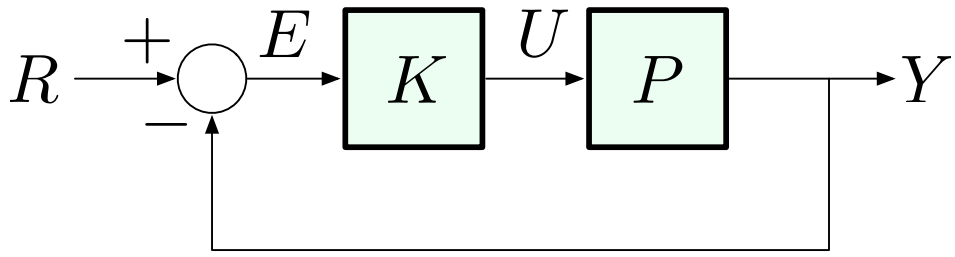
System Type



$$R(s) = \frac{1}{s^{k+1}} \implies E = \frac{1}{1+KP}R = \frac{1}{1+KP}\frac{1}{s^{k+1}}$$

$$e(\infty) = sE(s)\Big|_{s=0} = \frac{1}{1+KP}\frac{1}{s^k}\Bigg|_{s=0}$$

— let's see how forward gain KP affects tracking performance.

Let's suppose that KP has nth-order pole at $s=0$: $KP = \dfrac{K_0}{s^n}$

$$sE(s) = \frac{1}{\left(1+\frac{K_0}{s^n}\right)s^k} = \frac{s^{n-k}}{s^n+K_0}$$ — what about $sE(s)\Big|_{s=0}$?