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Robotics: Mobility.

Bio Inspiration - The study of limbed mobility.

Porsche - $12\ m/s^2$ (0 - 100)

Sail Fish ⇒ $8\ m/s^2$

Cheetah ⇒ $13\ m/s^2$

Helios 2 → 0.00024c.

⇒ 217.84 Mach

c = speed of light.

$c = 3 \times 10^8\ m/s$

$= 3 \times 10^5\ km/s$

$\Rightarrow 60 \times 60 \times 3 \times 10^5$ Km/hr

⇒

$s = 330\ m/s$

$\Rightarrow \frac{330}{1000} \times 60 \times 60$

⇒

- Motors with good rare earth magnets
- Motors with good thermal shedding capability.
- Motors with large air gap radii

Power is the rate at which energy gets moved around.

or

Power can be defined as the speed at which I can sustain my force

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Mechanical LTI Systems.

Newtons laws.

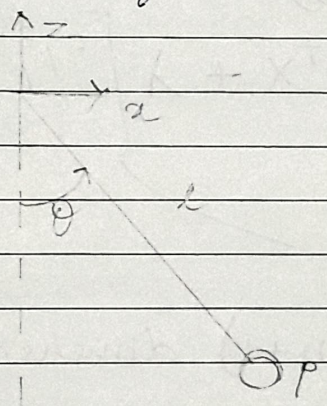
When a mass moves → $x(t)$.

they have velocity → $\dot{x}(t)$

acceleration → $\ddot{x}(t)$.

$\therefore \quad m \times \ddot{x} = f$

Friction is a viscous force.



$$p = \begin{bmatrix} p_x \\ p_z \end{bmatrix} = \begin{bmatrix} l \sin\theta \\ l \cos\theta \end{bmatrix} =: g(\theta)$$

g : kinematic function [forward].

$$\eta = \frac{ml^2}{2}\dot{\theta}^2 + mgl(\theta - 1)^2$$

$$\rightarrow \frac{2m(l \times 4)^2}{2}\dot{\theta}^2 + 2mg\,4l(\theta - 1)^2$$

$$\frac{8}{2} = 16ml^2\dot{\theta}^2 + 8mgl(\theta - 1)^2$$