SHRI KRISHNA MAHAVIDAYALAYA, GUNJOTI.

Deparment of Mathematics
M.Sc. Maths Sem-IV (2021-2022)

Project

Student Name :- Miss. Dongare Tejaswini Anand

Std :- M.Sc. II nd (Maths)

Subject :- Mechanics

Paper No :- MAT 512

Project Name :- Lagrange's equation from Hamilton's principle.

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Introduction.

First of all let me introduce my self My name is Tejaswini Anand Dong and the institution name where I am currently study in the name is Shri Krishna Mahavidayalaya, Gunjoti

I study in M.SC. II (Maths) this report is about the subject wise project work. Subject name is "Mechanics" my allated topic Name was "Lagrange's equation from Hamilton's principle."

I completed my project work as shown in this report.

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* Basic Deffinitions:-

* Mechanics:-

Mechanics is th
of mathematics and physics c
with the relationships between
matter and motion among
objects forces applied to ob
result in displacements c
changes of an object's p
relative to its environmen

* There are two main types
Mechanics

i) Classical mechanics

ii) Quantum mechanics.

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* Lagrange's equation:-

qdt = 0 . d dt L qq Lq = 0

The becomes a differenti equation (2nd order in time to be solved

It is the equation of motion for the partic and is called Lagrange's equation.

How do you derive Lagrangia from Hamiltonian.

Given the Lagrangian L for a system we can c the Hamiltonian H using t definition

$H = \Sigma i p i q i - L$ where

$p i = \partial L \partial q i$

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* Hamilton's principle

Hamilton's principle States that the true evolution $q(t)$ of a system described by N generalized coordinates

$$q = (q_1, q_2, \dots q_N)$$

between two specified states

$q_1 = q(t_1)$ and

$q_2 = q(t_2)$ at two

Specified times t_1 and t_2 is a stationary point (a point where the variation is zero) of the action functional.

* Lagrange equations from Hamilton's principle."

Hamilton published two papers in 1834 and 1835, announcing a fundamental new dynamical and Hamiltonian mechanics Hamilton was seeking a theory of optics when he developed Hamilton's Action principle plus the field of whi play a crucial role in classica mechanics and modern physic

Hamilton's Action princi states "dynamical systems follo paths that minimize the tim integral of the Lagrangian."

That is the action functi S

$$S = \int_{t_1}^{t_2} L(q, \dot{q}, t)\, dt$$

$$\delta S = \delta \int_{t_1}^{t_2} L\, dt = 0$$

$$\frac{d}{dt}\frac{\partial L}{\partial q_j} - \frac{\partial L}{\partial q_j} = 0$$

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Reference.

1) google

2) wikipedia

3) Mechanics Notes

4) Mechanics
- by Herbert Goldstein
Charles P Poole
John Safko.