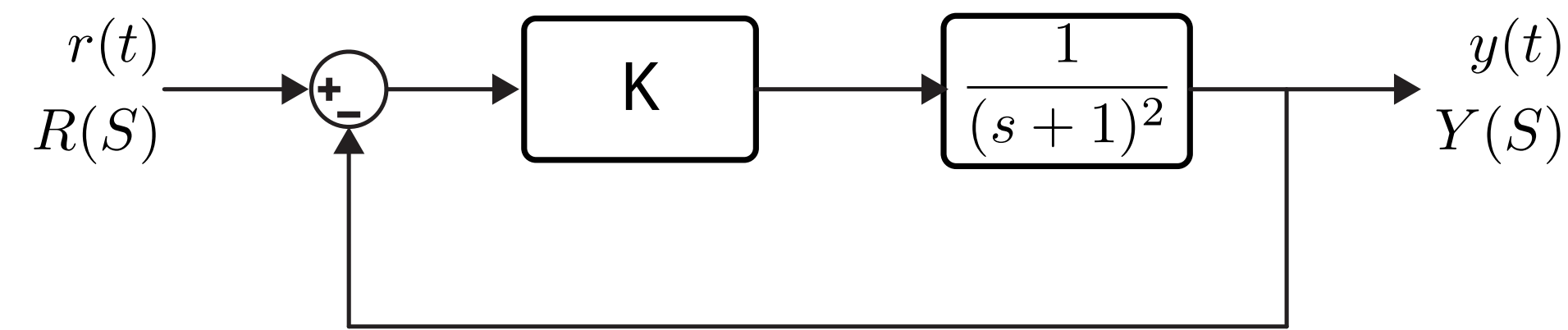
$G(s)$

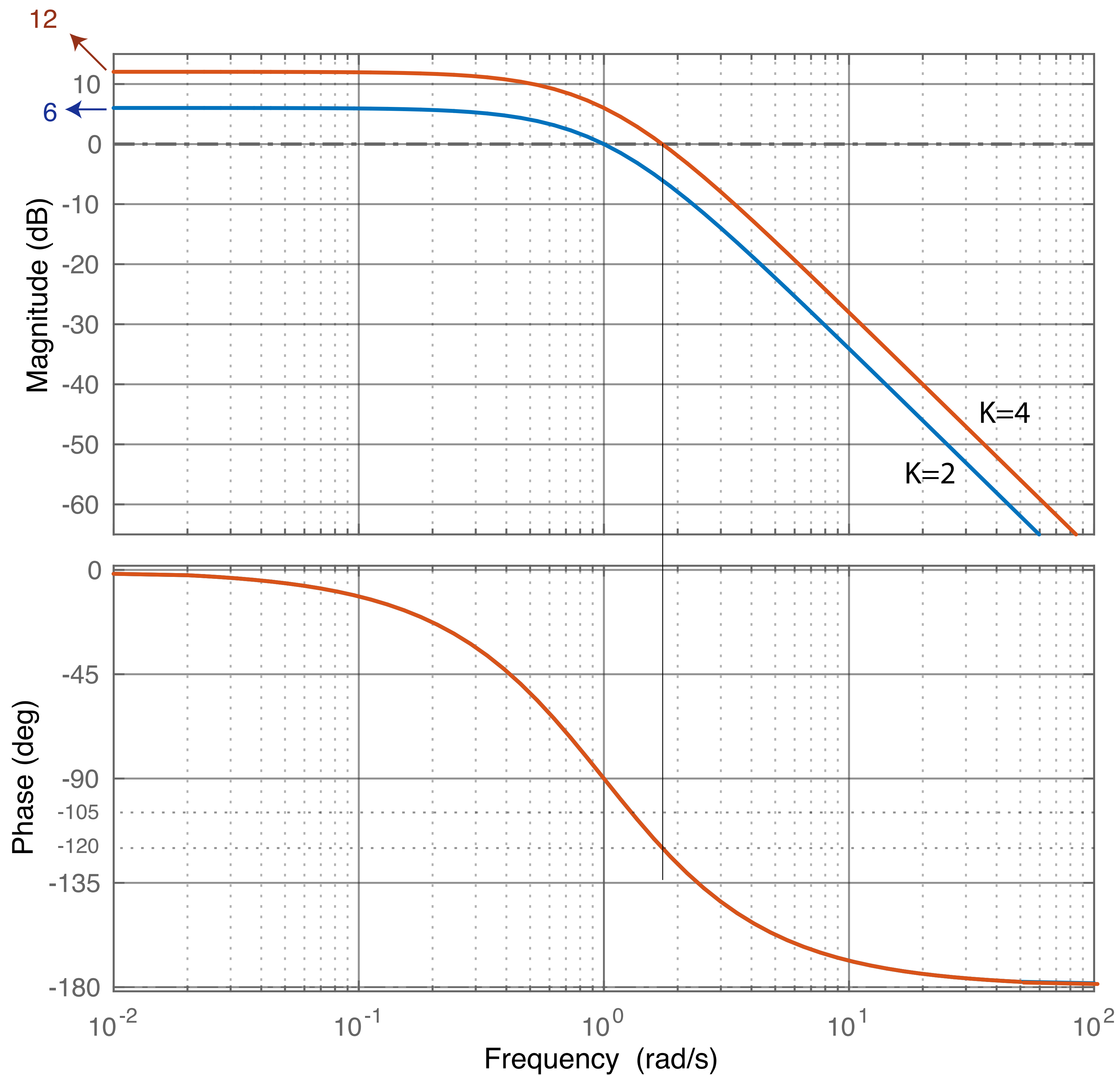
