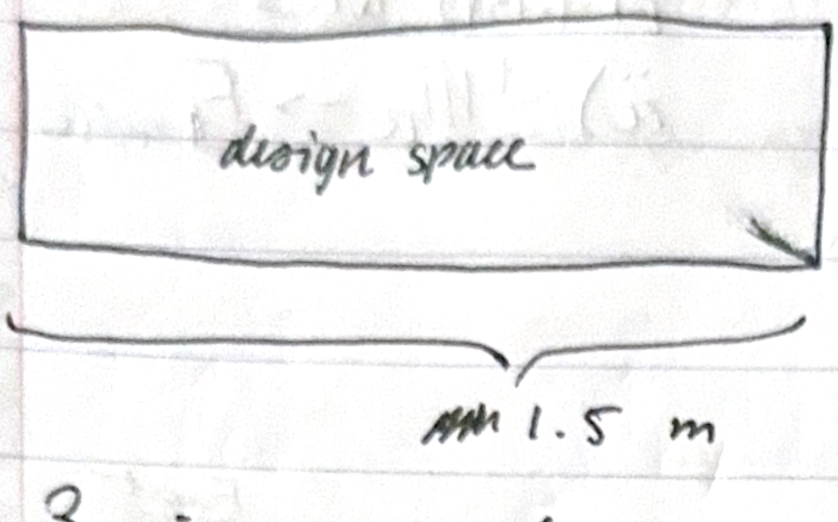
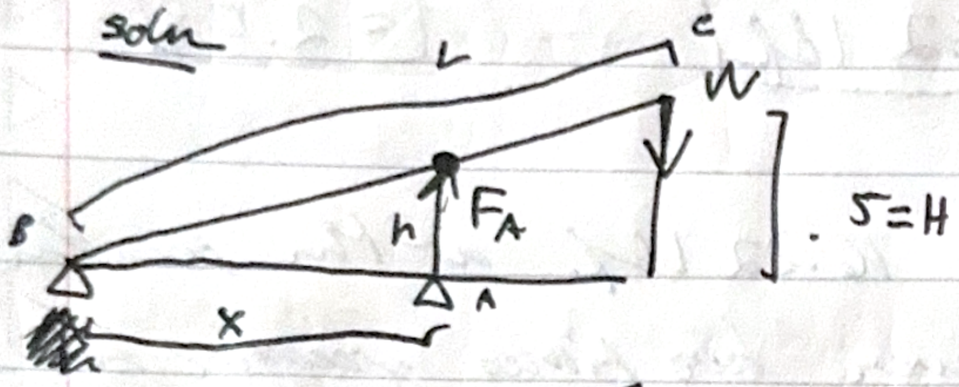
Portfolio Design



find
lift rigid
to max height
plane

3 pin supports &
linear actuator

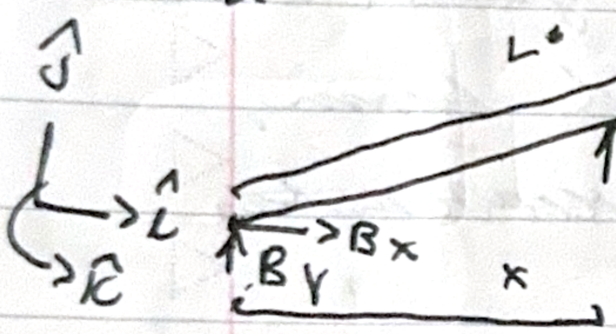
soln



$\frac{x}{h} = \frac{\sqrt{L^2-H^2}}{H}$

$xH = h\sqrt{L^2-H^2}$

$\int \rightarrow x = \frac{h\sqrt{L^2-H^2}}{H}$



$\sum M = 0$

$F_A(x) - W(\sqrt{L^2-H^2}) = 0$

$W = F_A(\frac{h}{H})$

RSX Linear actuator

$h_{max} = 1.5\ m$

$F_A = 294\ kN$

W is maximized when $h = H$

Reflection

W is maximized when $h = H$. In this case, with the RSX linear actuator, the maximum stroke length is > than the max height in the design space, so it is possible to place it directly under W. With no bound on height, $WH = F_A h$. To maximize both, $W = H = \sqrt{F_A h}$. With a fixed h, you can use the first relation ($\frac{x}{h} = \frac{\sqrt{L^2-H^2}}{H}$) to find the optimal position / value of x for any bar of length L.