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Chapter 1

Problem Types

Chapter 2

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Concepts

Chapter 4

Equations

4.1 Euler-Lagrange Eq.'s

Euler-Lagrange Equations

For one coordinate q

$$\frac{d}{dt}\frac{\partial \mathcal{L}}{\partial \dot{q}} - \frac{\partial \mathcal{L}}{\partial q} = 0$$

4.2 Invariance of the Lagrangian

For the two Lagrangians

$$\mathcal{L} = T - V$$

and

$$\mathcal{L}' = T - V + \frac{df(x,t)}{dt}$$

the dynamics are exactly the same for *any* function $f(x,t)$.

4.3 Parallel Axis Theorem

4.4 Hamilton-Jacobi Equation

For the Hamiltonian $\mathcal{H}$

$$H$$

4.5 Hamilton's Eq.'s