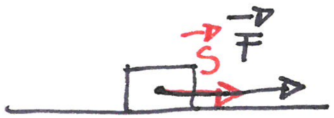
$\vec{J}$ $\quad\vec{p}\quad$ $\vec{J} = \Delta\vec{p}$

$\vec{a} = \frac{\vec{F}}{m} \longrightarrow \vec{F} = m\vec{a}$ $\qquad L = \vec{F}\cdot\vec{s}$

TEOREMA del LAVORO e dell' EN. CINETICA



$$L = \vec{F}\cdot\vec{s} = F\cdot s\cos\theta = F\cdot s\underbrace{\cos 0°}_{=1} = F\cdot s$$

$$L = F\cdot s = (ma)\cdot s$$

$$s = \cancel{s_0} + \frac{v^2 - v_0^2}{2a}$$

$$L = m\cdot\frac{v_f^2 - v_0^2}{2\cancel{s}}\cdot\cancel{s}$$

$$s = \frac{v^2 - v_0^2}{2a} \longrightarrow a = \frac{v_f^2 - v_0^2}{2s}$$

$$L = m\frac{v_f^2 - v_0^2}{2} = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$$

$\frac{1}{2}mv^2 = E_k$

ENERGIA CINETICA

$$\boxed{L_{TOT} = \Delta E_k}$$

$$\boxed{L = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2}$$

$$\begin{cases} s = s_0 + v_0 t + \frac{1}{2} a t^2 & \text{LEGGE ORARIA } s(t) \\ v = v_0 + at \longrightarrow & \frac{v - v_0}{a} = \frac{\cancel{a}t}{\cancel{a}} \longrightarrow t = \frac{v - v_0}{a} \end{cases}$$

$s(v)$

$$s = s_0 + v_0 \cdot \left(\frac{v - v_0}{a}\right) + \frac{1}{2} a \left(\frac{v - v_0}{a}\right)^2$$

$$= s_0 + \frac{v_0 (v - v_0)}{a} + \frac{1}{2} \cancel{a} \frac{(v - v_0)^2}{a^{\cancel{2}}}$$

$$= s_0 + \frac{v_0 v - v_0^2}{a} + \frac{1}{2} \frac{v^2 + v_0^2 - 2 v v_0}{a}$$

$$= s_0 + \frac{\cancel{2 v_0 v} - 2 v_0^2 + v^2 + v_0^2 - \cancel{2 v v_0}}{2a}$$

$$= s_0 + \frac{v^2 - v_0^2}{2a}$$

$$s(v) = s_0 + \frac{v^2 - v_0^2}{2a}$$

$$W = \frac{L}{\Delta t}$$

POTENZA

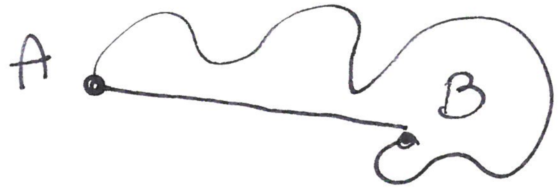
$$W_{istantanea} = \frac{dL}{dt} \qquad \left[\frac{J}{s}\right] = WATT = [W]$$

$$WATT = W = \frac{J}{s} = \frac{N \cdot m}{s} = \frac{kg \cdot \frac{m}{s^2} \cdot m}{s} = \frac{kg\, m^2}{s^3}$$

CAMPO di FORZE

regione di spazio in cui in ogni punto e' presente una forza capace di agire su un elemento con essa compatibile

CONSERVATIVE



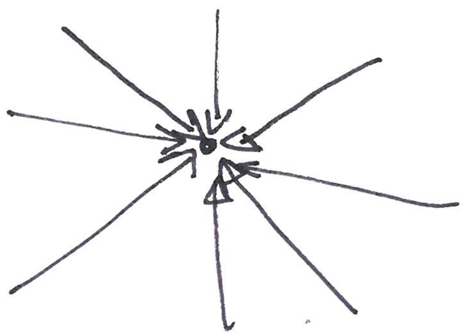
L non dipende dal percorso

NON CONSERVATIVE (dissipative)

