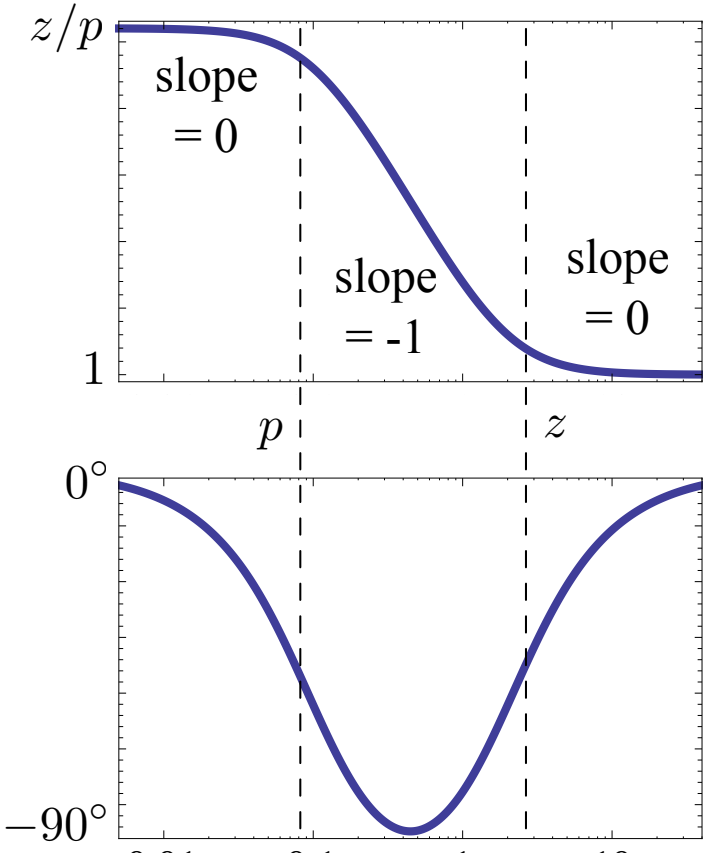
Lag Compensation: Bode Plot



- $\dfrac{j\omega + z}{j\omega + p} \xrightarrow{\omega \to 0} \dfrac{z}{p}$

  steady-state tracking error:

$$e(\infty) = \frac{sR(s)}{1 + D(s)G(s)}\bigg|_{s=0}$$

  large $z/p \Longrightarrow$ better s.s. tracking

- lag decreases $\omega_c \Longrightarrow$ slows down time response (to compensate, adjust K or add lead)
- caution: lead increases PM, but adding lag can undo this
- to mitigate this, choose both z and p very small, while maintaining desired ratio z/p