Math 2C03 2021 Prac pb set #10 Sections 7.1-2 (18670006)

Due: Sat, May 1, 2021 11:00 PM EDT

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Description

Laplace transform, def, inverse and properties

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1. Question Details ZillDiffEQ9 7.1.001.EP. [4603957]

Use Definition 7.1.1.

Definition 7.1.1 Laplace Transform

$$f(t) = \begin{cases} -1, & 0 \le t < 1 \\ 1, & t \ge 1 \end{cases}$$

Complete the integral(s) that defines $\mathcal{L}\{f(t)\}$.

$$\mathcal{L}\{f(t)\} = \int_0^{\square} \left(\quad \right) dt + \int_{\square}^{\infty} \left(\quad \right) dt$$

Find $\mathcal{L}\{f(t)\}$. (Write your answer as a function of s.)

$\mathcal{L}\{f(t)\} =$ $(s > 0)$

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2. Question Details ZillDiffEQ9 7.1.002.EP. [4603925]

Use Definition 7.1.1.

Definition 7.1.1 Laplace Transform

$$f(t) = \begin{cases} 6, & 0 \le t < 3 \\ 0, & t \ge 3 \end{cases}$$

Complete the integral(s) that defines $\mathcal{L}\{f(t)\}$.

$$\mathcal{L}\{f(t)\} = \int_0^{\square} \left(\quad \right) dt + \int_{\square}^{\infty} \left(\quad \right) dt$$

Find $\mathcal{L}\{f(t)\}$. (Write your answer as a function of s.)

$\mathcal{L}\{f(t)\} =$ $(s > 0)$

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3. Question Details ZillDiffEQ9 7.1.003.EP. [4903613]

Use the following definition of a Laplace transform.

Let f be a function defined for $t \geq 0$. Then the integral

$$\mathscr{L}\{f(t)\} = \int_0^\infty e^{-st} f(t)\, dt$$

is said to be the Laplace transform of f, provided that the integral converges.

$$f(t) = \begin{cases} t, & 0 \leq t < 1 \\ 1, & t \geq 1 \end{cases}$$

Complete the integral(s) that defines $\mathscr{L}\{f(t)\}$.

$$\mathscr{L}\{f(t)\} = \int_0^{\square} \left(\quad \right) dt + \int_{\square}^{\infty} \left(\quad \right) dt$$

Find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$$\mathscr{L}\{f(t)\} = \quad (s > 0)$$

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4. Question Details ZillDiffEQ9 7.1.005.EP. [4603983]

Use Definition 7.1.1.

Definition 7.1.1 Laplace Transform

$$f(t) = \begin{cases} \cos(t), & 0 \leq t < \pi \\ 0, & t \geq \pi \end{cases}$$

Complete the integral(s) that defines $\mathscr{L}\{f(t)\}$.

$$\mathscr{L}\{f(t)\} = \int_{\square}^{\pi} \left(\quad \right) dt + \int_{\pi}^{\infty} \left(\quad \right) dt$$

Find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$$\mathscr{L}\{f(t)\} = \quad (s > 0)$$

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5. Question Details ZillDiffEQ9 7.1.007. [3744832]

Use Definition 7.1.1.

DEFINITION 7.1.1 Laplace Transform

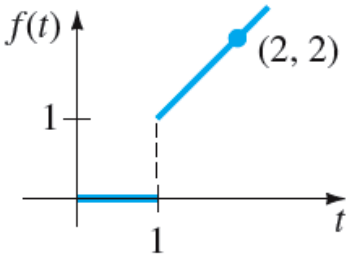
Let f be a function defined for $t \geq 0$. Then the integral

$$\mathscr{L}\{f(t)\} = \int_0^\infty e^{-st} f(t)\, dt$$

is said to be the **Laplace transform** of f, provided that the integral converges.

