Lecture 1 Activity Results for Test Student

Score for this attempt: **1** out of 1

Submitted Jan 9 at 3:10pm

This attempt took 4 minutes.

Question 1

1 / 1 pts

Find a general solution of $u''(x) = 3u(x)$.

- $u(x) = c\, e^{\sqrt{3}x}$
- $u(x) = c\, e^{-\sqrt{3}x}$
- Correct! $u(x) = c_1 e^{\sqrt{3}x} + c_2 e^{-\sqrt{3}x}$
- $u(x) = c_1 e^{3x} + c_2 e^{-3x}$
- $u(x) = c_1 \cos(\sqrt{3}x) + c_2 \sin(\sqrt{3}x)$

Additional Comments:

Question 2

0 / 0 pts

Find a general solution of $u''(x) - 6u'(x) + 9u(x) = 0$.

- $u(x) = c\,e^{3x}$
- $u(x) = c_1 e^{3x} + c_2 e^{-3x}$
- $u(x) = c\,xe^{3x}$

Correct!

- $u(x) = c_1 e^{3x} + c_2 xe^{3x}$
- $u(x) = c_1 e^{-3x} + c_2 xe^{-3x}$

Additional Comments:

Question 3

0 / 0 pts

Let $u_p(t)$ be a particular solution of $u''(t) - 3u(t) = \cos(t^2)$. Find a general solution of $u''(t) - 3u(t) = \cos(t^2)$.

- $u(t) = c_1 u_p(t) + c_2 e^{\sqrt{3}t}$
- $u(t) = c_1 u_p(t) + c_2 e^{-\sqrt{3}t}$

Correct!

$u(t) = u_p(t) + c_1 e^{\sqrt{3}t} + c_2 e^{-\sqrt{3}t}$

$u(t) = u_p(t) + c_1 e^{\sqrt{3}t} + c_2 t e^{\sqrt{3}t}$

$u(t) = u_p(t) + c_1 \cos(\sqrt{3}t) + c_2 \sin(\sqrt{3}t)$

Additional Comments:

Question 4

0 / 0 pts

Consider the PDE $\cos(t)u_t + e^x u_x = x^2 \sin(t)$ for $u(x, t)$. We classify it as

a first order, nonlinear, inhomogeneous PDE.

a first order, linear, homogeneous PDE.

Correct!

a first order, linear, inhomogeneous PDE.

a first order, nonlinear, homogeneous PDE.

a second order, linear, inhomogeneous PDE.

Additional Comments:

Question 5

0 / 0 pts

Consider the eigenvalue problem $\begin{cases} X''(x) = -\lambda X(x) \\ X(0) = 0, \quad X(L) = 0 \end{cases}$.

The eigenvalues and eigenfunctions are

- $\lambda_n = (n\pi)^2, \quad X_n(x) = \sin(n\pi x), \quad n = 1, 2, \ldots$

Correct!

- $\lambda_n = (\frac{n\pi}{L})^2, \quad X_n(x) = \sin(\frac{n\pi}{L}x), \quad n = 1, 2, \ldots$
- $\lambda_n = (\frac{n\pi}{L})^2, \quad X_n(x) = \sin(\frac{n\pi}{L}x), \quad n = 0, 1, 2, \ldots$
- $\lambda_n = (\frac{2n\pi}{L})^2, \quad X_n(x) = \sin(\frac{2n\pi}{L}x), \quad n = 1, 2, \ldots$
- $\lambda_n = (\frac{n\pi}{L})^2, \quad X_n(x) = \cos(\frac{n\pi}{L}x), \quad n = 0, 1, 2, \ldots$

Additional Comments:

Question 6

0 / 0 pts

Which of the following is true? **Select all that apply.**

- [ ] $u_t = ku_{xx}$ is an inhomogeneous PDE.

Correct!

- [x] $u_t = ku_{xx}$ is a homogeneous PDE.
- [ ] $u(x,0) = \sin(\frac{\pi}{L}x)$ is a homogeneous initial condition.

Correct!

- [x] $u(0,t) = \sin(t)$ is an inhomogeneous boundary condition.
- [ ] $u(0,t) = \sin(t)$ is a homogeneous boundary condition.

Additional Comments:

Unanswered

Question 7

0 / 0 pts

Which statement below is true?

$$\int_0^L \sin(\frac{\alpha\pi}{L}x)\sin(\frac{\beta\pi}{L}x)dx = \frac{1}{2}\Big(\int_0^L \sin(\frac{(\alpha+\beta)\pi}{L}x)dx + \int_0^L \sin(\frac{(\alpha-\beta)\pi}{L}x)dx\Big)$$

$$\int_0^L \sin(\frac{\alpha\pi}{L}x)\sin(\frac{\beta\pi}{L}x)dx = \frac{1}{2}\Big(\int_0^L \cos(\frac{(\alpha+\beta)\pi}{L}x)dx + \int_0^L \cos(\frac{(\alpha-\beta)\pi}{L}x)dx\Big)$$

$$\int_0^L \sin(\frac{\alpha\pi}{L}x)\sin(\frac{\beta\pi}{L}x)dx = \frac{1}{2}\Big(\int_0^L \cos(\frac{(\alpha+\beta)\pi}{L}x)dx - \int_0^L \cos(\frac{(\alpha-\beta)\pi}{L}x)dx\Big)$$

$$\int_0^L \sin(\frac{\alpha\pi}{L}x)\sin(\frac{\beta\pi}{L}x)dx = \frac{1}{2}\Big(\int_0^L \sin(\frac{(\alpha+\beta)\pi}{L}x)dx - \int_0^L \sin(\frac{(\alpha-\beta)\pi}{L}x)dx\Big)$$

orrect Answer

$$\int_0^L \sin(\frac{\alpha\pi}{L}x)\sin(\frac{\beta\pi}{L}x)dx = \frac{1}{2}\Big(\int_0^L \cos(\frac{(\alpha-\beta)\pi}{L}x)dx - \int_0^L \cos(\frac{(\alpha+\beta)\pi}{L}x)dx\Big)$$

Additional Comments:

Fudge Points:

You can manually adjust the score by adding positive or negative points to this box.

Final Score: 1 out of 1

Update Scores