Lead & Lag Compensation

Need to choose lag pole/zero that are sufficiently small (not to distort the phase lead too much) and satisfy $\dfrac{z_{\text{lag}}}{p_{\text{lag}}} \approx 2.5$.

We can stick with our previous design:

$$z_{\text{lag}} = 0.05, \qquad p_{\text{lag}} = 0.02$$

Overall controller:

$$\underbrace{4\frac{\frac{s}{0.8}+1}{\frac{s}{5}+1}}_{\substack{\text{lead (with} \\ \text{gain } K=4 \text{ absorbed)}}} \cdot \underbrace{\frac{s+0.05}{s+0.02}}_{\substack{\text{lag (not in} \\ \text{Bode form)}}}$$

(Note: we don't rewrite lag in Bode form, because $z_{\text{lag}}/p_{\text{lag}}$ is not incorporated into K.)