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Courses » Integral Equations,calculus of variations and its applications

Announcements **Course** Ask a Question Progress Mentor FAQ

## Unit 2 - Week-1

### Course outline

#### How to access the portal

#### Week-1

- Definition and classification of linear integral equations
- Conversion of IVP into integral equations
- Conversion of BVP into an integral equations
- Conversion of integral equations into differential equations
- Integro-differential equations
- Quiz : Assignment1
- Solution of Assignment 1

#### Week 2

#### Week 3

#### Week 4

## Assignment1

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2018-08-15, 23:59 IST.**  
assignment.

1) Which one of the following is a solution of Volterra integral equation **1 point**

$$\int_0^x e^{x-t}u(t)dt = x$$



$$\sqrt{x}$$



$$1 - x$$



$$1 + x$$



$$x$$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$$1 - x$$

2) The integral equation corresponding to the differential equation **1 point**

$$y''(x) - 3y'(x) + 2y(x) = 4 \sin x; y(0) = 1, y'(0) = -2 \text{ is}$$



$$y(x) = 1 + x - 4 \sin x + \int_0^x (3 - 2(x - t))y(t)dt$$



$$y(x) = 1 + x + 4 \sin x + \int_0^x (3 - 2(x - t))y(t)dt$$



$$y(x) = 1 - x - 4 \sin x - \int_0^x x(3 - 2(x - t))y(t)dt$$



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Week 8

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The integral equation corresponding to the differential equation  $y''(x) + xy'(x) + y(x) = 0$ ,  $y(0) = 1$ ,  $y'(0) = 0$  is

$\phi(x) = 1 + \int_0^x (2x - t)\phi(t)dt$

$\phi(x) = -1 + \int_0^x (t - 2x)\phi(t)dt$

$\phi(x) = -1 - \int_0^x (t - 2x)\phi(t)dt$

$\phi(x) = 1 - \int_0^x (t - 2x)\phi(t)dt$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\phi(x) = -1 + \int_0^x (t - 2x)\phi(t)dt$

4) The integral equation corresponding to the boundary value problem 0 points

$y''(x) + \lambda y(x) = 0$ ,  $y(1) = 1$ ,  $y(l) = 0$  is

$y(x) = \lambda \int_0^l K(x, t)y(t)dt$  where

$$K(x, t) = \begin{cases} \frac{t}{l}(l - x) & 0 < t < x \\ \frac{x}{l}(l - t) & x < t < l \end{cases}$$

$y(x) = \lambda \int_0^l K(x, t)y(t)dt$  where

$$K(x, t) = \begin{cases} \frac{t}{l}(x - l) & 0 < t < x \\ \frac{x}{l}(l - t) & x < t < l \end{cases}$$

$y(x) = \lambda \int_0^l K(x, t)y(t)dt$  where

$$K(x, t) = \begin{cases} \frac{t}{l}(x - l) & 0 < t < x \\ \frac{x}{l}(t - l) & x < t < l \end{cases}$$

$y(x) = \lambda \int_0^l K(x, t)y(t)dt$  where

$$K(x, t) = \begin{cases} \frac{l}{t}(l - x) & 0 < t < x \\ \frac{l}{x}(l - t) & x < t < l \end{cases}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$y(x) = \lambda \int_0^l K(x, t)y(t)dt$  where

$$K(x, t) = \begin{cases} \frac{t}{l}(l - x) & 0 < t < x \\ \frac{x}{l}(l - t) & x < t < l \end{cases}$$

5) The integral equation corresponding to the boundary value problem 0 points

$y''(x) + xy(x) = 1$ ,  $y(0) = 0$ ,  $y(1) = 0$  is



$$y(x) = \frac{x(1+x)}{2} + \int_0^1 K(x,t)y(t)dt \text{ where}$$

$$K(x,t) = \begin{cases} t^2(1-x) & t < x \\ xt(1-t) & x < t \end{cases}$$



$$y(x) = \frac{x(1-x)}{2} + \int_0^1 K(x,t)y(t)dt \text{ where}$$

$$K(x,t) = \begin{cases} t^2(1-x) & t < x \\ xt(1-t) & x < t \end{cases}$$



$$y(x) = \frac{x(1+x)}{2} + \int_0^1 K(x,t)y(t)dt \text{ where}$$

$$K(x,t) = \begin{cases} t^2(1+x) & t < x \\ xt(1+t) & x < t \end{cases}$$



$$y(x) = \frac{x(1+x)}{2} + \int_0^1 K(x,t)y(t)dt \text{ where}$$

$$K(x,t) = \begin{cases} x^2(1-x) & t < x \\ xt(1-t) & x < t \end{cases}$$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$$y(x) = \frac{x(1+x)}{2} + \int_0^1 K(x,t)y(t)dt \text{ where}$$

$$K(x,t) = \begin{cases} t^2(1-x) & t < x \\ xt(1-t) & x < t \end{cases}$$

6) The initial value problem corresponding to the integral equation **1 point**

$$y(x) = \frac{x^2}{2} + \int_0^x t(t-x)y(t)dt$$



$$y''(x) + y(x) = 1, y(0) = y'(0) = 0$$



$$y''(x) + xy(x) = 1, y(0) = y'(0) = 0$$



$$y''(x) + xy(x) = 1, y(0) = y'(0) = 1$$



$$y''(x) + xy(x) = 0, y(0) = y'(0) = 0$$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$$y''(x) + xy(x) = 1, y(0) = y'(0) = 0$$

7) The boundary value problem corresponding to the integral equation **1 point**

$$y(x) = 1 + \int_0^x ty(t)dt + \int_x^1 xy(t)dt \text{ is}$$



$$y'' + y = 0, y(0) = 1, y'(1) = 0$$



$$y'' + xy = 0, y(0) = 1, y'(1) = 0$$



$$y'' + y = 0, y(0) = 1 = y'(1)$$



$$y'' + y = 0, y(1) = y'(1) = 0$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$y'' + y = 0, y(0) = 1, y'(1) = 0$$

8) The solution of the integro - differential equation

1 point

$$\phi'(x) = \phi(x) - \int_0^x (x-t)\phi'(t)dt + \int_0^x \phi(t)dt + x, \phi(0) = -1 \text{ is}$$

$$1 - 2e^x$$

$$x - e^{-x}$$

$$-e^{-x}$$

$$-e^x$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$-e^x$$

9) The solution of the integro - differential equation

1 point

$$\phi''(x) + \int_0^x e^{2(x-t)}\phi'(t)dt = e^{2x}, \phi(0) = \phi'(0) = 0 \text{ is}$$

$$x(e^x - 1)$$

$$xe^x - e^x + 1$$

$$1 - e^x + x$$

$$x^2 + e^x - x - 1$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$xe^x - e^x + 1$$

10) Which one of the functions is a solution of Volterra integro equation

1 point

$$\int_0^x (x-t)^2 u(t)dt = x^3$$

1

3

2

1/3

No, the answer is incorrect.

Score: 0

Accepted Answers:

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