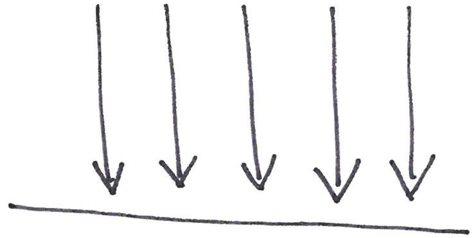
L dipende dal percorso

FORZE CONSERVATIVE

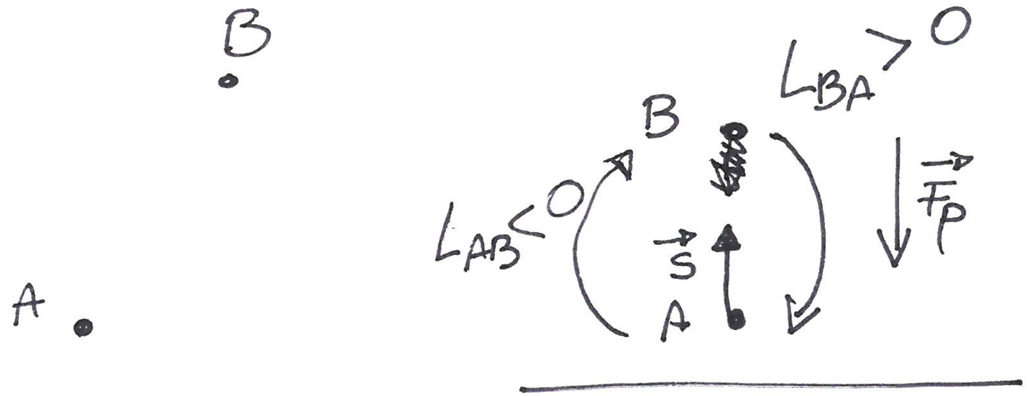
FORZE CENTRALI



F. PARALLELE



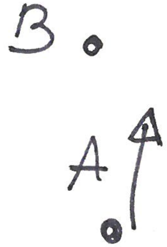
ENERGIA POTENZIALE → CAMPO CONSERVATIVO



$$L_{AB} = \vec{F}_p \cdot \vec{s} = F_p \cdot s \underbrace{\cos \pi}_{-1} = -F_p \cdot s < 0$$

$$L_{BA} = \vec{F}_p \cdot \vec{s} = F_p \cdot s \underbrace{\cos 0}_{1} = F_p \cdot s > 0$$

