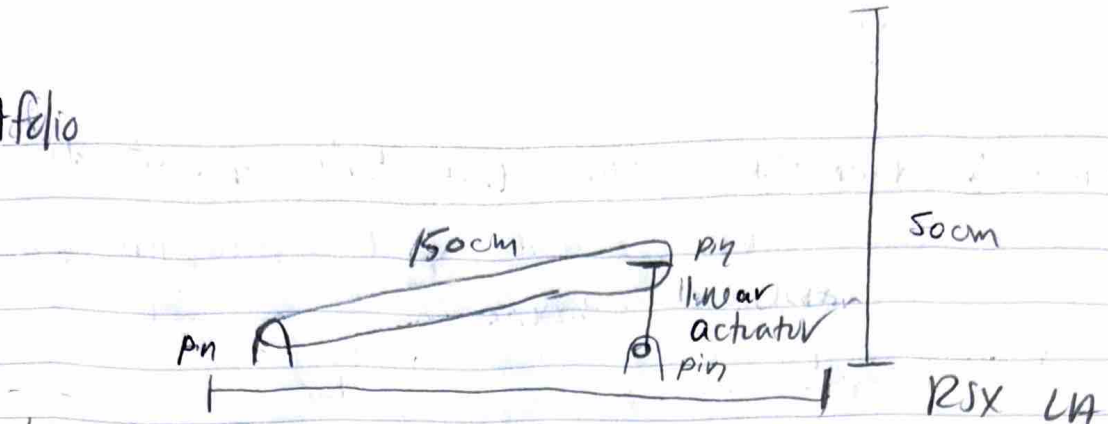
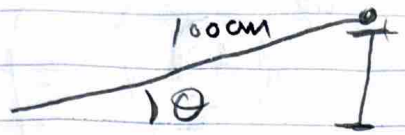
Portfolio





$M = L\cos\theta$

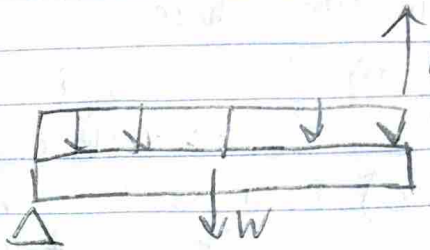
moment dec as $\cos\theta$ increases
the higher the θ, the lower the moment

- actuator should be at $X = L$ to maximize forces and this height.

$H = L\sin\theta$

↳ higher θ, higher H
↳ max H at greater θ so $X = L$ for the actuator placement

Step 2: Non Rigid modeled as pinned pinned



a) Max beam deflection

assumes Superposition of I + II
assumes small θ so no rxn at roller of I

so $\delta_{max} = \delta_{II} + \delta_{I}$ $\quad \frac{-5wL^4}{384EI} + \frac{(L/P)L^3}{48EI}$

$\sum M = W\frac{50}{2} - 294\cdot10^3$

$P_{max} = 588\cdot10^3 N$

$.02 \cdot 1.5m = 0.03m <$

$I = \left(\frac{-5wL^4}{384E} - \frac{PL^3}{48E}\right) 0.03 \Rightarrow \frac{M_{max}}{I} = 6.89\cdot10^{-6} \Rightarrow$ must be bigger

rolled steel

$E = 200\cdot10^9$, assumes beam neglects

Use W150x18 to play it safe $I = 9.2$ FOS which is > 6.89