RINKU SHARMA

Classical Mechanics

Law of Conservation Momentum (linear Angular)

" Energy

$W_{12} = V_2 - V_1 = T_2 - T_1$

or $T_1 + V_1 = T_2 + V_2 =$ constant

$T + V =$ constant $= E$

$$\underline{L} = \underset{\text{KE}}{T} - \underset{\text{PE}}{V} = T(r, \dot{r}) - V(r)$$

$r \rightarrow$ cyclic coordⁿ

$p \rightarrow$ conserved

$\theta \rightarrow$ coordⁿ for Rotation cyclic

$L \rightarrow$ conserved

$t \rightarrow$ time cyclic

$H \rightarrow (T+V) \rightarrow$ conserved.

First Integral of the motion $\frac{d}{dr}$ or $\frac{d}{dt}$

$\vec{F} = \frac{dp}{dt}$

$\overset{\shortparallel}{0} \Rightarrow p =$ conserved

$N = \vec{r} \times \vec{F}$

$= \frac{d\vec{L}}{dt}$

$\vec{L} = \vec{r} \times \vec{p}$

$\frac{d\vec{L}}{dt} = 0 \rightarrow \vec{L}$ constant

W.E $\quad W_{12} = \int_1^2 \vec{F} \cdot d\vec{r}$

$= \int_1^2 \frac{dp}{dt} \cdot dr$

$= \frac{1}{2} m (V_2^2 - V_1^2)$

$= T_2 - T_1$

$\vec{F} = -\nabla V$

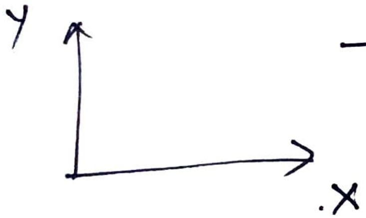
$W_{12} = V_2 - V_1$

$$\boxed{m_i \ddot{\vec{r}}_i = \underbrace{\vec{F}_i^{(e)}} + \sum_{\substack{i,j=1 \\ i \neq j}}^{\infty} \vec{F}_{ij}}$$

EOM for a system of particles

101 students

Constrainted Motion : It cannot aribibarily proceed in any manner



$\longrightarrow$ $\underline{r, \theta}$

$r =$ constant $r = l$

$\theta \to$ variable   one coord^n

2 coord^n $\longrightarrow$

3-D.

$$\boxed{x^2 + y^2 + z^2 = r^2}$$

$x = r\sin\theta \cos\phi$

$y = r\sin\theta \sin\phi$

$z = r\cos\theta$

Types of constraints

- time dependent / time Independent
- integrable algebraic equations among the coord^{n}s / Non integrable ones
- conservative / dissipative
- algebraic equations / algebraic inequalities

$\downarrow$

$x^2 + y^2 + z^2 \geq a^2$