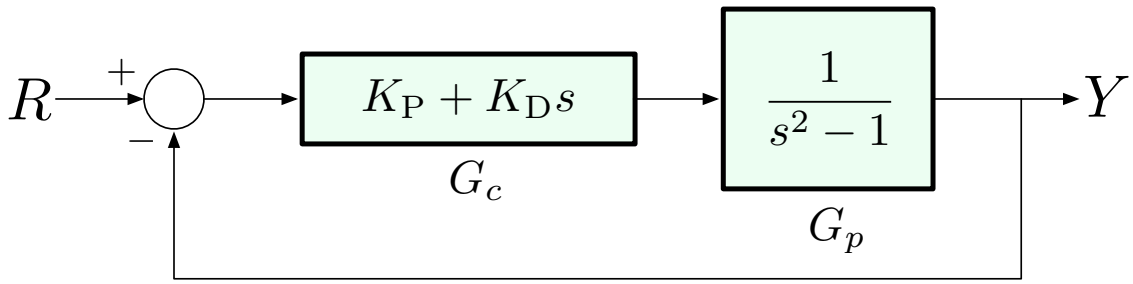
Example

PD control of an unstable 2nd-order plant



$$\frac{Y}{R} = \frac{G_c G_p}{1 + G_c G_p} \qquad \text{poles: } 1 + G_c(s)G_p(s) = 0$$

$$1 + (K_\mathrm{P} + K_\mathrm{D}s)\left(\frac{1}{s^2-1}\right) = 0$$

We will examine the impact of varying $K = K_\mathrm{D}$, assuming the ratio $K_\mathrm{P}/K_\mathrm{D}$ *fixed*.