Nyquist Plot

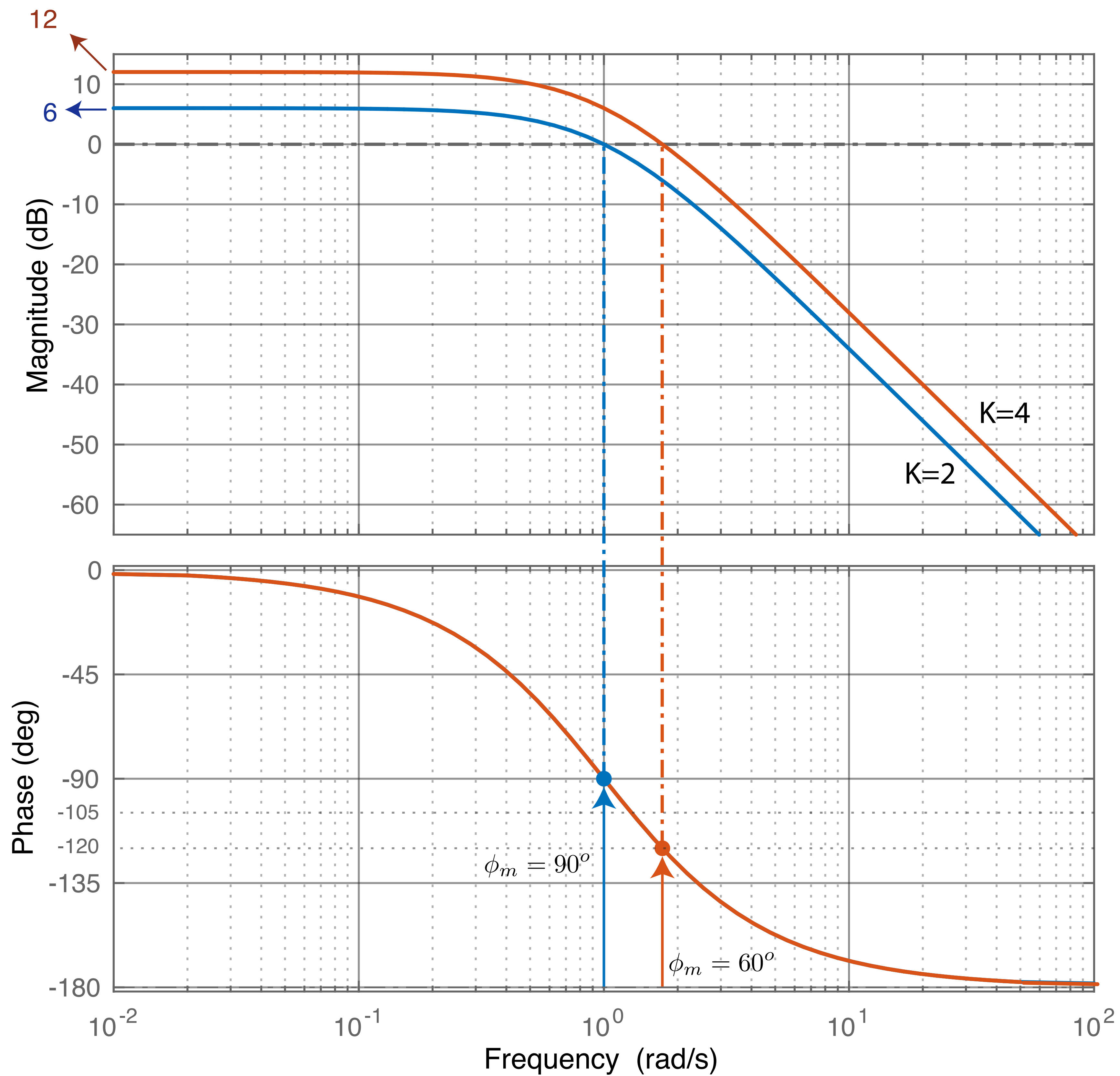


