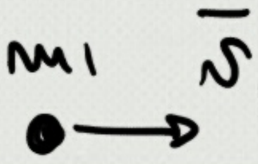
1 : equazione del moto uniformemente accelerato $\Rightarrow$ indipendente dalla massa

2.1 : Conservazione della quantita' di moto : $\bar{P} = cost$

- urto elastico $(m_1 = m_2)$

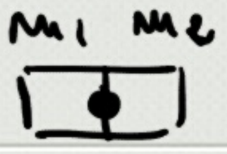



$\Rightarrow \quad v_1' = 0 \qquad v_2' = v_1$

- urto completamente anelastico $(m_1 = m_2)$


$\Rightarrow \quad m_1 v_1 = (m_1 + m_2) v' \Rightarrow v' = \frac{v_1}{2}$

- "esplosione"



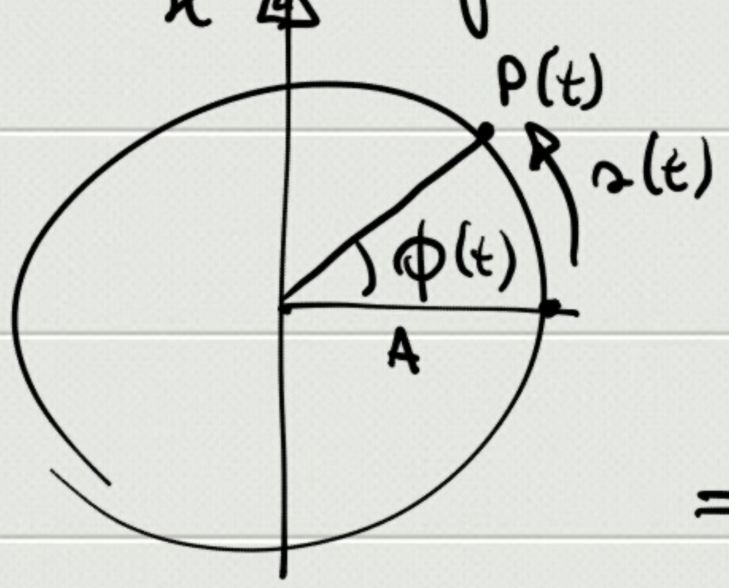

$m_1 = m_2$

$$P = 0 = m_1 \bar{v}_1' + m_2 \bar{v}_2' \Rightarrow v_1 = -v_2$$

2.2 : $\bar{P} = cost$ se sistema isolato

$$\bar{R}^E = m \bar{a}_{CM} = \frac{d\bar{P}}{dt} \neq 0 \Rightarrow \bar{P} \neq cost \Rightarrow \bar{v}_{CM} \neq 0$$

