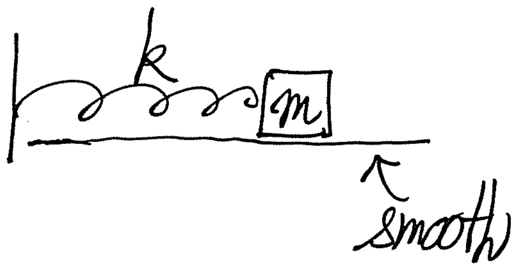
A quick run through Classical Mechanics: Lead Sheet

1. Newtonian Mechanics



$$F = ma = m\frac{d^2x}{dt^2}$$

What is F? Eq. of Motion?

Work - Energy Theorem: Where kinetic energy enters

Special type of forces (Conservative forces)
(potential energy enters)

Conservation of energy (total energy enters)

2/. Lagrangian Mechanics

$$\frac{d}{dt}\left(\frac{\partial L}{\partial \dot{x}}\right) - \frac{\partial L}{\partial x} = 0 \quad \text{(Euler-Lagrange Eq.)}$$

Correct $L(x, \dot{x})$ gives correct Eq. of motion

Simple form of $L(x, \dot{x})$ for many cases

What's good abait Lagrangian formulation?

- Relevance to Quantum Mechanics

3/. Hamiltonian Mechanics

From Lagrangian to Hamiltonian

$$H(x,p) = \dot{x}p - L$$

Simple form of $H(x,p)$ for many cases

Phase Space and Hamilton's Equations (of Motion)

Relevance to Quantum Mechanics

Appreciate how classical mechanics had influenced Schrödinger, Heisenberg, and Dirac when they formulated Quantum Mechanics in 1924-1926