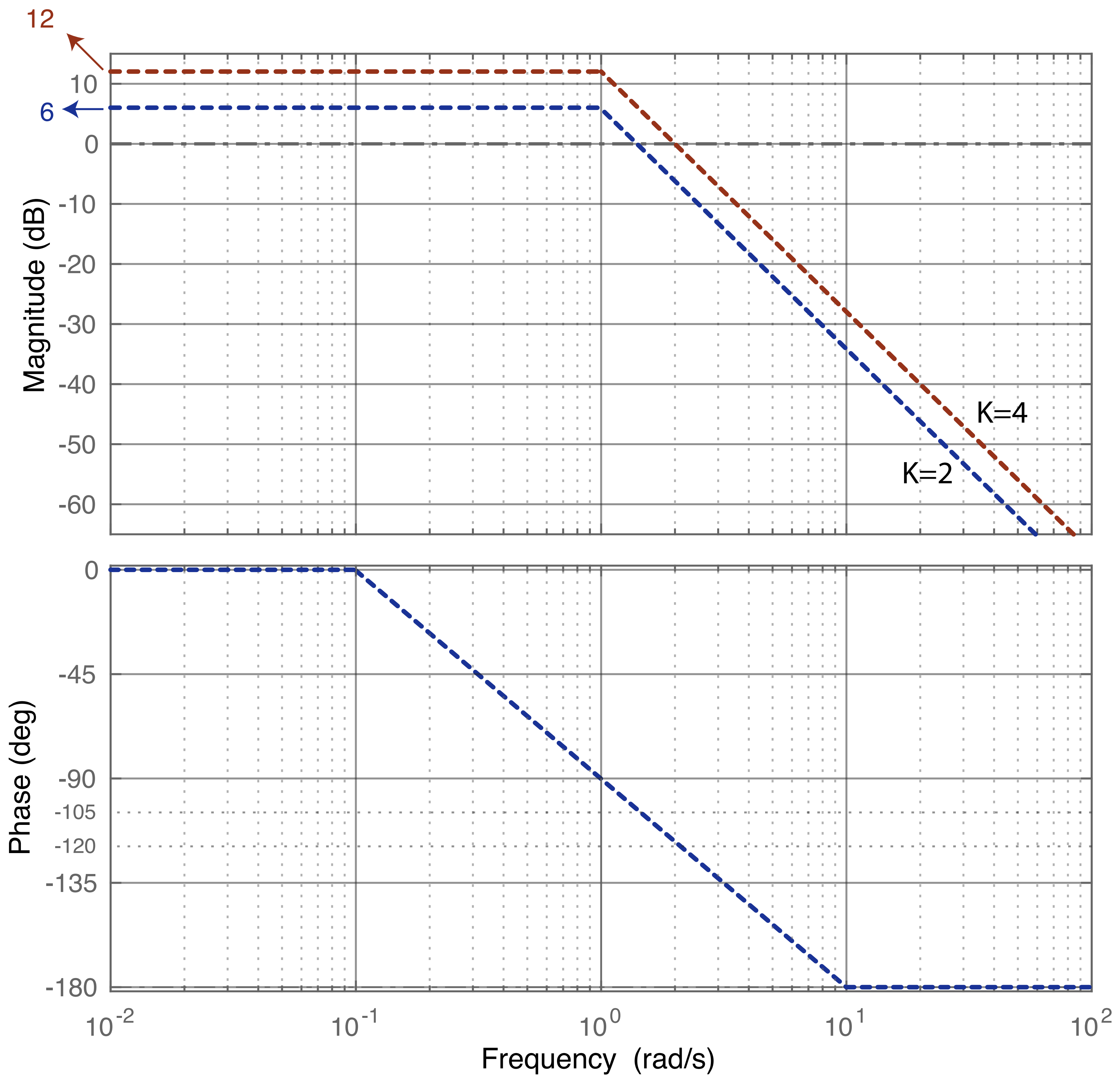
Bode Plot

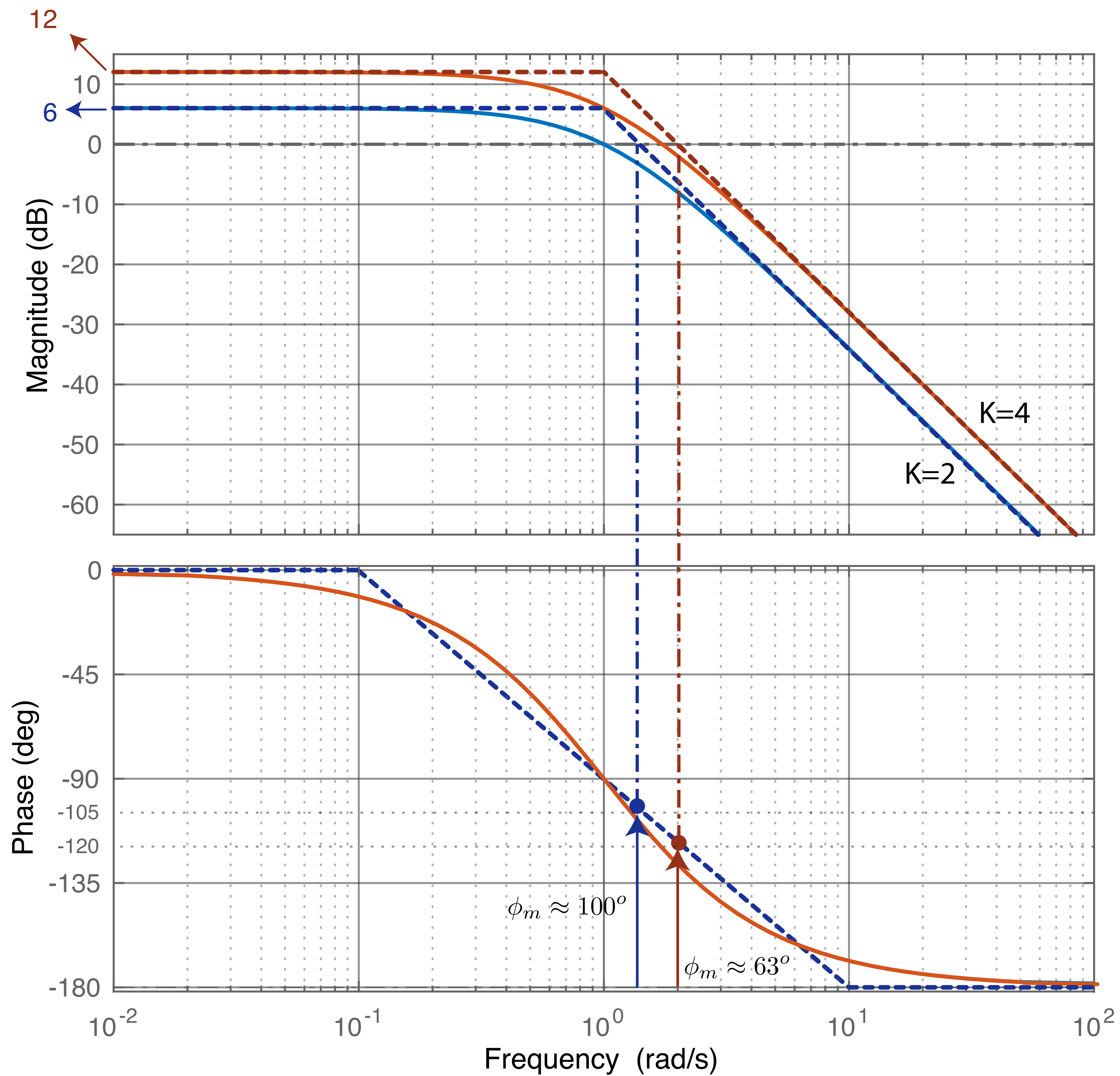






