Lecture 13 Activity Results for Test Student

Score for this attempt: **1** out of 1
Submitted Feb 20 at 9:45am
This attempt took 2 minutes.

Question 1

1 / 1 pts

Consider the IVP $\begin{cases} y'(t) = -\alpha(t)y(t) + f(t) \\ y(0) = 0 \end{cases}$ for y(t).

Let $G(t, t')$ denote the solution for the forcing $f(t) = \delta(t - t'),\ t' > 0$.

Which statement below is true regarding the solution y(t) for a general f(t)?

- $y(t) = f(t)G(t, t)$
- $G(t, t') \neq 0$ for $t' > t$; $y(t) = \int_0^{+\infty} f(t')G(t, t')dt'$
- Correct! $G(t, t') = 0$ for $t' > t$; $y(t) = \int_0^t f(t')G(t, t')dt'$
- $G(t, t') = 0$ for $t' > t$; $y(t) = f(t)\int_0^t G(t, t')dt'$
- There is not enough information to determine y(t).

Additional Comments:

Question 2

0 / 0 pts

$\begin{cases} y'(t) = -\alpha y(t) + \delta(t - t'),\ t' > 0 \\ y(0) = 0 \end{cases}$ is equivalent to

$\begin{cases} \text{for } t < t', y(t) = 0 \\ \text{for } t \geq t', y(t) \text{ satisfies } \begin{cases} y'(t) = -\alpha y(t) \\ y(t') = 1 \end{cases} \end{cases}$.

This gives us another way of solving for y(t). What is y(t)?

- $y(t) = e^{-\alpha(t-t')}$
- $y(t) = \begin{cases} 0, & \text{for } t < t' \\ e^{-\alpha t}, & \text{for } t \geq t' \end{cases}$
- $y(t) = \begin{cases} 0, & \text{for } t < t' \\ \frac{1}{\alpha}e^{-\alpha(t-t')}, & \text{for } t \geq t' \end{cases}$
- Correct! $y(t) = \begin{cases} 0, & \text{for } t < t' \\ e^{-\alpha(t-t')}, & \text{for } t \geq t' \end{cases}$
- $y(t) = \frac{1}{\alpha}e^{-\alpha(t-t')}$

Additional Comments:

Question 3

0 / 0 pts

$\begin{cases} y''(t) = -\alpha^2 y(t) + \delta(t - t'),\ t' > 0 \\ y(0) = 0,\ y'(0) = 0 \end{cases}$ is equivalent to

$\begin{cases} \text{for } t < t', y(t) = 0 \\ \text{for } t \geq t', y(t) \text{ satisfies } \begin{cases} y''(t) = -\alpha^2 y(t) \\ y(t') = 0,\ y'(t') = 1 \end{cases} \end{cases}$.

This gives us another way of solving for y(t). What is y(t)?

- $y(t) = \frac{1}{\alpha}\sin(\alpha(t - t'))$
- $y(t) = \begin{cases} 0, & \text{for } t < t' \\ \frac{1}{\alpha}\sin(\alpha t), & \text{for } t \geq t' \end{cases}$
- Correct! $y(t) = \begin{cases} 0, & \text{for } t < t' \\ \frac{1}{\alpha}\sin(\alpha(t - t')), & \text{for } t \geq t' \end{cases}$
- $y(t) = \begin{cases} 0, & \text{for } t < t' \\ \sin(\alpha(t - t')), & \text{for } t \geq t' \end{cases}$
- $y(t) = \sin(\alpha(t - t'))$

Additional Comments:

Question 4

0 / 0 pts

Consider the IBVP $\begin{cases} u_{tt} = (c(x,t))^2 u_{xx} + f(x,t) \\ u(0,t) = 0,\ u(L,t) = 0 \\ u(x,0) = 0,\ u_t(x,0) = 0 \end{cases}$ for u(x, t).

Let $G(x, t, x', t')$ denote the solution for the forcing $f(x,t) = \delta(x - x')\delta(t - t'),\ x' \in (0, L),\ t' > 0$.

Which statement below is true regarding the solution u(x, t) for a general f(x, t)?

- $u(x,t) = f(x,t)G(x,t,x,t)$
- $G(x,t,x',t') \neq 0$ for $t' > t$; $u(x,t) = \int_0^{+\infty}\int_0^L f(x',t')G(x,t,x',t')dx'dt'$
- Correct! $G(x,t,x',t') = 0$ for $t' > t$; $u(x,t) = \int_0^t\int_0^L f(x',t')G(x,t,x',t')dx'dt'$
- $G(x,t,x',t') = 0$ for $t' > t$; $u(x,t) = f(x,t)\int_0^t\int_0^L G(x,t,x',t')dx'dt'$
- There is not enough information to determine u(x, t).

