$dW = F_T\, ds = m\frac{dv}{dt}\, ds = m v\, dv$ [illegible]

L forza peso: $L = \int_A^B m\vec{g}\cdot d\vec{s} = [illegible]$

$L = mg(z_A - z_B) = E_{pA} - E_{pB}$ [illegible]

L forza elastica 1D: $L = \int_A^B -kx\,dx = -k\frac{x^2}{2}\Big|_A^B$ [illegible]

L forza attrito: $L = \int_A^B \vec{F}\cdot d\vec{s} = \int_A^B \mu_d N \hat{u}_v \cdot d\vec{s}$ $= -\mu_d N$ [illegible]

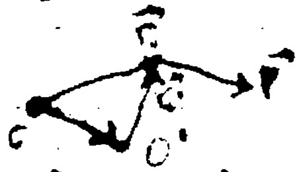
$dW = \vec{F}\cdot d\vec{s} = F_x dx + F_y dy + F_z dz = -dE_p$ [illegible]

$\oint dW = 0 \Rightarrow \exists\, f(x,y,z)$ t.c. $F_x = -\frac{\partial f}{\partial x}$, $F_y = -\frac{\partial f}{\partial y}$ [illegible]

$F = -\nabla E_p \longrightarrow F = mg \Rightarrow \frac{dE_p}{dz}$ [illegible]

$\hookrightarrow F = -kx \Rightarrow \frac{dE_p}{dx} = -kx$ [illegible]

$\vec{L}_0 = \vec{r}\times\vec{p} = \vec{r}\times m\vec{v}$ $\quad \vec{r}_c = \vec{CO'} + \vec{r}_{c'} \Rightarrow \vec{L}_c = \vec{CO'}\times\vec{p} + \vec{r}_{c'}\times\vec{p}$



$\vec{L}_c = \vec{CO'}\times\vec{p} + \vec{L}_{O'}$

$\vec{L} = \vec{r}\times m(\vec{v}_r + \vec{v}_\theta) = \vec{r}\times m\vec{v}_\theta$

$\vec{M}_0 = \vec{r}_c \times \vec{F}$ $\quad \vec{M}_{0'} = \vec{M}_0 + \vec{CO'}\times\vec{F}$ $\quad \vec{M} = \Sigma\, \vec{r}_i\times\vec{F}_i = \vec{r}\times\Sigma\vec{F}_i$ [illegible]

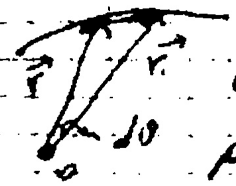
$$\frac{d\vec{L}}{dt} = \frac{d\vec{r}}{dt}\times\vec{p} + \vec{r}\times\frac{d\vec{p}}{dt} = \cancel{\vec{v}\times m\vec{v}} + \vec{r}\times\vec{F} = \vec{M}$$

$$\vec{v} = \frac{d\vec{r}}{dt} = \frac{dr}{dt}\hat{u}_r + r\frac{d\hat{u}_r}{dt} = v\hat{u}_r + r\frac{d\theta}{dt}\hat{u}_\theta$$

$\hookrightarrow \vec{L} = \vec{r}\times m r\frac{d\theta}{dt}\hat{u}_\theta$

Se O sta nel piano del moto, $\vec{r}\perp\hat{u}_\theta \Rightarrow L = mr^2\frac{d\theta}{dt}$

F centrale $\Rightarrow \vec{L} =$ cost. $\Rightarrow \frac{1}{2}r^2\frac{d\theta}{dt} =$ cost. $\quad \frac{dA}{dt} = \frac{1}{2}r^2\frac{d\theta}{dt}$



$dA = \frac{1}{2}r\, r\,d\theta$ $\quad \frac{dA}{dt} =$ cost. $\quad \frac{dA}{dt} = \frac{L}{2m}$ $\quad \int dA = \int \frac{L}{2m}dt$

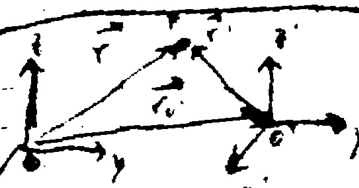
$A = \frac{L}{2m}T$ $\quad$ periodo: $T = 2\frac{mA}{L}$

Lavoro forze centrali: $L = \int_A^B \vec{F}\cdot d\vec{s} = \int_A^B F(r)\,\hat{u}_r\cdot d\vec{s}$

$ds\cos\theta = dr \Rightarrow \hat{u}_r\cdot d\vec{s} = dr$ $\Rightarrow L = \int_A^B F(r)\,dr = f(r_B) - f(r_A)$

$d\vec{r} = r\,d\theta\,\hat{u}_\theta$ $\quad |d\vec{r}| = r\,d\theta = dr$

$\vec{\omega}\times\hat{x}$



$\vec{r} = \vec{r}_{0'} + \vec{r}'$

$$\vec{v} = \frac{d\vec{r}}{dt} = \frac{d\vec{r}_{0'}}{dt} + \frac{dx'}{dt}\hat{x}' + \frac{dy'}{dt}\hat{y}' + \frac{dz'}{dt}\hat{z}' + x'\frac{d\hat{x}'}{dt} + y'\frac{d\hat{y}'}{dt} + z'\frac{d\hat{z}'}{dt} =$$

$$= \vec{v}_{0'} + \vec{v}' + \vec{\omega}\times(x'\hat{x}' + y'\hat{y}' + z'\hat{z}') = \vec{v}_{0'} + \vec{v}' + \vec{\omega}\times\vec{r}'$$