Physics Reference #03

Force of a Spring (compressed x)

$$\vec{F}_s = -m\omega^2 x = -kx$$

Work

$$W = \int \vec{F}_r \bullet d\vec{r}$$

Kinetic Energy

$$K = \tfrac{1}{2}mv^2$$

Dot Product

$$\vec{A}\bullet\vec{B} = A_xB_x + A_yB_y + A_zB_z$$
$$\vec{A}\bullet\vec{B} = AB\cos\theta$$

Work done by a Gas

$$W = \int_a^b PdV$$

Conservative Work

$$W = \oint \vec{F}_r \bullet d\vec{r} = 0$$

Non-Conservative Work

$$W = \oint \vec{F}_r \bullet d\vec{r} \neq 0$$

Work

$$W_{NC} = \Delta K + \Delta U$$

Potential of Gravity

$$\Delta U_{grav} = mg\Delta y$$

Potential of a Spring

$$\Delta U_{spr} = \tfrac{1}{2}kx^2 = \tfrac{1}{2}m\omega^2x^2$$

Frictional Work

$$W_{frict} = -\mu_k F_N L$$

Power

$$P = \vec{F}\bullet\vec{v}$$

Power

$$\Delta W = \int Pdt$$

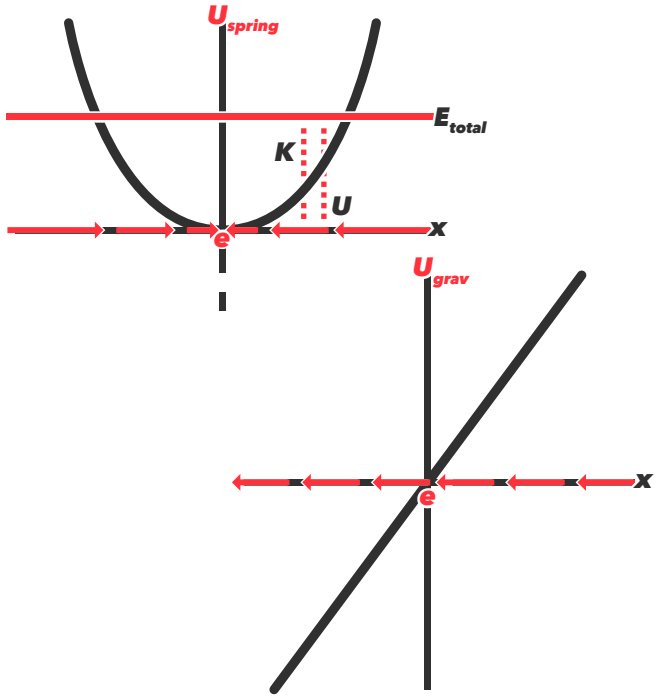
Frictionless Ramp Velocity

$$\vec{V} = \sqrt{(2gH)} = \sqrt{(2gL\sin\theta)}$$

Frictional Ramp Velocity

$$\vec{V} = \sqrt{(2gL\sin\theta - 2gL\mu_k\cos\theta)}$$

Equilibrium Curves



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