Lecture #2

\[ S = \int_{t_i}^{t_f} \mathcal{L} \, dt \]

equations of motion \( \delta S = 0 \)

\[ \mathcal{E} = \mathcal{L} \quad \frac{d}{dt} \left( \frac{\partial \mathcal{L}}{\partial \dot{\mathbf{q}}} \right) - \frac{\partial \mathcal{L}}{\partial \mathbf{q}} = 0 \]

Today

I a) Galilean invariance
I b) Lagrangian of a free particle
II a) System of particles
II b) Examples
II c) Integrals of motion
II d) Energy