3: Moto armonico come proiezione del moto circolare uniforme




$$s(t) = s_0 + vt$$

$$\Rightarrow \phi(t) = \phi_0 + \omega t$$

$\times \frac{1}{R}$

$$\Rightarrow \boxed{x(t) = A \sin(\omega t + \phi_0)}$$

4: Pendolo semplice

$$T = 2\pi\sqrt{\frac{L}{g}}$$ non dipende dalle masse

5: Pendoli di lunghezze diverse

$$T = 2\pi\sqrt{\frac{L}{g}} \qquad N_i T_i = N_j T_j$$

$$\Rightarrow N_i \sqrt{L_i} = N_j \sqrt{L_j}$$

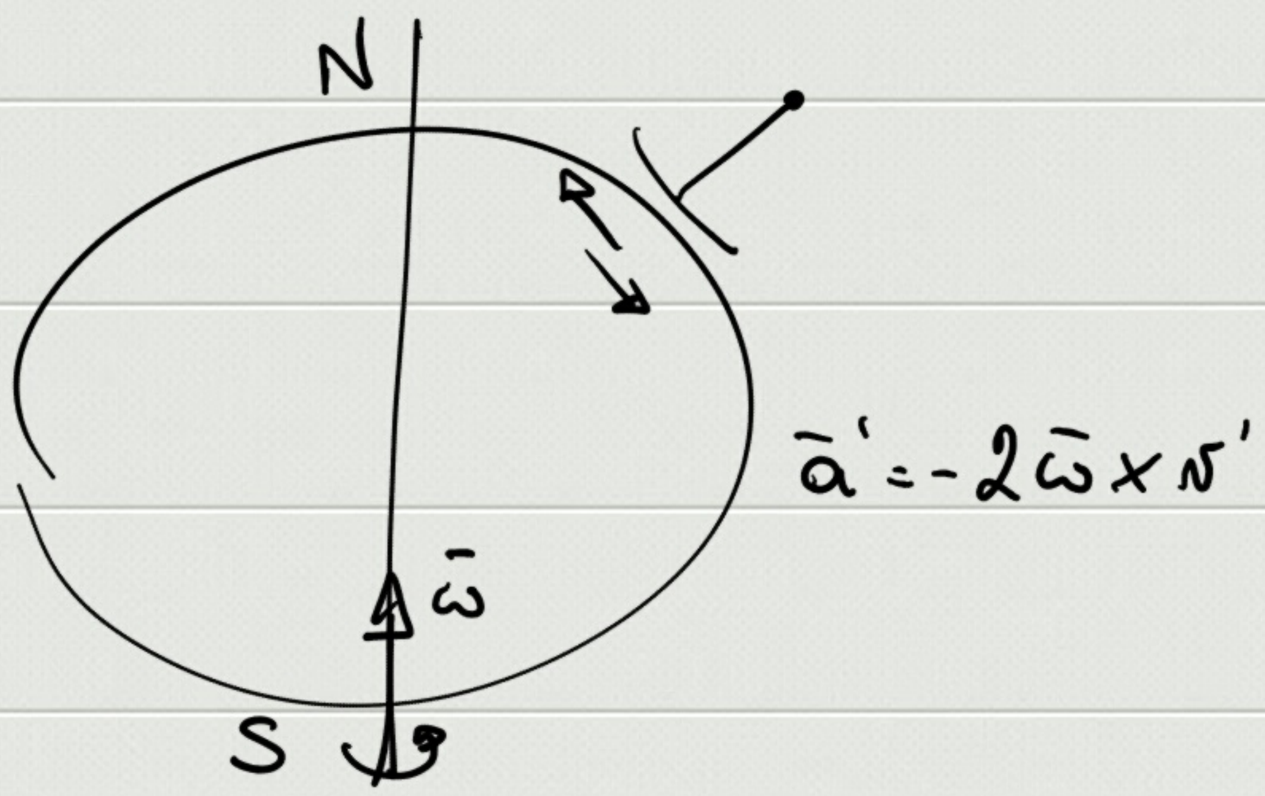
$$\Rightarrow L_j = L_i \frac{N_i^2}{N_j^2}$$

