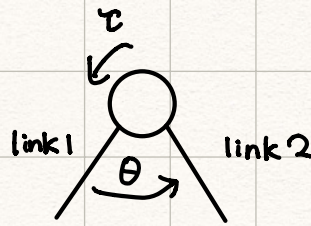
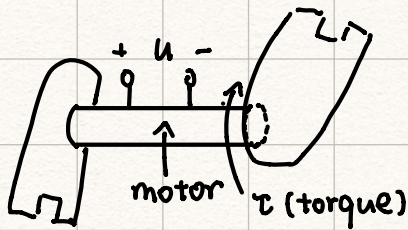


Brief overview

Office Hour: Friday 12-1 GB 343A

Ex: robot joint



u = voltage

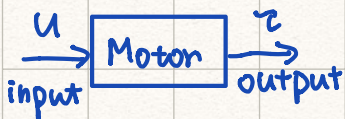
time

Problem: Assign voltage $u(t)$ s.t. angle b.w. link 1 & link 2, denoted θ , is equal to a desired value θ_d .

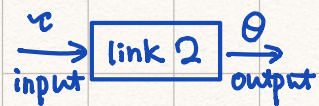
degree of freedom

Ass: link 1 = fixed \Rightarrow 1 DOF robot link (arm)

Ass: torque τ is proportional to voltage u .

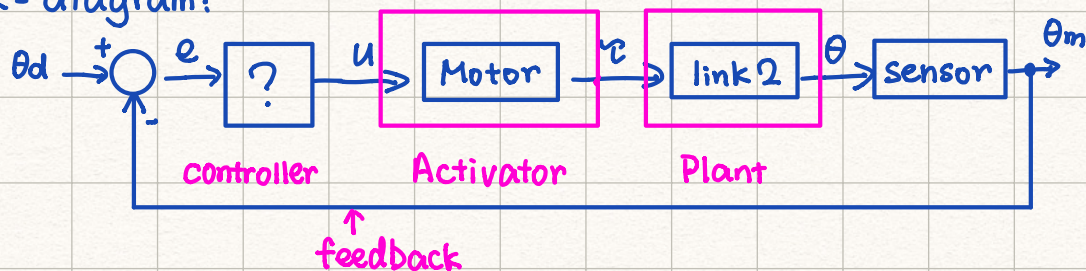


link is subject to torque which rotates hence change θ



$\theta \rightarrow$ sensor $\rightarrow \theta_m$ θ_m = measure of θ (digital)

Block-diagram:



$e = \theta_d - \theta$ = error b.w. actual θ and θ_d

Ass: all variables are proportional

? : Intuition: try to correct error

If $e > 0$, i.e. $\theta < \theta_d \Rightarrow$ need $\theta \uparrow$

If $e < 0$, i.e. $\theta > \theta_d \Rightarrow$ need $\theta \downarrow$

Idea: use proportional control: $u = K \cdot e$, $K > 0$

This course: in this e.x:

- 1). Modeling of dynamical systems ("plants")
- 2). Transient and steady-state time response of a system
- 3). Stability concept and tests for it.
- 4). Basic control design
- 5). Simulation, Parameter tuning
- 6). Implementation