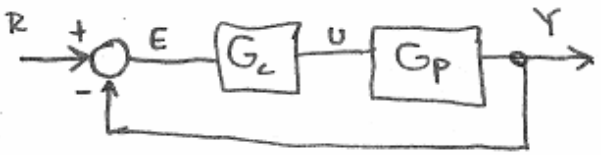
CONTROL OVERVIEW



Goal: $y(t)$ follows $r(t)$

Open loop G_p

Closed loop $H_{cl} = \dfrac{G_c G_p}{1 + G_c G_p}$

MATLAB `Hcl = feedback(Gc * Gp, 1)`

P control $G_c = K$ $\quad u(t) = K e(t)$

PI control $G_c = K_p + \dfrac{K_I}{s} = \dfrac{K_p s + K_I}{s}$ $\quad u(t) = K_p e(t) + K_I \int e(t)\,dt$

PD control $G_c = K_p + K_D s$ $\quad u(t) = K_p e(t) + K_D \dot{e}(t)$

PID control $G_c = K_p + K_D s + \dfrac{K_I}{s} = \dfrac{K_D s^2 + K_p s + K_I}{s}$ $\quad u(t) = K_p e(t) + K_D \dot{e}(t) + K_I \int e(t)\,dt$

ON-OFF CONTROL $\quad u(t) = \begin{cases} 1 & e > 0 \\ 0 & e \leq 0 \end{cases}$

CLOSED-LOOP SPECS

speed (ζ)	settling time	band width
accuracy (e_{ss})	overshoot	disturb rejection
	e_{ss}	power, $