6 : accelerazione di Coriolis $\bar{a}_c = 2\bar{\omega} \times \bar{v}'$

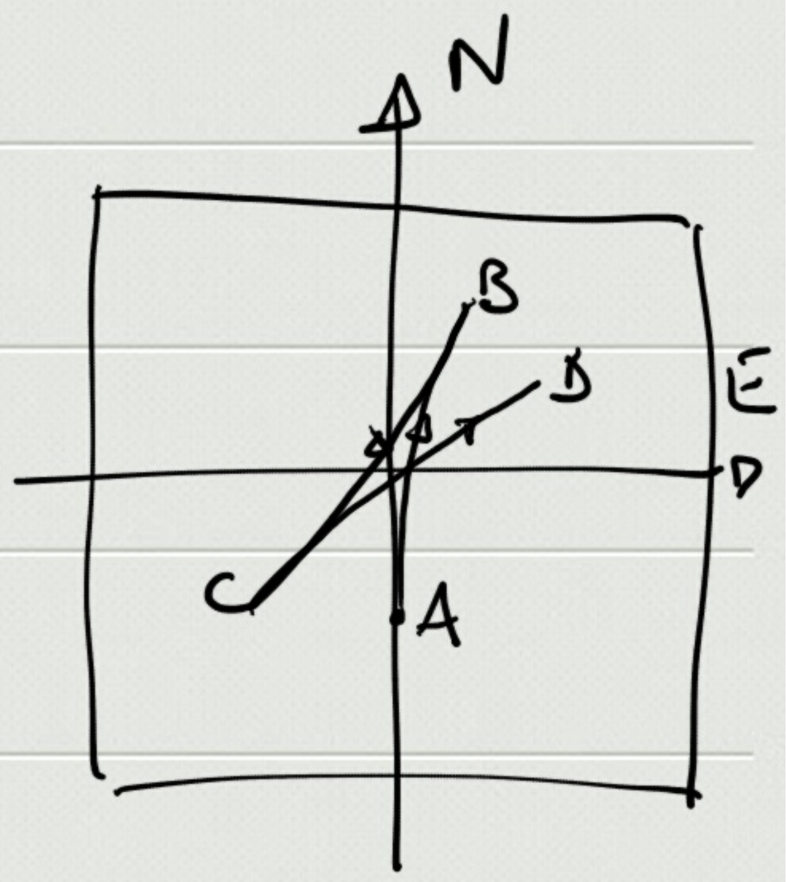
$$\bar{a} = \bar{a}' + \bar{a}_{o'} + \bar{\omega} \times (\bar{\omega} \times \bar{r}') + \frac{d\bar{\omega}}{dt} \times \bar{r}' + 2\bar{\omega} \times \bar{v}'$$

$$\left.\begin{array}{l} a' = a_{o'} = 0 \\ \omega = \text{cost} \end{array}\right\} \Rightarrow \quad \bar{a} = \bar{\omega} \times (\bar{\omega} \times \bar{r}') + 2\bar{\omega} \times \bar{v}'$$

7.1 : Pendolo di Foucoult (modello)




