N73

Дано:

$R = 0{,}3\ м$

$m = 1\ кг$

$\upsilon = 30\ км/ч$

Решение:

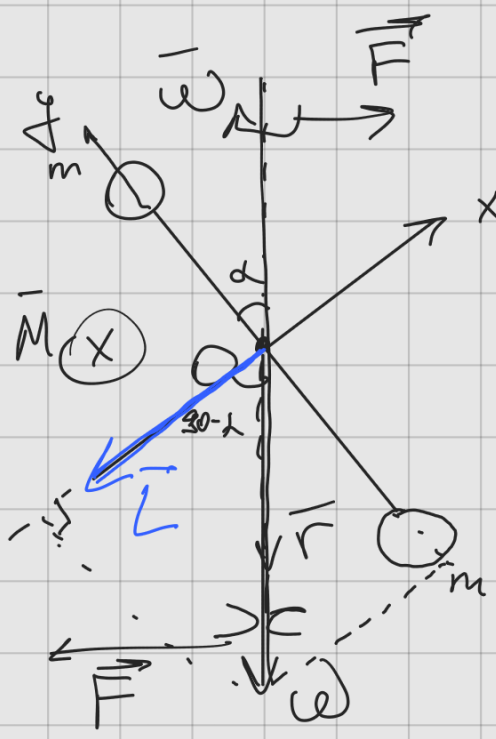
1) $L = I\omega,\ I = \frac{2}{3}mR^2$

2) $\omega = \frac{\upsilon}{R}$

3) $L = \frac{2}{3}mR^2 \cdot \frac{\upsilon}{R} = \frac{2mR\upsilon}{3} = 1{,}6\ \frac{кг \cdot м^2}{с}$

4) $M = \Omega L = \frac{\Delta\alpha}{t} \cdot 1{,}6 = \frac{1}{0{,}1} \cdot 1{,}6 = 16\ Н \cdot м$

N74



$\omega_x = -\omega \sin\alpha$

$\omega_y = -\omega \cos\alpha$

$I_x = 2me^2 = \frac{me^2}{2}$

$I_y = 0$

$|L_x| = \left|-I_x \omega \sin\alpha\right| = \left|-\frac{me^2}{2}\omega \sin\alpha\right| = |L|$

$M = \Omega L \sin(90-\alpha) = \underset{\omega}{\Omega} L \cos\alpha = \omega L \cos\alpha$

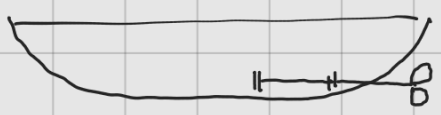
N75

№75

Дано:
$N = 7500 об/мин$
$m = 12 т$
$\rho = 0{,}25 м$
$R = 600 м$
$v = 72 км/ч$
$a = 1 м$

Найти: F

Решение:



1) $\omega = 2\pi\nu = \frac{2\pi N}{60} = \frac{\pi N}{30} = 2.5\pi$

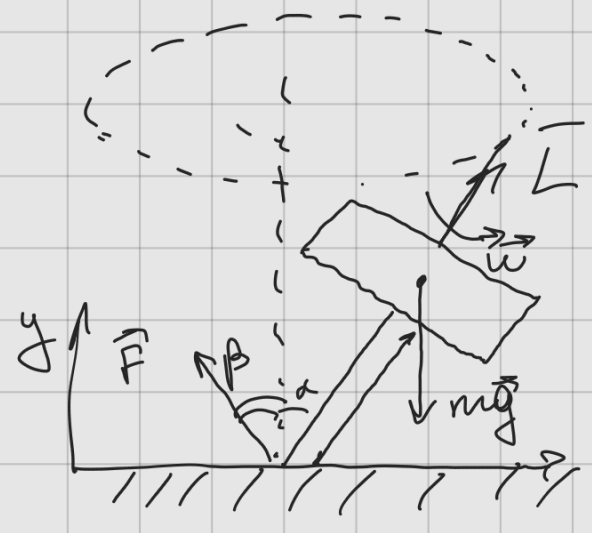
2) $L_B = I\omega = m\rho^2\omega$

3) $\Omega = \frac{v}{R} \Rightarrow M = \Omega L = \frac{m\rho^2\omega v}{R} \Rightarrow$

$\Rightarrow F = \frac{m\rho^2\omega v}{Ra} =$

№76

Дано:
m, α, a
Найти:
β



$L = I\omega$

$M = mg\sin\alpha a$

$mg\sin\alpha a = \Omega \cdot L \cdot \sin\alpha$

$L \uparrow\uparrow \Omega$

ω - известно $\Rightarrow$

$\Rightarrow \Omega = \frac{mga}{I\omega}$

$I\omega$

2) II З.Н. ка : $F\sin\beta = m a_y$; $F\cos\beta = mg$

$$F\sin\beta = m \cdot \Omega^2 a \sin\alpha$$

$$\left.\begin{aligned} \sin\beta &= \frac{m\Omega^2 a\sin\alpha}{F} \\ \cos\beta &= \frac{mg}{F} \end{aligned}\right\} \quad tg\beta = \frac{\Omega^2 a\sin\alpha}{g} =$$

$$= \frac{a\sin\alpha}{g}, \quad \frac{m^2 g^2 a^2}{I^2\omega^2} = \frac{m^2 a^3 g \sin\alpha}{I^2\omega^2}$$