

VI. Energy, Work & Power

(A) Work

1. $W = \int F \cdot dx = F \cdot x$ for constant F

2. + or -

3. $F \parallel x$

(B) $W = \Delta KE$

(C) Power = $\frac{\Delta W}{\Delta t} = \frac{dW}{dt} = \frac{d}{dt}(F \cdot x) = F \cdot v$

(D) Energy

1. $U_s = \frac{1}{2} kx^2$, assume $F = kx$

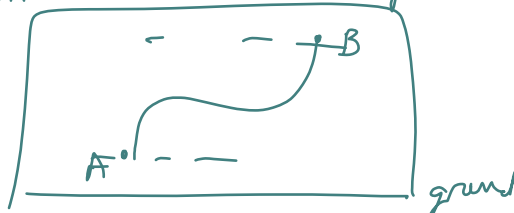
2. $U_g = mgh$, close to earth

3. $K_T = \frac{1}{2} mv^2$

4. $K_r = \frac{1}{2} I\omega^2$

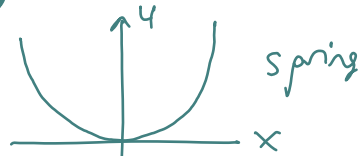
5. $E_1 + W_{n.c.} = E_2$

(a) Conservative forces are path independent
(b) Non-conservative are path dependent



(E) Potential Energy diagrams/functions, $U(x)$

1. $F = -\frac{dU}{dx}$



2. Equilibrium types

(a) stable, A

(b) unstable, B

(c) neutral, E

