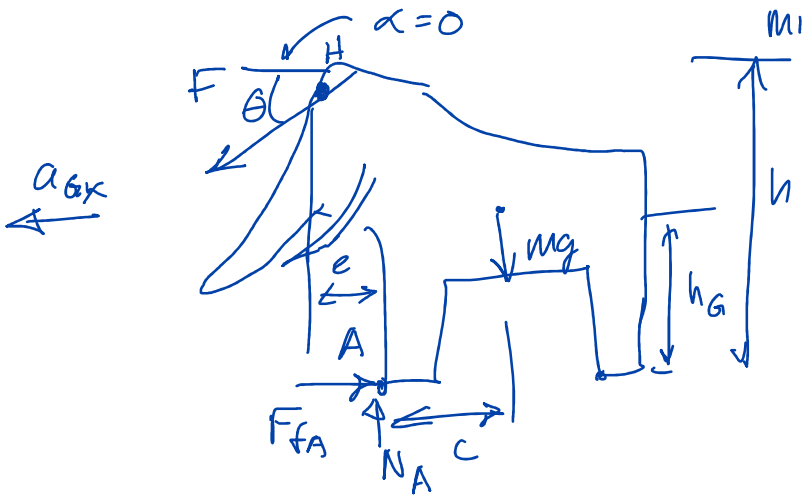
Q2: You want to tip that mammoth! You and your friends manage to lasso the mammoth around the top of it's head. If each person can apply 400 N to pulling on the mammoth, how many people will you need to tip the mammoth? $\theta = 30°$ The ground is rough (no slipping)



minimum for tipping:
- $\alpha = 0$, $a_{Gx} = 0$
- Normal force @ A
- no slipping
- $a_{Gy} = 0$

$\Sigma F_x: -F\cos\theta + F_{fA} = 0$

$\Sigma F_y: N_A - mg = 0$

$\Sigma M_A: \vec{r}_{H/A} \times \vec{F} - mgc = 0$

$\vec{r}_{H/A} = -e\hat{i} + h\hat{j}$

$\vec{F} = -F\cos\theta\hat{i} - F\sin\theta\hat{j}$

$\vec{r}_{H/A} \times \vec{F} = (eF\sin\theta + hF\cos\theta)\hat{k}$

$\Rightarrow eF\sin\theta + hF\cos\theta - mgc = 0$

$F(e\sin\theta + h\cos\theta) = mgc$

$$F = \frac{mgc}{(e\sin\theta + h\cos\theta)} = \frac{6000\,kg(9.81\,m/s^2)(1.5\,m)}{(0.3\sin 30 + 3.75\cos 30)}$$

$$= \frac{88290}{3.398} = 25982.9\,N$$

400 N per person: $n = \frac{25982.9\,N}{400\,N} = 64.957$ round up $=$ 65 people.