

# Lagrangian Mechanics

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## Abstract:

"In this talk we'll explore the principles of 'Lagrangian Mechanics', a few toy models, the deeper significance and symmetry that hides behind it. We'll follow this talk with a discussion of further examples and problems to be solved over discussion sessions."

# Overview

- 1 Introduction
- 2 Hamilton's Principle
- 3 Euler-Lagrange Equation
- 4 Generalized Coordinates
- 5 Configuration Space
- 6 Rewriting Lagrange's Equations
- 7 Lagrange's Equations with Undetermined Multipliers
- 8 Equivalence of Lagrangian and Newtonian Dynamics
- 9 Essence of Lagrangian Dynamics
- 10 A Theorem About Kinetic Energy
- 11 Conservation Theorems Revisited
  - Conservation of Momentum
  - Conservation of Angular Momentum
  - Conservation of Energy

# Bibliography & Image Credits



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