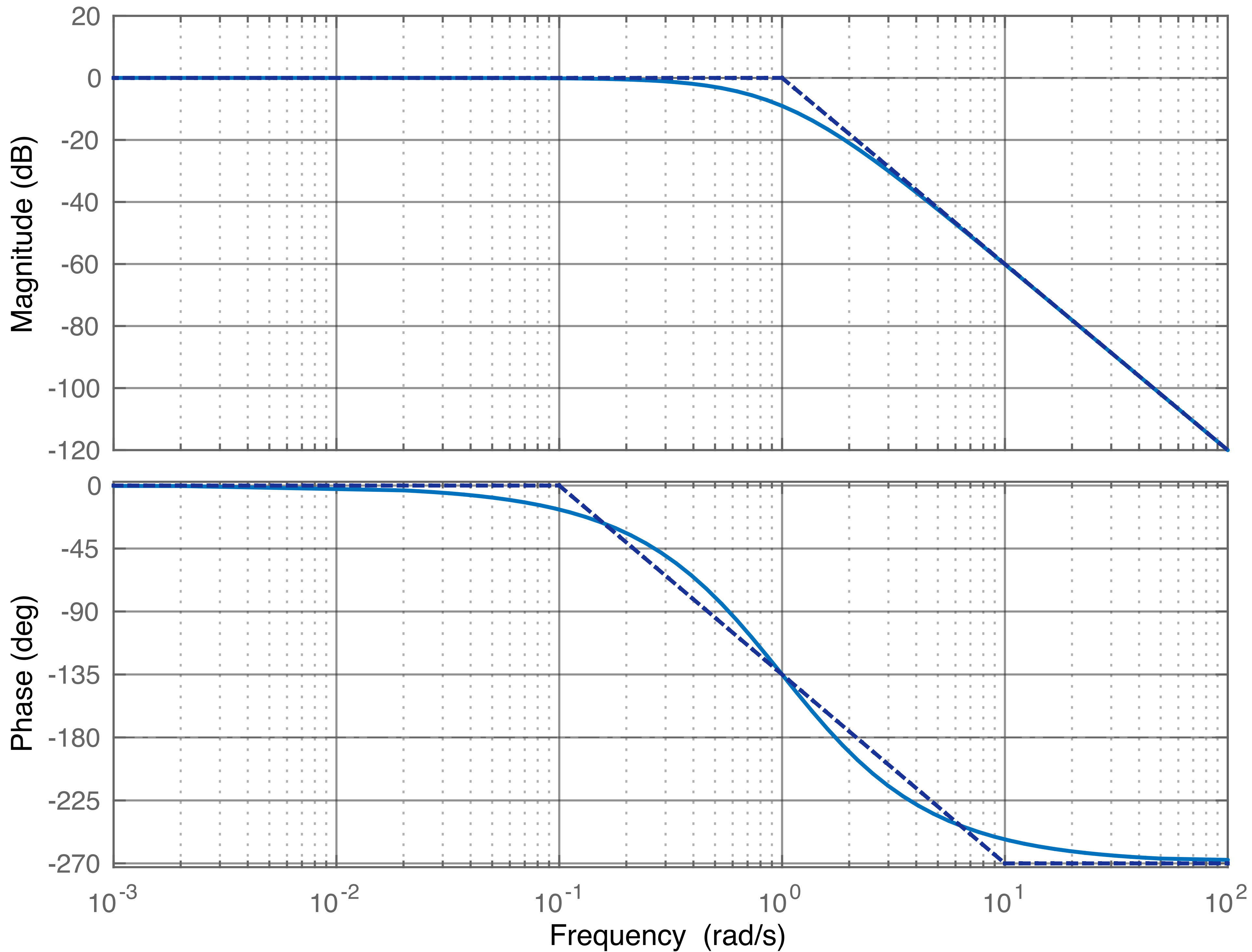




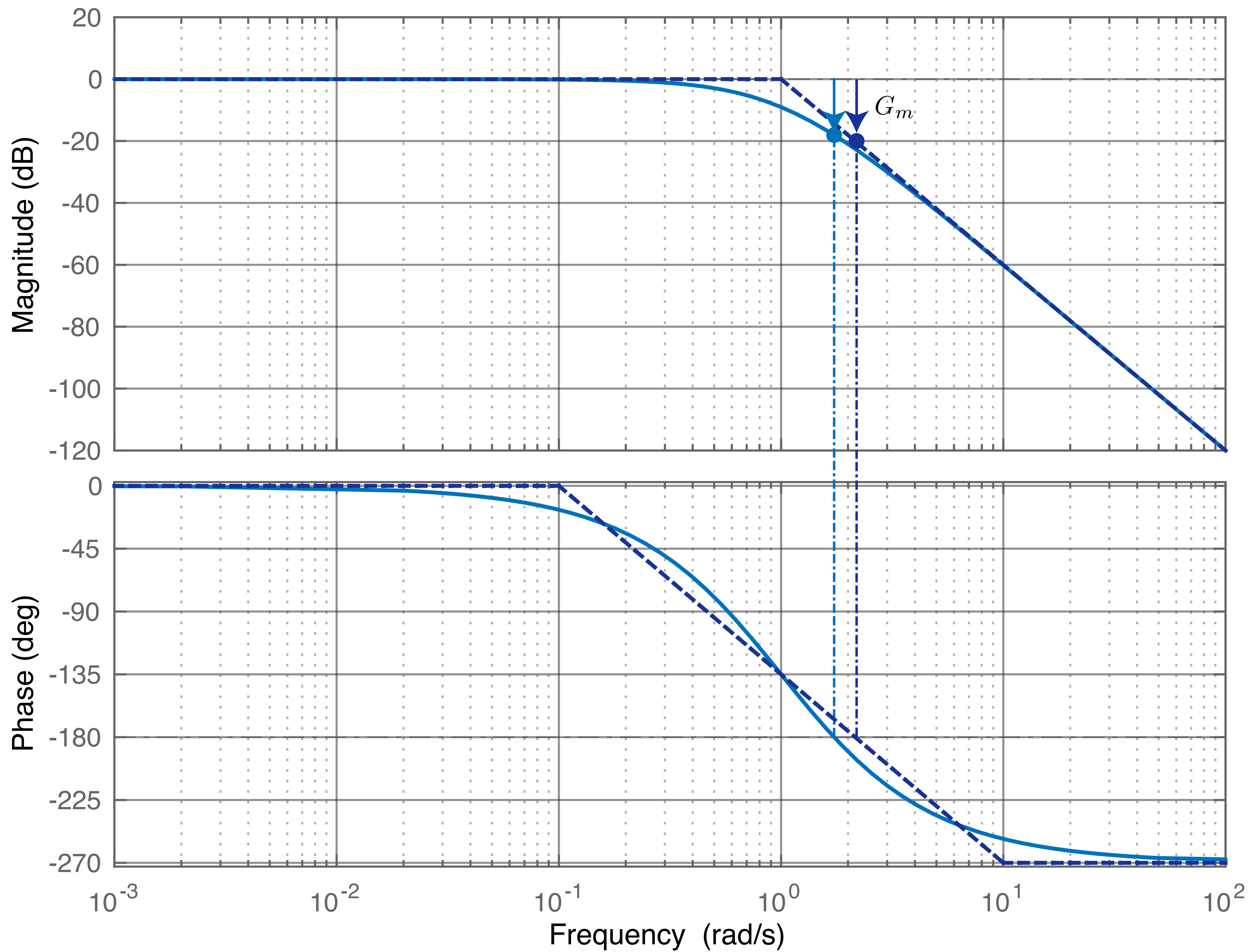




