ENGRD 2020
Fall 2025

Homework 4
Statics and Mechanics of Solids

Due Sept 29th
11:59pm via
Gradescope

***Please submit a sketch of the design as part of this homework. We will ask you to upload your design online (portfolio) as part of homework 5.

Highest possible height: 50 cm

Actuator type: RSX, max force: 294 kN, max length: 1.5 m

FBD of actuator: $C_x = B_x$, lets assume = 0 $B_y = C_y = 147$ kN downward

Use $\Sigma \vec{M}_A = 0 \Rightarrow$ find w_{max} (FBD of Rod only)

$$\Sigma \vec{M}_A = 0 = \left[(75\text{cm}\,\hat{i} + 25\text{cm}\,\hat{j}) \times (147\text{kN}\,\hat{j})\right] + \left[(75\text{cm}\,\hat{i} + 25\text{cm}\,\hat{j}) \times (294\text{kN}\,\hat{j})\right]$$
$$+ \left[(150\text{cm}\,\hat{i} + 50\text{cm}\,\hat{j}) \times (-w_{max}\,\hat{j})\right] = 11025\,\hat{k} + 22050\,\hat{k} - 150\,w_{max}\,\hat{k}$$

$w_{max} = 220.5$ kN