

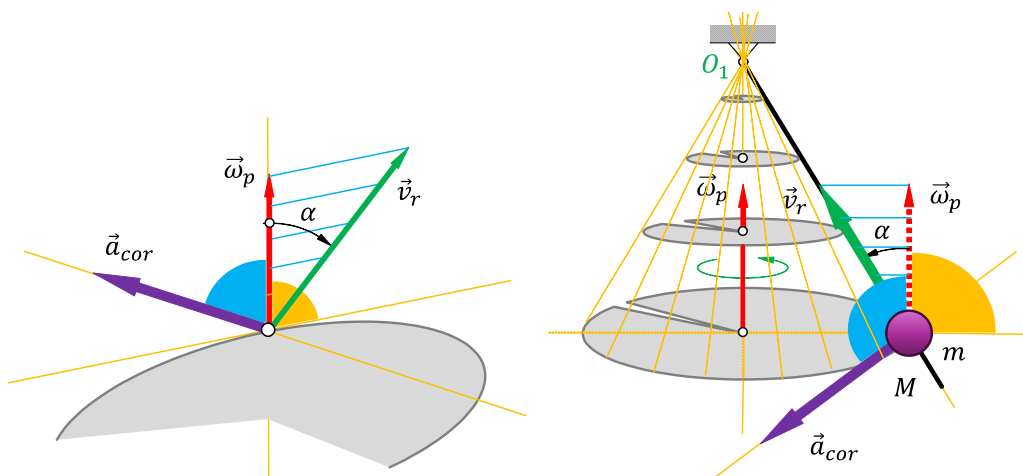
1. Zadatak

Za datu tačku M koja se kreće prema određenom zakonu puta registrovana je njena prenosna brzina od 20 rad/s, odnosno relativna brzina od 10m/s. Potrebno je sračunati, nacrtati intenzitet a potom i napisati šta predstavlja Koriolisovo ubrzanje..

$$\omega_p := 20 \quad v_r := 10$$

$$a_{cor} := 2 \cdot \omega_p \cdot v_r$$

$$a_{cor} = 400$$



$$\alpha := \frac{\pi}{2}$$

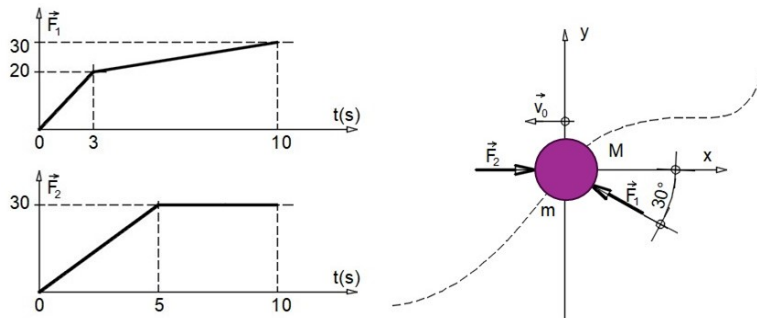
$$a_{cor} := 2 \cdot \omega_p \cdot v_r \cdot \sin(\alpha)$$

$$a_{cor} = 400$$

Koriolisovo ubrzanje karakteriše uzajamno dejstvo prenosnog i relativnog kretanja tačke, odnosno promenu relativne brzine usled prenosnog dela kretanja.

2. Zadatak

Na osnovu date skice, primenom zakona o promeni količine kretanja sa zanemarivanjem težine materijalne tačke usled dejstva sila F_1 i F_2 , sračunati: pravac vektora brzine tačke M, kao i njegov intenzitet u trenutku $t=10s$.



Sračunavanje pravaca i smerova impulsa sila jer su oni kolinearni sa silama:

$$I_1 = \int_{t_0}^{t_1} F_1 dt \quad I_1 := \frac{20 \cdot 3}{2} + \frac{20 + 30}{2} \cdot 7 \quad I_1 = 205$$

$$I_2 = \int_{t_0}^{t_1} F_2 dt \quad I_2 := \frac{30 \cdot 5}{2} + 30 \cdot 5 \quad I_2 = 225$$