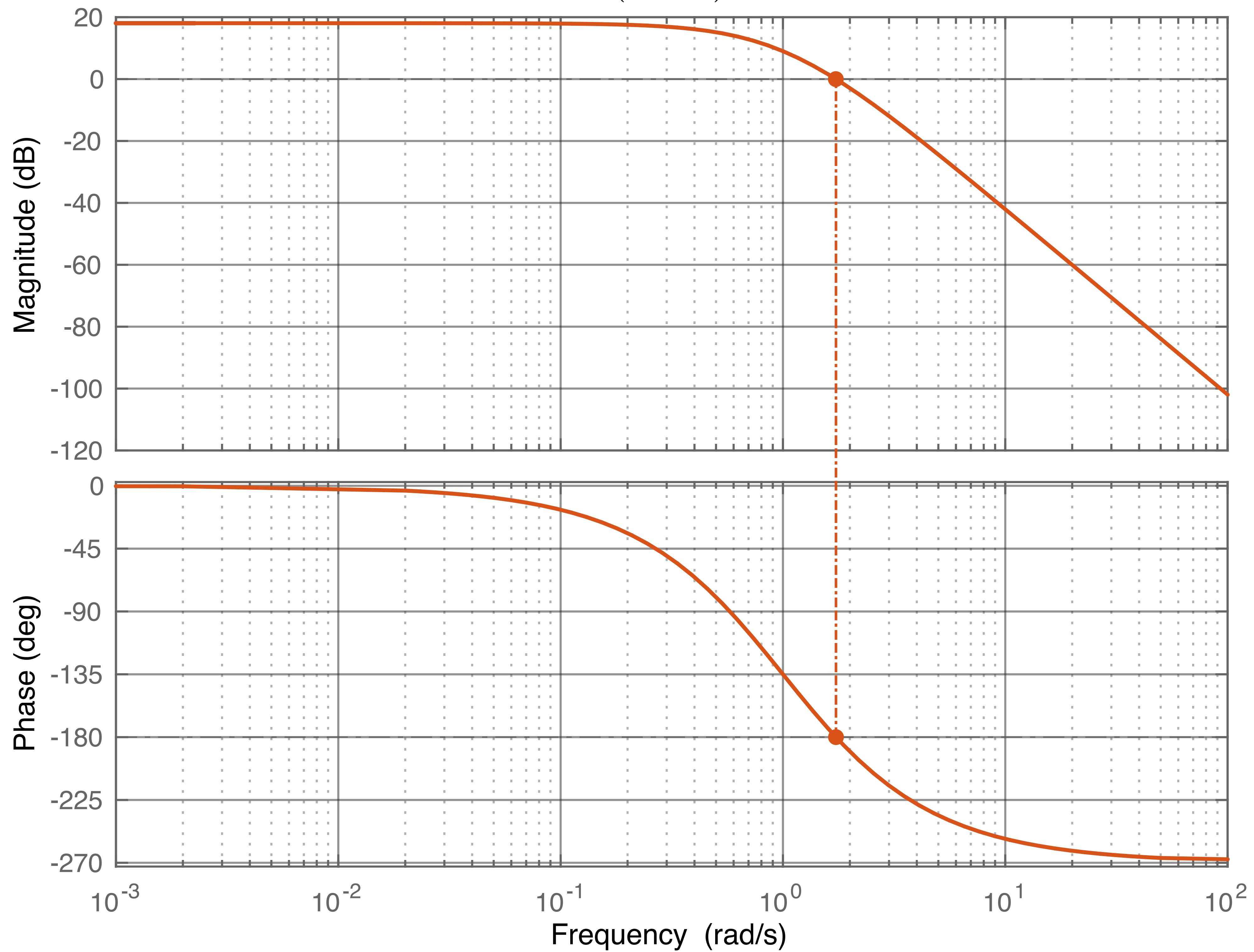
$$\frac{1}{(s+1)^3}$$

