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Work Energy for Particles

Summarize

"1" Position of Particle

"2" "Ending" Position of Particle

$$T_1 + U_{1-2} = T_2$$

T = kinetic Energy = $\frac{1}{2}mv^2$ N.m (Joules)

U_{1-2} = Work done on particle by external forces while particle moves from position 1→2.

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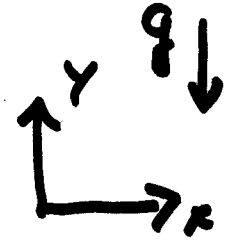
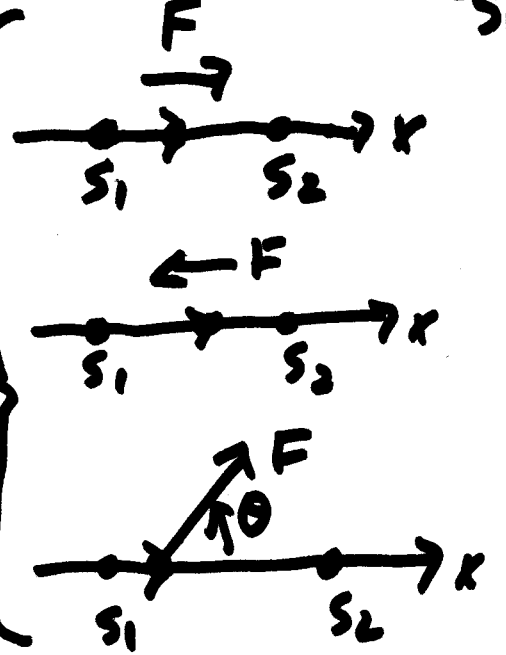
Work Done By Gravity $U_{1-2} = -W(y_2 - y_1)$



Work Done By a Spring $U_{1-2} = -k(x_2^2 - x_1^2)$

By an external force $U_{1-2} = \int_{s_1}^{s_2} \vec{F} \cdot d\vec{r}$

$\int_{s_1}^{s_2} \vec{F} \cdot d\vec{r} =$

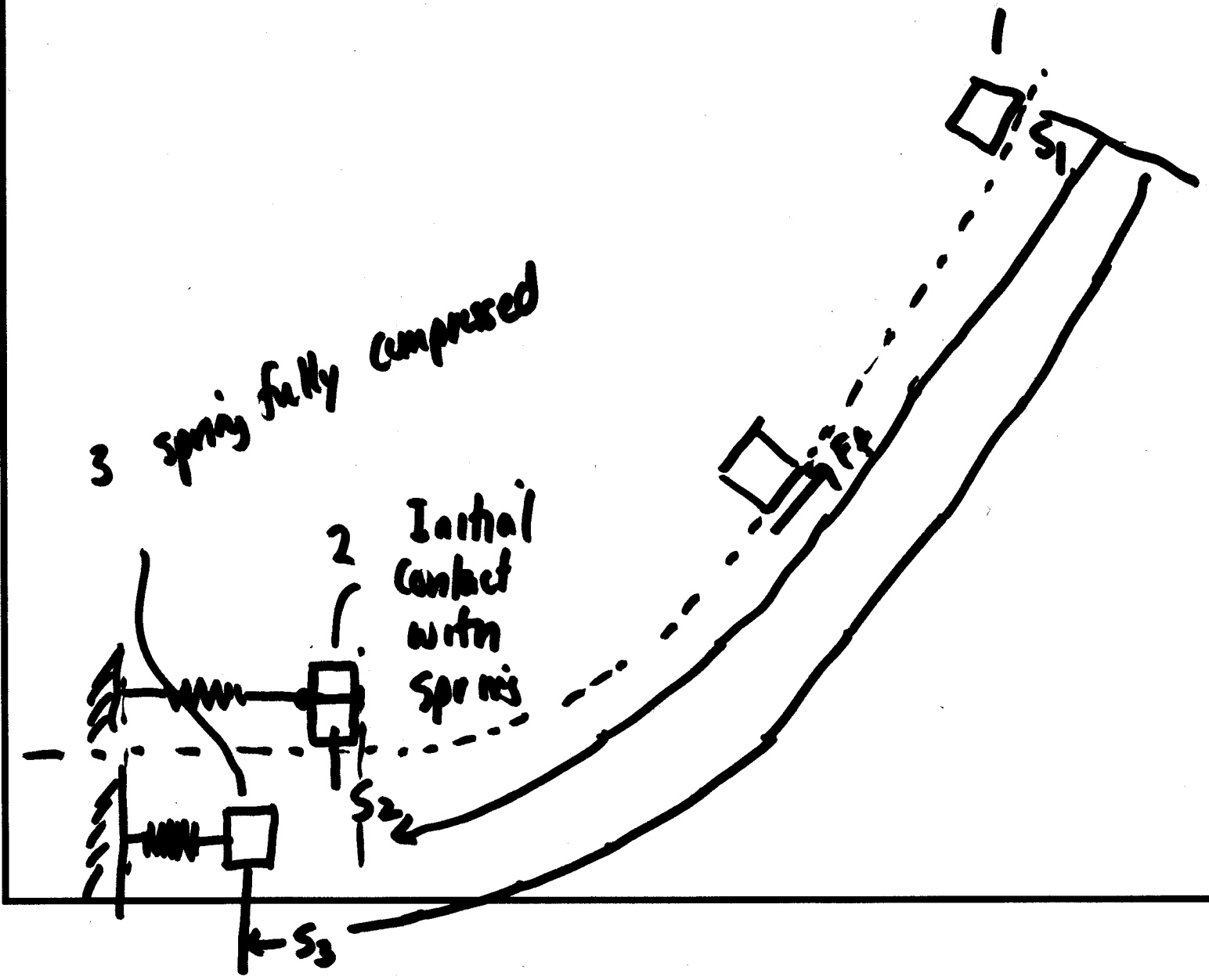


$U_{1-2} = F(s_2 - s_1)$

$U_{1-2} = -F(s_2 - s_1)$

$U_{1-2} = F\cos\theta(s_2 - s_1)$

University of Idaho More Detailed Analysis



University of Idaho Work/Energy Equation

1-2 $\cancel{\frac{1}{2}mv_1^2}^{\,0} - W(y_2 - y_1) = \frac{1}{2}mv_2^2$

2-3 $\frac{1}{2}mv_2^2 - \cancel{W(y_3 - y_2)}^{\,0} - \frac{1}{2}k(s_3^2 - s_2^2) = \cancel{\frac{1}{2}mv_3^2}^{\,0}$

Unknowns: s_3, v_2