$U_B \mp U_A$



$U_B > U_A$

$$<0$$

$$U_B = U_A + L_{AB}$$

$$U_B = U_A - L_{AB}$$

$$L_{AB} = U_A - U_B$$

$$U_B - U_A = \Delta U$$

$$L_{AB} = -(U_B - U_A)$$

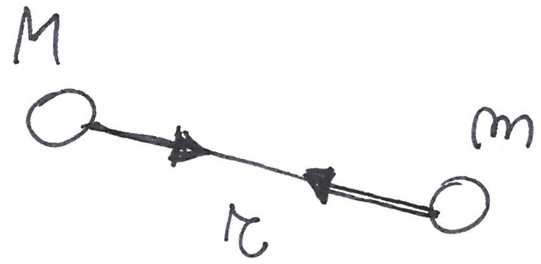
$$L_{AB} = -\Delta U$$

$$\boxed{L_{CONS} = -\Delta U}$$

$$U = [J]$$

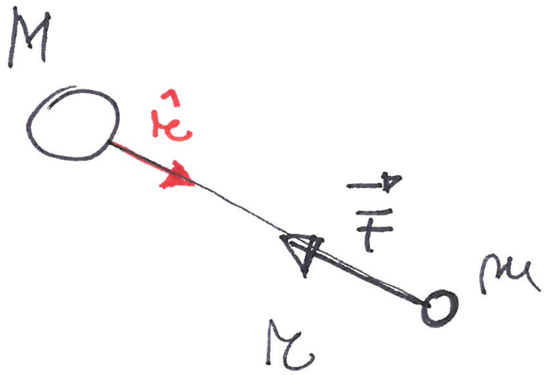
FORZA GRAVITAZIONALE

$$F = G\frac{M\cdot m}{r^2}$$



M massa generatrice

m massa esploratrice



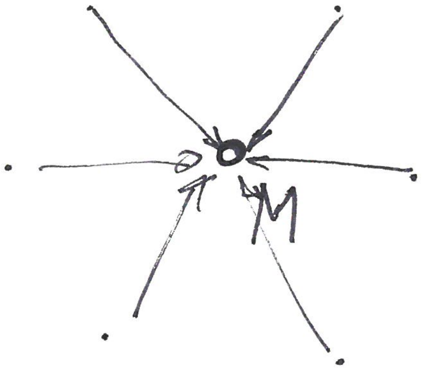
$$\boxed{\vec F = -G\frac{M m}{r^2}\cdot\hat r}$$

$\hat r$ = VERSORE

$$G = 6{,}7\cdot10^{-11}\frac{N\cdot m^2}{kg^2}$$

$$N = G\frac{kg\cdot kg}{m^2}$$

$$\frac{m^2 N}{kg^2} = G$$



Campo centrale conservativo

$$L = -\Delta U$$

$$\vec{F} = -\frac{GMm}{r^2}\hat{r}$$ TORZA GRAVITAZIONALE

CAMPO GRAVITAZIONALE

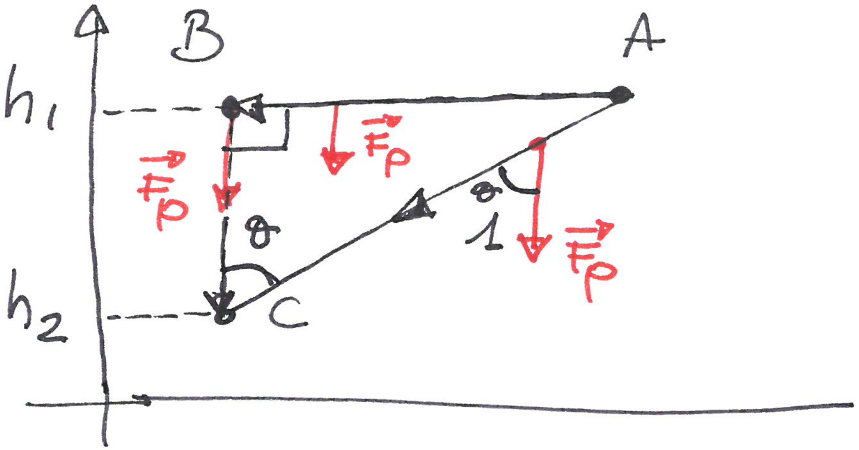
$$\vec{\gamma}_g = \frac{\vec{F}}{m} = -\frac{GM}{r^2}\hat{r} \qquad \vec{F} = m\vec{\gamma}_g$$

→ dimensioni di accelerazione

$\vec{\gamma}_g$ CAUSA

$\vec{g}$ EFFETTO

$$\boxed{g \cong 9{,}8\ m/s^2}$$



1) A → C

2) A → B → C

1) $L_{AC} = \vec{F_p} \cdot \vec{AC} = F_p \cdot AC \cos\theta = mg \cdot AC \cos\theta$

2) $L_{A\to B\to C} = L_{AB} + L_{BC} = \vec{F_p} \cdot \vec{AB} + \vec{F_p} \cdot \vec{BC}$

$$= \cancel{mg \cdot AB \underbrace{\cos\frac{\pi}{2}}_{=0}} + mg \cdot BC \cdot \underbrace{\cos 0}_{=1}$$

$$= mg\, BC$$

$L_{AC} = mg\, \underline{AC \cos\theta}$

$L_{A\to B\to C} = mg\, \underline{BC}$

ABC $\quad BC = AC \cos\theta$

$$L_{AC} = mg\,BC = mg(h_1 - h_2) = \underbrace{mgh_1}_{} - mgh_2$$

$$L = U_1 - U_2$$

$$U = mgh$$

EN POTENZIALE

GRAVITAZIONALE

$$L = -\Delta U$$