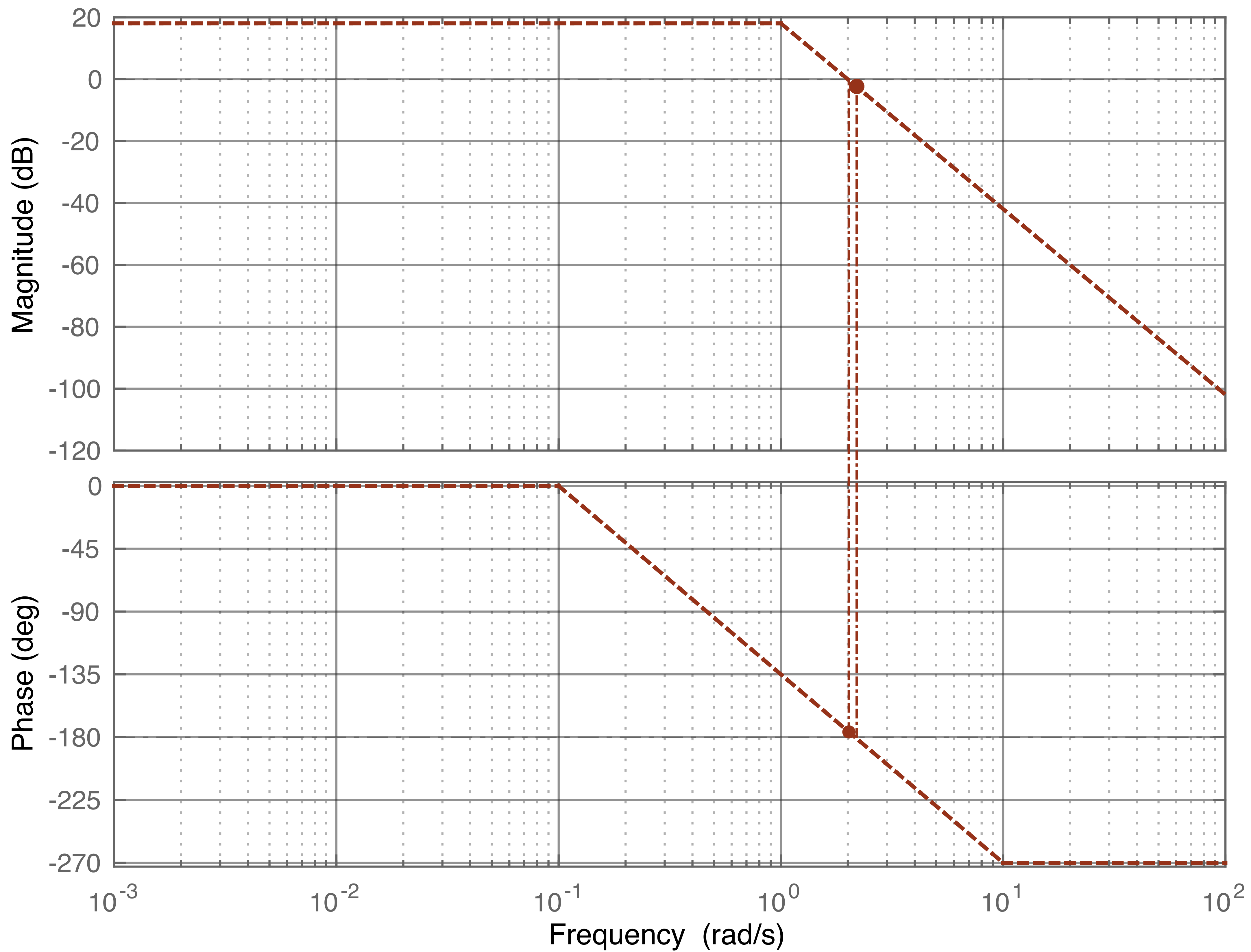


$$\frac{1}{(s+1)^3}$$

