

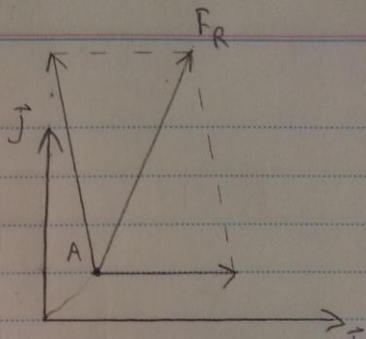
Kulišić(bez 5.6.)

5. Statika

5.1.

$A(1\text{ m}, 1\text{ m}, 0\text{ m})$

$\frac{\vec{F}_1}{N} = 3\vec{i}$ $\frac{\vec{F}_2}{N} = -\vec{i} + 5\vec{j}$


$$\vec{M} = \vec{r} \times \vec{F} = \vec{r} \times (3\vec{i} + (-\vec{i} + 5\vec{j})) = \vec{r} \times (2\vec{i} + 5\vec{j})$$
$$= (\vec{i} + \vec{j}) \times (2\vec{i} + 5\vec{j}) = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 1 & 0 \\ 2 & 5 & 0 \end{vmatrix} = 3\vec{k}$$

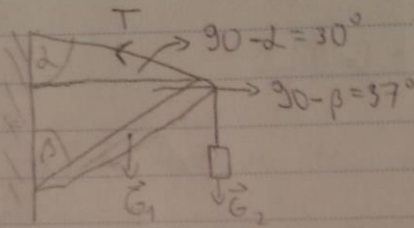
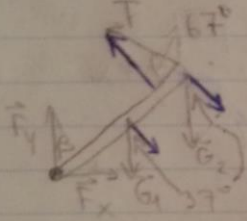
5. Statika

5.2. $\alpha = 60^\circ$, $\beta = 53^\circ$

$m = 10 \text{ kg}$

$m_v = 20 \text{ kg}$

Prikaz sile:



$G_1 = gm = 98.1 \text{ N}$

$G_2 = g \cdot m_v = 196.2 \text{ N}$

Gledamo samo sile koje bi utjecale na rotaciju štapa (znači F_y i F_x ne utječu na rotaciju jer su u centru rotacije) i vektorski zbroj tih sila mora biti 0 da bi tijelo mirovalo

$G_{21} = \cos(37^\circ) \cdot G_2 = 156.69 \text{ N}$

$G_{11} = \cos(37^\circ) \cdot G_1 = 78.35 \text{ N}$

$T_1 = \sin 67^\circ \cdot T$

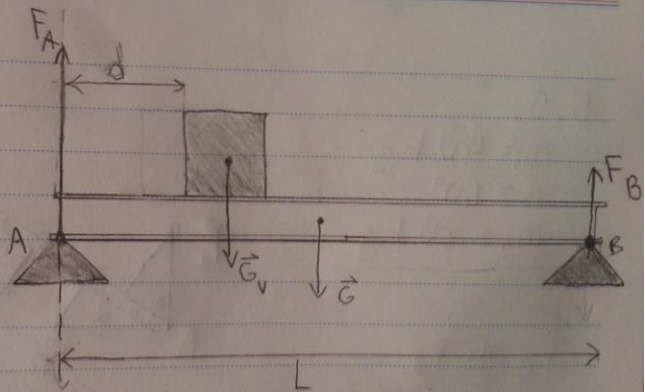
5.3.

$L = 12 \text{ m}$

$m = 100 \text{ kg}$

$m_v = 200 \text{ kg}$

$d = 3 \text{ m}$



① sile:

$\vec{F}_A + \vec{F}_B - \vec{G} - \vec{G}_v = 0 \Rightarrow F_A + F_B = 2943 \Rightarrow F_A = 1962 \text{ N}$

② momenti s

obzirom na točku A:

$0 \cdot \vec{F}_A + 12 \cdot \vec{F}_B - 6 \cdot \vec{G} - 3 \cdot \vec{G}_v = 0$

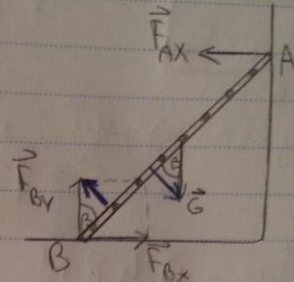
$\vec{F}_B = 981 \text{ N}$

5.4.

$$\alpha = 45^\circ$$

$$m = 10 \text{ kg}$$

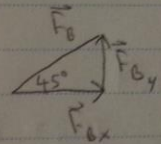
$$\vec{F}_{tr} = \vec{F}_{Bx}$$



Moment ljestvi iz točke A: $\Delta \cdot F_{By} - \frac{1}{2} \Delta G_{\perp} = 0$

$$\sin \alpha F_{By} - \frac{\sin \alpha G}{2} = 0$$

$$F_{By} = 49.05 \text{ N}$$



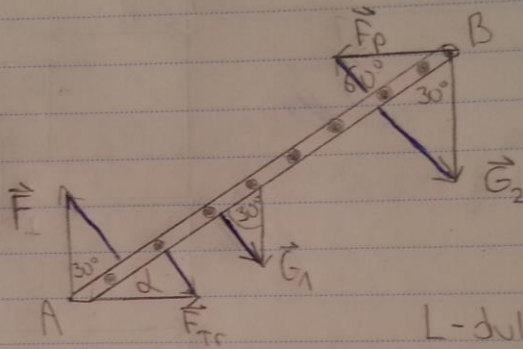
$$\tan \alpha = \frac{F_{By}}{F_{Bx}} \Rightarrow \vec{F}_{Tr} = \vec{F}_{Bx} = 49.05 \text{ N}$$

5.5.

$$m_1 = 40 \text{ kg}$$

$$\alpha = 60^\circ$$

$$m_2 = 80 \text{ kg}$$



$$F_{Tr} = (N) F$$

L-duljina ljestvi

moment \rightarrow točka A:

$$\Delta \cdot G_{2\perp} + \frac{1}{2} \Delta G_{1\perp} - \Delta \cdot F_{p\perp} = 0$$

$$\sin 30^\circ \cdot m_2 g + \frac{\sin 30^\circ}{2} m_1 g = \sin 60^\circ \cdot F_p$$

$$F_p = 566.38 \text{ N}$$

$$F_{Te} = F_p$$

moment \rightarrow točka B:

$$\frac{1}{2} \Delta \cdot m_1 g \sin 30^\circ - \Delta \cdot F_{Tr} \sin 60^\circ - \Delta \cdot \sin 30^\circ F = 0$$

$$F = 1177.2$$

$$\mu = \frac{F_{Tr}}{F} = 0.48$$

5.7.

$$m_z = 80 \text{ kg}$$

$$G_c = 400 \text{ N}$$

$$L = 5 \text{ m}$$

$$r = 1 \text{ m}$$

$$x = L - 2.5 - 2r = 0.5 \text{ m}$$

$$\sum M_i = 0$$

$$\frac{1}{2} G_c + L G_c - (0.5 + 2.5) \vec{F} - L \cdot \vec{F} = 0$$

$$L \left(\frac{G_c}{2} + G_c \right) = \vec{F} \cdot 8 \Rightarrow \vec{F} = \underline{\underline{615.5 \text{ N}}}$$

