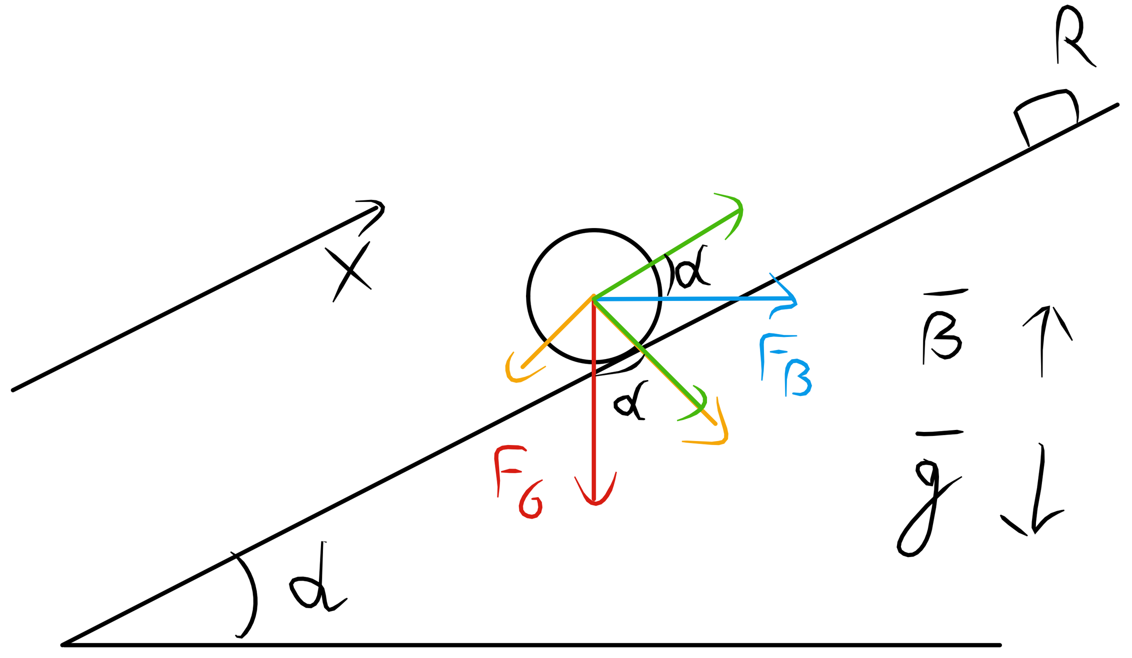

$$F_w = -mg\sin\alpha + BIl\cos\alpha$$

$$I = \frac{\varepsilon}{R} = -\frac{d\Phi}{dt}\frac{1}{R} = -\frac{1}{R} l\dot{x}B\cos\alpha$$

$$m\ddot{x} = -mg\sin\alpha - \frac{B^2l^2\cos^2\alpha}{R}\dot{x}$$

Znak się zgadza, bo ma być przeciwny do prędkości.

$$\ddot{x} + \frac{B^2l^2\cos^2\alpha}{Rm}\dot{x} = -g\sin\alpha$$

RORJ

$$\ddot{x} + \frac{B^2l^2\cos^2\alpha}{Rm}\dot{x} = 0$$

$$\frac{\ddot{x}}{\dot{x}} = -\frac{B^2l^2\cos^2\alpha}{Rm}$$

$$\ln\dot{x} = -\frac{B^2l^2\cos^2\alpha}{Rm}t + \ln C$$

$$\dot{x} = Ce^{-\frac{B^2l^2\cos^2\alpha}{Rm}t}$$

RSRN

$$\dot{x} = C(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t}$$

$$\ddot{x} = \dot{C}(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t} - \frac{B^2l^2\cos^2\alpha}{Rm}C(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t}$$

$$\dot{C}(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t} \cancel{- \frac{B^2l^2\cos^2\alpha}{Rm}C(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t}} \cancel{+ \frac{B^2l^2\cos^2\alpha}{Rm}C(t)e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t}} = -g\sin\alpha$$

$$\dot{C}(t) = -g\sin\alpha\, e^{\frac{B^2l^2\cos^2\alpha}{Rm}t}$$

$$C(t) = \frac{-gRm\tan\alpha}{B^2l^2\cos\alpha}e^{\frac{B^2l^2\cos^2\alpha}{Rm}t} + D$$

RORN

$$\dot{x}(t) = De^{-\frac{B^2l^2\cos^2\alpha}{Rm}t} - \frac{gRm\tan\alpha}{B^2l^2\cos\alpha}$$

$$\dot{x}(0) = 0 \Rightarrow D = \frac{gRm\tan\alpha}{B^2l^2\cos\alpha}$$

$$\dot{x}(t) = \frac{gRm\tan\alpha}{B^2l^2\cos\alpha}\left(e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t} - 1\right)$$

$$\lim_{t\to\infty}\dot{x}(t) = -\frac{gRm\tan\alpha}{B^2l^2\cos\alpha}$$

$$x(t) = \frac{gRm\tan\alpha}{B^2l^2\cos\alpha}\left(-\frac{Rm}{B^2l^2\cos^2\alpha}e^{-\frac{B^2l^2\cos^2\alpha}{Rm}t} - t + E\right)$$