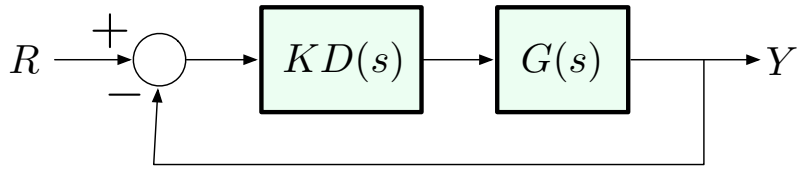
Design, Second Attempt



$$G(s) = \frac{1}{s^2}$$

Let's try proportional-derivative feedback:

$$KD(s) = K(\tau s + 1), \qquad \text{where } K = K_{\mathrm{P}},\ K\tau = K_{\mathrm{D}}$$

Open-loop transfer function: $KD(s)G(s) = \dfrac{K(\tau s + 1)}{s^2}$.

Bode plot interpretation: PD controller introduces a Type 2 term in the numerator, which pushes the slope up by 1

— this has the effect of pushing the M-slope of $KD(s)G(s)$ from -2 to -1 past the break-point ($\omega = 1/\tau$).