Primenom zakona o promeni količine kretanja nalazimo projekcije sila:

$$\text{Given} \quad m := 5 \quad \alpha := 0 \quad v_{0x} := 5 \quad \beta := 30 \quad v_{0y} := 0$$

$$\text{x-pravac:} \quad m \cdot v_{1x} - m \cdot v_{0x} = -I_1 \cdot \cos(\alpha \cdot \text{deg}) + I_2 \cdot \cos(\beta \cdot \text{deg})$$

$$\text{y-pravac:} \quad m \cdot v_{1y} - m \cdot v_{0y} = I_1 \cdot \sin(\alpha \cdot \text{deg}) - I_2 \cdot \sin(\beta \cdot \text{deg})$$

Rešenja sistema jednačina:

$$\text{Find}(v_{1x}, v_{1y}) \rightarrow \begin{pmatrix} 45 \cdot \cos(30 \cdot \text{deg}) - 36 \\ -45 \cdot \sin(30 \cdot \text{deg}) \end{pmatrix}$$

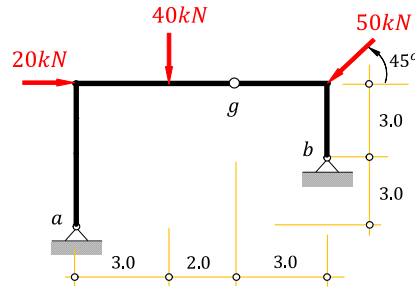
$$v_{1x} := 45 \cdot \cos(30 \cdot \text{deg}) - 36 \quad v_{1x} = 2.971$$

$$v_{1y} := -45 \cdot \sin(30 \cdot \text{deg}) \quad v_{1y} = -22.5$$

$$\text{Intenzitet brzine:} \quad v_M := \sqrt{(v_{1x})^2 + (v_{1y})^2} \quad v_M = 22.695 \frac{\text{m}}{\text{s}}$$

3. zadatak

Za nosač na skici primenom opšte jednačine statike sračunati vertikalne reakcije veza u čvoru "a" i "b".



1. plan pomeranja: $l_1 := 6$ $l_2 := 3$

$$\delta\phi_1 := \frac{1}{(3 + 2 + l_1)} \quad \delta\phi_1 = 0.091$$

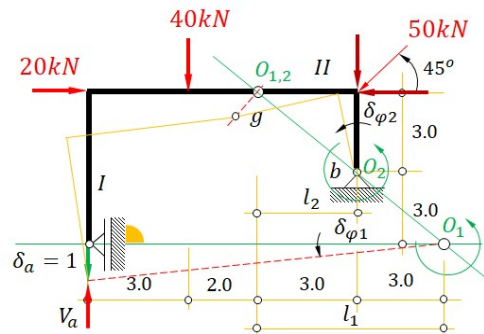
Given uslov: $\delta\phi_1 \cdot l_1 = \delta\phi_2 \cdot l_2$

$$\text{Find}(\delta\phi_2) \rightarrow \frac{2}{11} \quad \delta\phi_2 := \frac{2}{11}$$

$\delta A = 0$

$$\text{Given} \quad -V_a \cdot \delta\phi_1 \cdot (5 + 3 + 3) - 20 \cdot \delta\phi_1 \cdot 6 + 40 \cdot \delta\phi_1 \cdot 8 + 50 \cdot \frac{\sqrt{2}}{2} \cdot \delta\phi_2 \cdot 3 = 0$$

$$\text{Find}(V_a) \rightarrow \frac{150 \cdot \sqrt{2}}{11} + \frac{200}{11} \quad V_a := \frac{150 \cdot \sqrt{2}}{11} + \frac{200}{11} \quad V_a = 37.467$$



2. plan pomeranja: $l_{11} := 5$ $l_{22} := 2.5$

$$\delta\phi_2 := \frac{1}{(l_2 + 3)} \quad \delta\phi_2 = \frac{2}{11}$$

Given uslov: $\delta\phi_1 \cdot l_1 = \delta\phi_2 \cdot l_2$

$$\text{Find}(\delta\phi_1) \rightarrow 0.090909090909090909 \quad \delta\phi_1 = \frac{1}{11}$$

$\delta A = 0$

$$\text{Given} \quad -V_b \cdot \delta\phi_2 \cdot 5.5 + 20 \cdot \delta\phi_1 \cdot 6 + 40 \cdot \delta\phi_1 \cdot 3 + 50 \cdot \frac{\sqrt{2}}{2} \cdot \delta\phi_2 \cdot 5.5 - 50 \cdot \frac{\sqrt{2}}{2} \cdot \delta\phi_2 \cdot 3 = 0$$

$$\text{Find}(V_b) \rightarrow 37.888790481512443737 \quad V_b := 37.889$$

