Lecture 16 Activity Results for Test Student

Score for this attempt: **1** out of 1
Submitted Feb 29 at 8:35am
This attempt took 1 minute.

Question 1

1 / 1 pts

Consider the IVP $\begin{cases} u_t - xu_x = -3u \\ u(x,0) = f(x) \end{cases}$.

Let $u^{(1)}(x,t)$ be the solution for $f(x) = \dfrac{1}{1+e^{-x}}$;

$u^{(2)}(x,t)$ be the solution for $f(x) = \cos(x)$; and

$u^{(3)}(x,t)$ be the solution for $f(x) = \dfrac{2}{1+e^{-x}} + 3\cos(x)$.

Which statement below is true?

- $u^{(3)}(x,t) = u^{(1)}(x,t) + u^{(2)}(x,t)$
- $u^{(3)}(x,t) = 3u^{(1)}(x,t) + 2u^{(2)}(x,t)$
- Correct! $u^{(3)}(x,t) = 2u^{(1)}(x,t) + 3u^{(2)}(x,t)$
- We cannot write out $u^{(3)}(x,t)$ based on $u^{(1)}(x,t)$ and $u^{(2)}(x,t)$.
- $u^{(3)}(x,t) = u^{(1)}(x,t)u^{(2)}(x,t)$

Additional Comments:

Question 2

0 / 0 pts

Consider the IVP $\begin{cases} u_t - xu_x = -3u^2 \\ u(x,0) = f(x) \end{cases}$.

Let $u^{(1)}(x,t)$ be the solution for $f(x) = \dfrac{1}{1+e^{-x}}$;

$u^{(2)}(x,t)$ be the solution for $f(x) = \cos(x)$; and

$u^{(3)}(x,t)$ be the solution for $f(x) = \dfrac{2}{1+e^{-x}} + 3\cos(x)$.

Which statement below is true?

- $u^{(3)}(x,t) = u^{(1)}(x,t) + u^{(2)}(x,t)$
- $u^{(3)}(x,t) = 3u^{(1)}(x,t) + 2u^{(2)}(x,t)$
- $u^{(3)}(x,t) = 2u^{(1)}(x,t) + 3u^{(2)}(x,t)$
- Correct! We cannot write out $u^{(3)}(x,t)$ based on $u^{(1)}(x,t)$ and $u^{(2)}(x,t)$.
- $u^{(3)}(x,t) = u^{(1)}(x,t)u^{(2)}(x,t)$

Additional Comments:

Question 3

0 / 0 pts

Consider the first oder PDE $u_t - xu_x = -3u$ in $D = \{(x,t) | x \geq L, t \geq 0\}$.

Suppose the value of *u* is imposed at *t* = 0 along the *x*-axis for $x \in (L, +\infty)$.

For *L* > 0, which of the following gives a well-posed problem for solving *u* in region *D*? **Select all that apply.**

- condition $u(L,t) = 0,\ t \geq 0$.
- condition $u(L,t) = \cos(t),\ t \geq 0$.
- condition $u(L+10,t) = \cos(t),\ t \geq 0$.
- Correct! no additional condition imposed.
- condition $u(L,t) = \dfrac{1}{1+e^{-t}},\ t \geq 0$.
- condition $u(L,t) = \cos(t),\ t \geq 10$.

Additional Comments:

Question 4

0 / 0 pts

Consider the first oder PDE $u_t + xu_x = -3u$ in $D = \{(x,t) | x \geq L, t \geq 0\}$.

Suppose the value of *u* is imposed at *t* = 0 along the *x*-axis for $x \in (L, +\infty)$.

For *L* > 0, which of the following gives a well-posed problem for solving *u* in region *D*? **Select all that apply.**

- Correct! condition $u(L,t) = 0,\ t \geq 0$.
- Correct! condition $u(L,t) = \cos(t),\ t \geq 0$.
- condition $u(L+10,t) = \cos(t),\ t \geq 0$.
- no additional condition imposed.
- Correct! condition $u(L,t) = \dfrac{1}{1+e^{-t}},\ t \geq 0$.
- condition $u(L,t) = \cos(t),\ t \geq 10$.

Additional Comments:

Question 5

0 / 0 pts

Consider the IVP $\begin{cases} u_t - xu_x = -3u^2 \\ u(x,0) = f(x) \end{cases}$.

Which statement below is true regarding the characteristics? **Select all that apply.**

- The characteristics are a family of straight lines independent of *f*(*x*).
- The characteristics are a family of straight lines that vary with (*x*).
- Correct! The characteristics are a family of curves independent of *f*(*x*).
- The characteristics are a family of curves that vary with *f*(*x*).
- For some *f*(*x*), the characteristics may intersect in the (x, t) plane.

Additional Comments:

Question 6

0 / 0 pts

Consider the first oder PDE $u_t - xu_x = -3u^2$ in $D = \{(x,t) | x \in (-L, L), t \geq 0\}$ where *L* > 0. Suppose the value of *u* is imposed at *t* = 0 along the *x*-axis for $x \in (-L, L)$.

Which of the following gives a well-posed problem for solving *u* in region *D*? **Select all that apply.**

- condition $u(L,t) = 0,\ t \geq 0$.
- condition $u(L,t) = \cos(t),\ t \geq 0$.
- Correct! conditions $u(-L,t) = e^{-t}$ and $u(L,t) = \cos(t),\ t \geq 0$.
- no additional condition imposed.
- condition $u(-L,t) = \cos(t),\ t \geq 0$.
- condition $u(-L,t) = e^{-t},\ t \geq 0$.

Additional Comments:

Question 7

0 / 0 pts

Consider the first oder PDE $u_t + xu_x = -3u^2$ in $D = \{(x,t) | x \in (-L, L), t \geq 0\}$ where *L* > 0. Suppose the value of *u* is imposed at *t* = 0 along the *x*-axis for $x \in (-L, L)$.

Which of the following gives a well-posed problem for solving *u* in region *D*? **Select all that apply.**

- condition $u(L,t) = 0,\ t \geq 0$.
- condition $u(L,t) = \cos(t),\ t \geq 0$.
- conditions $u(-L,t) = e^{-t}$ and $u(L,t) = \cos(t),\ t \geq 0$.
- Correct! no additional condition imposed.
- condition $u(-L,t) = \cos(t),\ t \geq 0$.
- condition $u(-L,t) = e^{-t},\ t \geq 0$.

Additional Comments:

Question 8

0 / 0 pts

Based on our study, which of the following is true? **Select all that apply.**

- Correct! The method of characteristics can be applied to solve first order semi-linear PDEs in (*x*, *t*).
- The method of characteristics can be applied to solve the heat equation in (*x*, *t*).
- Correct! The method of characteristics can be applied to solve first order semi-linear PDEs in (*x*, *y*, *t*).
- Correct! The method of characteristics can be applied to solve the wave equation in (*x*, *t*).
- The method of characteristics can be applied to solve 1D Sturm-Liouville problems.

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

Here's the latest quiz results for Test Student. You can modify the points for any question and add more comments, then click "Update Scores" at the bottom of the page.

Quiz Submissions

Attempt 1: 1

Test Student has 1 attempt left

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