

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

Week 1

Week 2

Week 3

- Generalization / Numerical solution of Euler Lagrange Equations - Part 01

- Generalization / Numerical solution of Euler Lagrange Equations - Part 02

- Generalization / Numerical solution of Euler Lagrange Equations - Part 03

- Generalization / Numerical solution of Euler Lagrange Equations - Part 04

- Generalization / Numerical solution of Euler Lagrange Equations - Part 05

- Generalization / Numerical solution of Euler Lagrange Equations - Part 06

- Variational Calculus and its applications in Control Theory and Nanomechanics : Week 3 Feedback Form

 Quiz : Assignment 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

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Assignment 3

The due date for submitting this assignment has passed.

Due on 2021-02-10, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) Which of the following is the form of extremals of the functional

1 point

$$F\{y(x), z(x)\} = \int_{x_0}^{x_1} (8yz - 5y^2 + y'^2 - 4z'^2) dx$$

- $y(x) = 4A \cos 2x - 4B \sin 2x - C \cos x - D \sin x$
- $y(x) = 4A \cos 2x + 4B \sin 2x + C \cos x + D \sin x$
- $y(x) = 2A \cos 2x + 2B \sin 2x + 4C \cos x + D \sin x$
- $y(x) = 4A \cos 2x + 2B \sin 2x + 2C \cos x + 2D \sin x$
- $y(x) = 2A \cos 2x + 4B \sin 2x - C \cos x + D \sin x$
- $y(x) = 2A \cos 2x - 4B \sin 2x - C \cos x - D \sin x$

where A, B, C and D are constants

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $y(x) = 4A \cos 2x + 4B \sin 2x + C \cos x + D \sin x$

- 2) Find the extremal of the following functional

1 point

$$F\{y\} = \int_0^1 (y''^2 - 360x^2 y) dx$$

 subject to $y(0) = 0$, $y'(0) = 1$, $y(1) = 1$ and $y'(1) = 5/2$

- $y(x) = \frac{1}{3}x^4 - \frac{1}{2}x^2 + x$
- $y(x) = \frac{1}{2}x^4 - \frac{1}{3}x^2 + x$
- $y(x) = \frac{1}{2}x^4 + \frac{1}{2}x^2 - x$
- $y(x) = \frac{1}{3}x^6 - \frac{1}{2}x^3 + x$
- $y(x) = \frac{1}{2}x^6 - \frac{1}{3}x^3 - x$
- $y(x) = \frac{1}{2}x^6 - \frac{1}{2}x^3 + x$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $y(x) = \frac{1}{2}x^6 - \frac{1}{2}x^3 + x$

- 3) Determine the equation of the shortest arc in the first quadrant which passes through the points (0, 0) and (1, 0) and encloses a prescribed area
- A
- with the x-axis, where
- $A \leq \frac{\pi}{8}$

1 point

- $(x - k)^2 + \left(y + \frac{1}{2}\right)^2 = k^2 + \frac{1}{4}$
- $(x + k)^2 + \left(y - \frac{1}{2}\right)^2 = k^2 + \frac{1}{4}$
- $(x + k)^2 + \left(y + \frac{1}{2}\right)^2 = k^2 - \frac{1}{4}$
- $\left(x + \frac{1}{2}\right)^2 + (y - k)^2 = k^2 + \frac{1}{4}$
- $\left(x - \frac{1}{2}\right)^2 + (y + k)^2 = k^2 + \frac{1}{4}$
- $\left(x - \frac{1}{2}\right)^2 + (y - k)^2 = k^2 - \frac{1}{4}$

where k is constant

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\left(x - \frac{1}{2}\right)^2 + (y + k)^2 = k^2 + \frac{1}{4}$