Additional Comments:

Question 5

0 / 0 pts

Consider the IBVP $\begin{cases} u_{tt} = c^2 u_{xx} + f(x,t) \\ u(0,t) = 0,\ u(L,t) = 0 \\ u(x,0) = \sin(\frac{\pi}{L}x),\ u_t(x,0) = 0 \end{cases}$ for u(x, t).

Let $G(x, t, x', t')$ denote the solution for the forcing $f(x,t) = \delta(x - x')\delta(t - t'),\ x' \in (0, L),\ t' > 0$.

Be careful about the initial conditions.

Which statement below is true regarding the solution u(x, t) for a general f(x, t)?

- $u(x,t) = f(x,t)G(x,t,x,t)$
- $G(x,t,x',t') \neq 0$ for $t' > t$; $u(x,t) = \int_0^{+\infty}\int_0^L f(x',t')G(x,t,x',t')dx'dt'$
- $G(x,t,x',t') = 0$ for $t' > t$; $u(x,t) = \int_0^t\int_0^L f(x',t')G(x,t,x',t')dx'dt'$
- $G(x,t,x',t') = 0$ for $t' > t$; $u(x,t) = f(x,t)\int_0^t\int_0^L G(x,t,x',t')dx'dt'$
- Correct! There is not enough information to determine u(x, t).

Additional Comments:

Question 6

0 / 0 pts

Consider the IBVP $\begin{cases} u_t = \sigma(x,t)u_{xx}, \\ u(0,t) = 0,\ u(L,t) = 0 \\ u(x,0) = f(x) \end{cases}$ for u(x, t).

Let $G(x, t, x')$ denote the solution for the IC $f(x) = \delta(x - x'),\ x' \in (0, L)$.

Which statement below is true regarding the solution u(x, t) for a general f(x)?

- $u(x,t) = f(x)G(x,t,x)$
- Correct! $G(x,t,x') \neq 0$ for $x' > x$; $u(x,t) = \int_0^L f(x')G(x,t,x')dx'$
- $G(x,t,x') = 0$ for $x' > x$; $u(x,t) = \int_0^x f(x')G(x,t,x')dx'$
- $G(x,t,x') \neq 0$ for $x' > x$; $u(x,t) = f(x)\int_0^L G(x,t,x')dx'$
- There is not enough information to determine u(x, t).

Additional Comments:

Question 7

0 / 0 pts

Consider the BVP $\begin{cases} u_{xx} + (c(x,y))^2 u_{yy} = 0, \\ \quad (x,y) \in (0,L) \times (0,H) \\ u(0,y) = 0,\ u(L,y) = g(y) \\ u(x,0) = 0,\ u(x,H) = 0 \end{cases}$ for u(x, y).

Let $G(x, y, y')$ denote the solution for the BC $g(y) = \delta(y - y'),\ y' \in (0, H)$
.

Which statement below is true regarding the solution u(x, y) for a general g(y)?

- $u(x,y) = g(y)G(x,y,y)$
- Correct! $G(x,y,y') \neq 0$ for $y' > y$; $u(x,y) = \int_0^H g(y')G(x,y,y')dy'$
- $G(x,y,y') = 0$ for $y' > y$; $u(x,y) = \int_0^y g(y')G(x,y,y')dy'$
- $G(x,y,y') \neq 0$ for $y' > y$; $u(x,y) = g(y)\int_0^H G(x,y,y')dy'$
- There is not enough information to determine u(x, y).

Additional Comments:

Question 8

0 / 0 pts

Consider the BVP $\begin{cases} \frac{1}{r^2}\left(r^2 u_r\right)_r = -f(r),\ r \in (0, R) \\ u(0) = \text{finite},\ u(R) = 0 \end{cases}$ for u(r).

Let $G(r, r')$ denote the solution for the forcing $f(r) = \delta(r - r'),\ r' \in (0, R)$
.

Which statement below is true regarding the solution u(r) for a general f(r)?

- $u(r) = f(r)G(r, r)$
- Correct! $G(r, r') \neq 0$ for $r' > r$; $u(r) = \int_0^R f(r')G(r, r')dr'$
- $G(r, r') = 0$ for $r' > r$; $u(r) = \int_0^r f(r')G(r, r')dr'$
- $G(r, r') \neq 0$ for $r' > r$; $u(r) = f(r)\int_0^R G(r, r')dr'$
- There is not enough information to determine y(t).

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

Allow this student an extra attempt

← Back to Quiz