$$F(t)$$

$$m\frac{dv}{dt} = F(t)$$

$$mv - mv_0 = \int_{t_0}^{t} F(t)\,dt \qquad v(t_0) = v_0$$

$$v(t) = v_0 + \frac{1}{m}\int_{t_0}^{t} F(t)\,dt$$

$$\frac{dx}{dt} = v(t)$$

$$x(t) = x_0 + v_0(t - t_0) + \frac{1}{m}\int_{t_0}^{t} dt'' \int_{t_0}^{t''} F(t')\,dt'$$

$$E_x(t) = E_0\cos(\omega t)$$

$$F(t) = -eE_x(t)$$

$$F(t) = -eE_0\cos(\omega t)$$

Fuerzas dep. de la posición

$$m\frac{dv}{dt} = F(x) \rightarrow mv\frac{dv}{dt} = F(x)\,v$$

$$\int mv\,dv = \int F(x)\,v\,\cancel{dt} \quad \rightsquigarrow v = \frac{dx}{\cancel{dt}}$$

$$\frac{1}{2}mv^2 - \frac{1}{2}mv_0^2 = \underbrace{\int_{x_0}^{x} F(x)\,dx}_{\text{Energía potencial.}}$$

$$T_2 - T_1 =$$

$$V(x) = -\int_{x_s}^{x} F(x)\,dx$$

Tomar $T_2 - T_1 = -V(x) + V(x_0)$

$$\rightarrow T_2 + \underline{V(x)} = \underbrace{V(x_0) + T_1}_{E} = E$$

$$\frac{1}{2}mv^2 = E - V(x)$$

$$v(t) = \sqrt{\frac{2}{m}}\left(E - V(x)\right)^{1/2} = \frac{dx}{dt}$$

$$t - t_0 = \sqrt{\frac{m}{2}} \int_{x_0}^{x} \left(E - V(x)\right)^{-1/2} dx$$

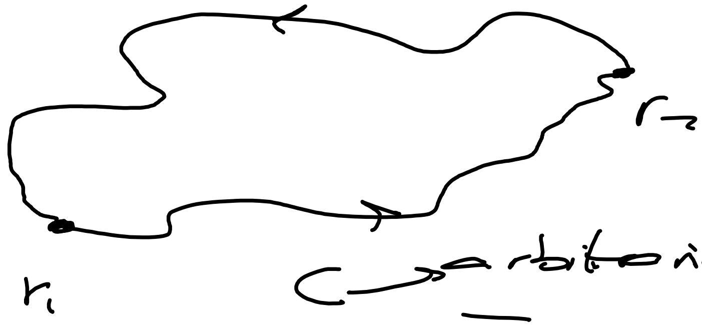
En forma más general

dado $\vec{r} = (x, y, z) \rightarrow V(\vec{r}) = V(x, y, z)$

$$V(\vec{r}) = -\int_{\vec{r}_0}^{\vec{r}} \vec{F}(\vec{r}) \cdot d\vec{r}.$$

$\vec{F}(\vec{r}) \rightarrow$ Fuerzas Conservativas.

$$\vec{F}(\vec{r}) = -\vec{\nabla} V(\vec{r}) \rightarrow \vec{\nabla} \times \vec{F}(\vec{r}) = \vec{0}$$



$C \rightarrow$ arbitraria

Teorema de Stockes

$$\oint_C \vec{F}(\vec{r})\cdot d\vec{r} = \iint_S \hat{n}\cdot \big(\underbrace{\vec{\nabla}\times \vec{F}(\vec{r})}_{0}\big)\, dS = 0$$

$$\boxed{\oint_C \vec{F}(\vec{r})\cdot d\vec{r} = 0}$$

↳ Conserva la energía

↳ No importa la trayectoria

↳ Trabajo reversible.