

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

Week 1

- Introduction / Euler Lagrange Equations - Part 1
- Introduction / Euler Lagrange Equations - Part 2
- Introduction / Euler Lagrange Equations - Part 3
- Introduction / Euler Lagrange Equations - Part 4
- Introduction / Euler Lagrange Equations - Part 5
- Introduction / Euler Lagrange Equations - Part 6

 Quiz : Assignment 1

- Variational Calculus and its applications in Control Theory and Nanomechanics : Week 1 Feedback Form

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

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Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-02-03, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) Consider the functional

1 point

$$J(y) = \int_0^1 (1+x)(y')^2 dx$$

 where y is twice continuously differentiable and $y(0) = 0$ and $y(1) = 1$. Of all functions of the form

$$y(x) = x + c_1 x(1-x) + c_2 x^2(1-x)$$

 Where c_1 and c_2 are constants, If we minimize J , Then which of the following option is / are correct

- $y = \frac{186}{131}x - \frac{77}{131}x^2 + \frac{20}{131}x^3$
- $y = \frac{186}{131}x + \frac{77}{131}x^2 - \frac{20}{131}x^3$
- $y = \frac{186}{131}x + \frac{77}{131}x^2 + \frac{20}{131}x^3$
- $y = \frac{146}{151}x - \frac{97}{151}x^2 + \frac{20}{151}x^3$
- $y = \frac{146}{151}x + \frac{97}{151}x^2 - \frac{20}{151}x^3$
- $y = \frac{146}{151}x + \frac{97}{151}x^2 + \frac{20}{151}x^3$

 No, the answer is incorrect.
Score: 0

Accepted Answers:

$$y = \frac{186}{131}x - \frac{77}{131}x^2 + \frac{20}{131}x^3$$

- 2) Let
- $f = x^2 + y^2 + z^2$
- subject to

1 point

$$\phi = xy + 1 - z = 0$$

Then Which of the following is / are correct options

- Minimum of f is 1
- Minimum of f is 2
- Minimum of f is 1 at (1, 0, 0)
- Minimum of f is 1 at (0, 0, 1)
- Minimum of f is 2 at (0, 0, $\sqrt{2}$)
- Minimum of f is 2 at (1, 0, 1)

 No, the answer is incorrect.
Score: 0

Accepted Answers:

 Minimum of f is 1
Minimum of f is 1 at (0, 0, 1)

- 3) Of all parabolas which pass through the points (0, 0) and (1, 1), determine that one which, when rotated about the x-axis, generates a solid of revolution with least possible volume between
- $x = 0$
- and
- $x = 1$
- [Notice that the equation may be taken in the form
- $y = x + cx(1-x)$
- , when
- c
- is to be determined]

1 point

- minimum volume is $\frac{\pi}{2}$
- minimum volume is $\frac{\pi}{4}$
- minimum volume is $\frac{\pi}{8}$
- minimum volume is $\frac{3\pi}{8}$
- minimum volume is $\frac{5\pi}{16}$
- minimum volume is $\frac{7\pi}{15}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
minimum volume is $\frac{\pi}{8}$