Let $G_p(s) = \dfrac{1}{s-1}, \qquad G_c(s) = K\dfrac{s+z}{s+p}$

Problem: given $p = 2$, find z to place poles at $-2 \pm 3j$.

Solution:

- we already found that we need $z = 5$
- resulting characteristic polynomial:

$$(s-1)(s+2) + K(s+5)$$
$$s^2 + (K+1)s + 5K - 2$$

- compare against desired characteristic polynomial:

$$s^2 + 4s + 13 \qquad \Longrightarrow \qquad K+1 = 4, \; 5K - 2 = 13$$

so we need $K = 3$

- compute s.s. tracking error: $\left| \dfrac{1}{1 - \frac{Kz}{p}} \right| = \dfrac{1}{6.5} \approx 15\%$