$\bar{a}' = -2\bar{\omega} \times \bar{v}'$

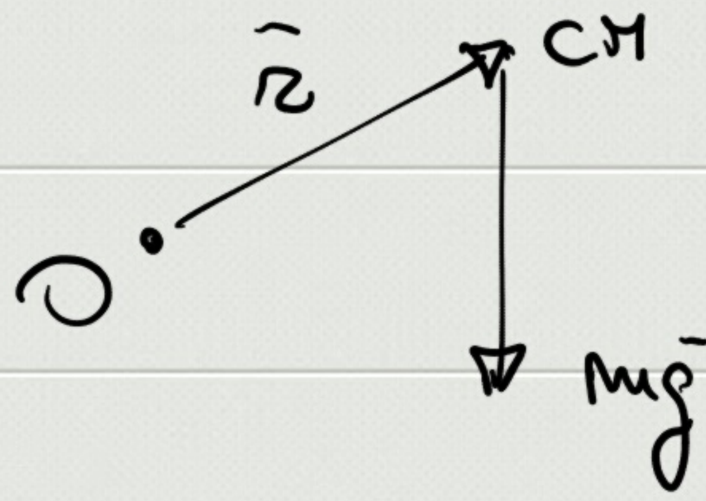



7.2 : Pendolo di Foucoult

8: giroscopo a sospensione cardanica

polo $\equiv$ CM punto fisso $\Rightarrow \boxed{\bar{L} = cost}$

9: giroscopo con polo = punto fisso $\neq$ CM




$$\bar{M}_O = \bar{r} \times m\bar{g} \overset{!}{=} \frac{d\bar{L}_O}{dt}$$

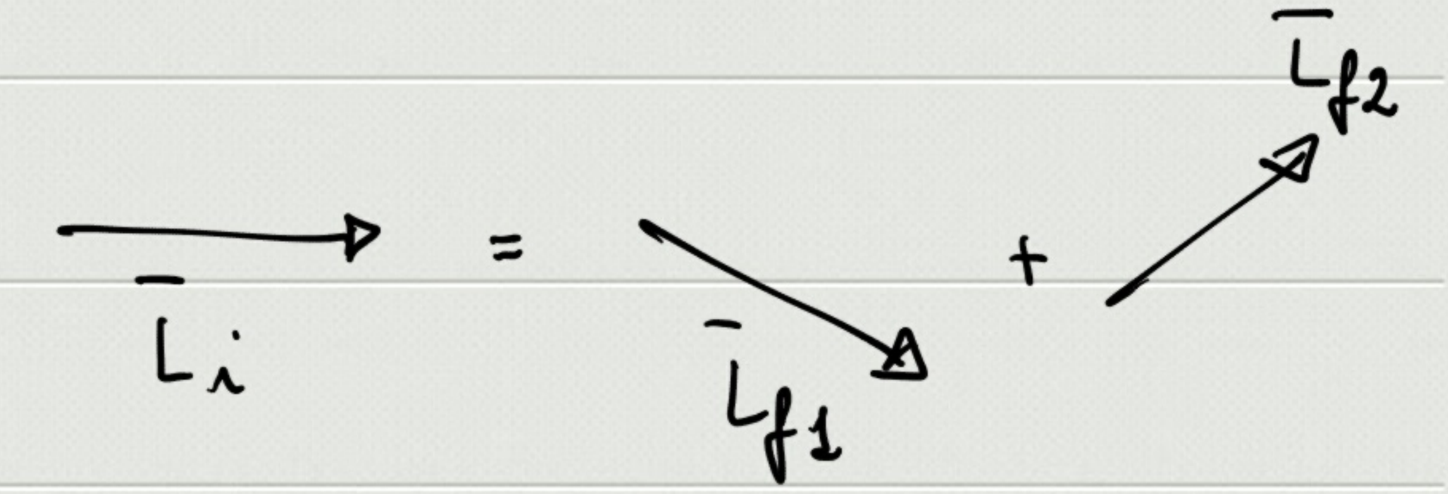
$$\Rightarrow \boxed{\bar{L}_f = \bar{L}_i + \bar{M}_O \Delta t}$$

10.1: conservazione del momento angolare: $\bar{L} = cost$

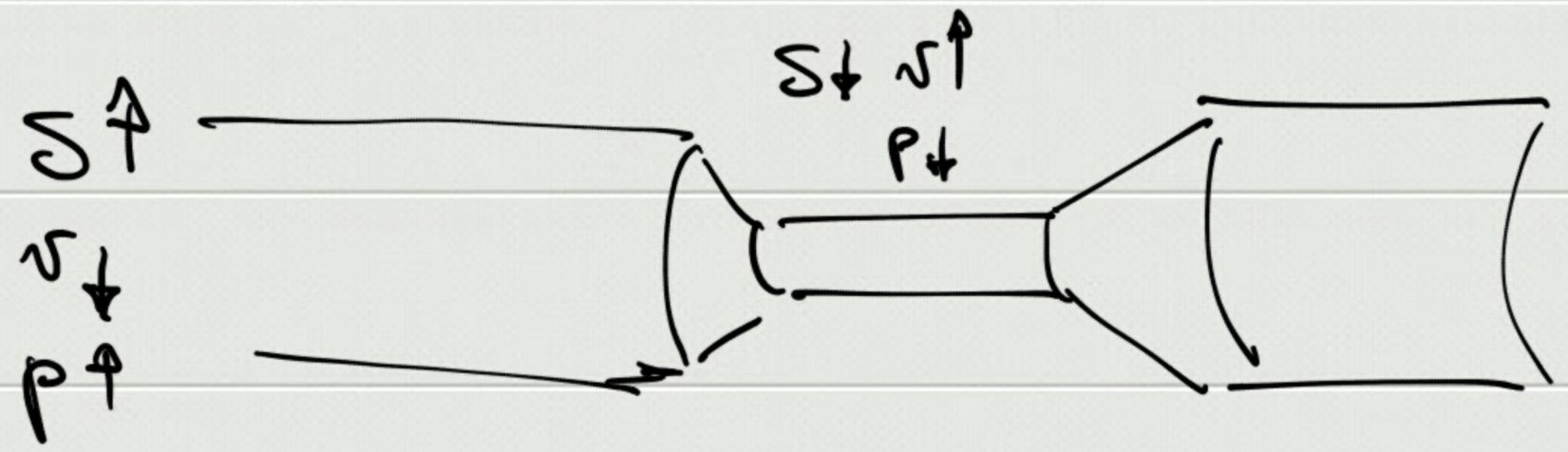
Sistema isolato: $\bar{L} = \bar{I}\bar{\omega} = cost$