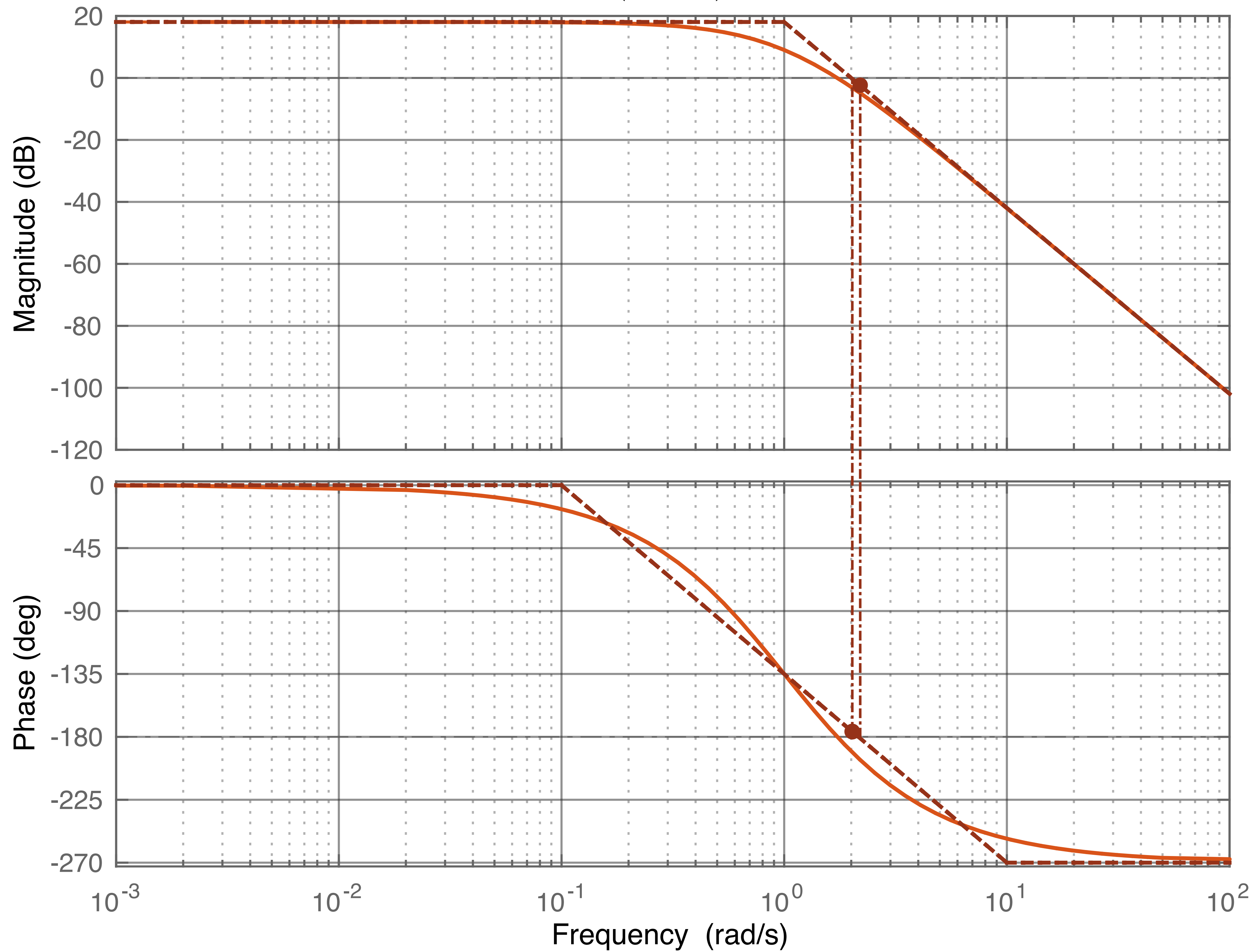


$$\frac{8}{(s+1)^3}$$

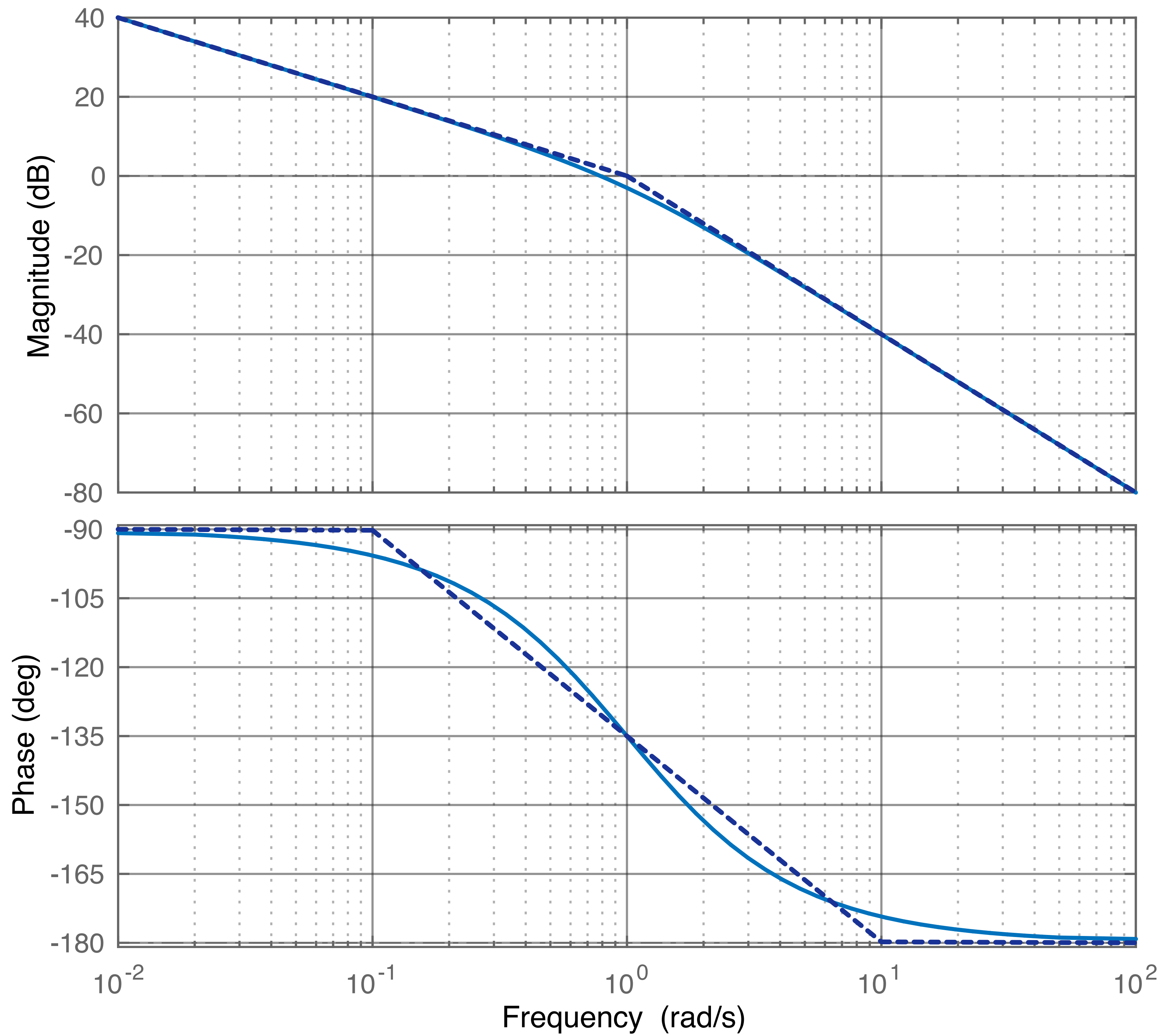




$$\frac{8}{(s+1)^3}$$



$$\frac{1}{s(s+1)}$$



$$\frac{1}{s(s+1)}$$

