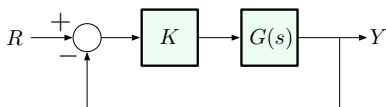


Example 2



$$G(s) = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s} \quad \zeta, \omega_n > 0$$

Consider gain $K = 1$, which gives closed-loop transfer function

$$\begin{aligned} \frac{KG(s)}{1 + KG(s)} &= \frac{\frac{\omega_n^2}{s^2 + 2\zeta\omega_n s}}{1 + \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s}} \\ &= \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2} \quad \text{--- prototype 2nd-order response} \end{aligned}$$

Question: what is the gain margin at $K = 1$?

Answer: $\text{GM} = \infty$