$$I_1 \omega_1 = I_2 \omega_2 \Rightarrow \omega_2 = \frac{I_1}{I_2}\omega_1$$

10.2: $\bar{L} = cost$



11: Tubo di Venturi

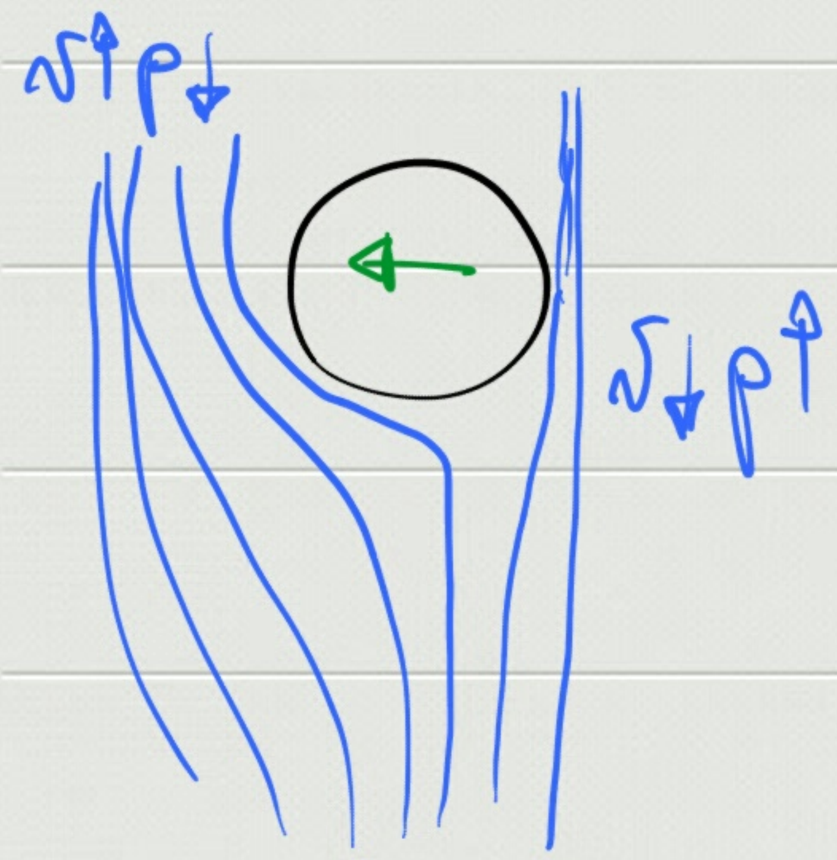



$q = vS = const$ $\quad p + \frac{1}{2}\rho v^2 = const$

12: paradosso idrodinamico:

depressione quando si riduce la sezione del tubo di flusso

13: Bernoulli: $p + \rho g z + \frac{1}{2}\rho v^2 = const$




14: Effetto Magnus