

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

- Broken extremals / Hamiltonian Formulation - Part 01

- Broken extremals / Hamiltonian Formulation - Part 02

- Broken extremals / Hamiltonian Formulation - Part 03

- Broken extremals / Hamiltonian Formulation - Part 04

- Broken extremals / Hamiltonian Formulation - Part 05

- Broken extremals / Hamiltonian Formulation - Part 06

- Variational Calculus and its applications in Control Theory and Nanomechanics : Week 6 Feedback Form

 Quiz : Assignment 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Text Transcripts

Live Session

Assignment 6

The due date for submitting this assignment has passed.

Due on 2021-03-03, 23:59 IST.

As per our records you have not submitted this assignment.

1) Find the curves for which the functional

1 point

$$I = \int_0^{x_1} \frac{\sqrt{1+y^2}}{y} dx$$

 with $y(0) = 0$ can have extrema if the point (x_1, y_1) can vary along the line $y = x - 5$

- $y = \pm\sqrt{x - 2x^2}$
- $y = \pm\sqrt{2x + 3x^2}$
- $y = \pm\sqrt{x - 5x^2}$
- $y = \pm\sqrt{3x - x^2}$
- $y = \pm\sqrt{10x + 5x^2}$
- $y = \pm\sqrt{10x - x^2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $y = \pm\sqrt{10x - x^2}$

2) Find the curves for which the functional

1 point

$$I = \int_0^{x_1} \frac{\sqrt{1+y^2}}{y} dx$$

 with $y(0) = 0$ can have extrema if the point (x_1, y_1) can vary along the circle $(x - 9)^2 + y^2 = 9$

- $y^2 = x^2 + 4x$
- $y^2 = -x^2 + 3x - 1$
- $y^2 = -x^2 + 5x + 3$
- $y^2 = -3x^2 + 2x + 1$
- $y^2 = -x^2 + 8x$
- $y^2 = x^2 - x$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $y^2 = -x^2 + 8x$

 3) Consider general functionals of the form $I = \int_0^{x_1} k(x, y)e^{\tan^{-1} y} \sqrt{1+y^2} dx$ where $k(x, y) \neq 0$ and the desired extremals are subject to the endpoint

1 point

 conditions that (x_0, y_0) is prescribed and fixed but (x_1, y_1) is only constrained to lie on the curve $y = \phi(x)$. Find the transversality condition that applies at

- (x_1, y_1)
- $(1 - y', 1 + y')(0, \phi')$
- $(1 + y', 1 - y')(0, \phi')$
- $(1 + y', 1 - y')(1, \phi')$
- $(1 - y', 1 + y')(1, \phi')$
- $(1 - y', 1 + y')(\phi', 1)$
- $(1 + y', 1 - y')(\phi', 1)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $(1 - y', 1 + y')(1, \phi')$
 $(1 + y', 1 - y')(\phi', 1)$