Find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$\mathscr{L}\{f(t)\} =$ ($s > 0$)



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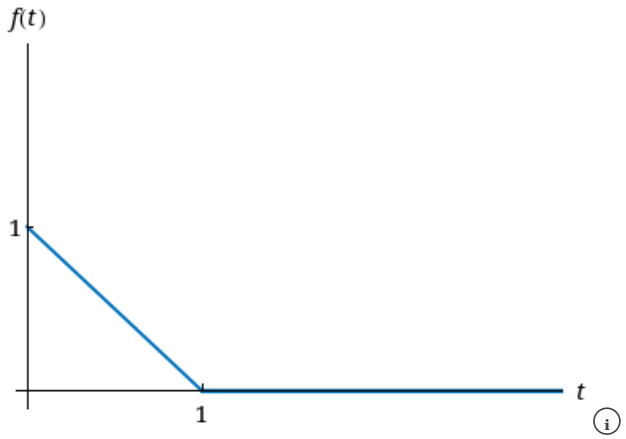
6. Question Details ZillDiffEQ9 7.1.009.EP. [4603920]

Use Definition 7.1.1.

Definition 7.1.1 Laplace Transform



Complete the integral(s) that defines $\mathscr{L}\{f(t)\}$.

$$\mathscr{L}\{f(t)\} = \int_0^{\square} \left(\quad \right) dt + \int_{\square}^{\infty} \left(\quad \right) dt$$

Find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$\mathscr{L}\{f(t)\} =$ $(s > 0)$

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7. Question Details ZillDiffEQ9 7.1.024. [3877305]

Use Theorem 7.1.1 to find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$$f(t) = -9t^2 + 24t + 9$$

$\mathscr{L}\{f(t)\} =$

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8. Question Details ZillDiffEQ9 7.1.030. [3897268]

Use Theorem 7.1.1 to find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$f(t) = (e^t - e^{-t})^2$

$\mathscr{L}\{f(t)\} =$

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9. Question Details ZillDiffEQ9 7.1.031.MI. [4568267]

Use Theorem 7.1.1 to find $\mathscr{L}\{f(t)\}$. (Write your answer as a function of s.)

$f(t) = 3t^2 - 2\sin(4t)$

$\mathscr{L}\{f(t)\} =$

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10. Question Details ZillDiffEQ9 7.1.037. [4568264]

Find $\mathscr{L}\{f(t)\}$ by first using a trigonometric identity. (Write your answer as a function of s.)

$f(t) = \sin(5t)\cos(5t)$

$\mathscr{L}\{f(t)\} =$

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11. Question Details ZillDiffEQ9 7.2.003. [4568141]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{1}{s^2} - \frac{120}{s^6}\right\}$$

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12. Question Details ZillDiffEQ9 7.2.010. [4568235]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{1}{7s-2}\right\}$$

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13. Question Details ZillDiffEQ9 7.2.013. [3756025]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{16s}{16s^2+1}\right\}$$

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14. Question Details ZillDiffEQ9 7.2.015. [4568109]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{4s-10}{s^2+25}\right\}$$

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15. Question Details ZillDiffEQ9 7.2.019. [3756045]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{s}{s^2+2s-3}\right\}$$

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16. Question Details ZillDiffEQ9 7.2.020. [4568154]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{1}{s^2 + s - 42}\right\}$$

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17. Question Details ZillDiffEQ9 7.2.023. [4568130]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{s}{(s - 5)(s - 6)(s - 30)}\right\}$$

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18. Question Details ZillDiffEQ9 7.2.025. [4568112]

Use appropriate algebra and Theorem 7.2.1 to find the given inverse Laplace transform. (Write your answer as a function of t.)

$$\mathscr{L}^{-1}\left\{\frac{1}{s^3 + 2s}\right\}$$

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19. Question Details ZillDiffEQ9 7.2.037.MI.SA. [4605511]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use the Laplace transform to solve the given initial-value problem.

$$y' + 6y = e^{3t},\ y(0) = 2$$

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20. Question Details ZillDiffEQ9 7.2.043. [3744682]

Use the Laplace transform to solve the given initial-value problem.

$$2y''' + 3y'' - 3y' - 2y = e^{-t}, \quad y(0) = 0, \quad y'(0) = 0, \quad y''(0) = 1$$

$y(t) =$

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Assignment Details

Name (AID): **Math 2C03 2021 Prac pb set #10 Sections 7.1-2 (18670006)**
Submissions Allowed: **20**
Category: **Homework**
Code:
Locked: **Yes**
Author: **Lia Bronsard (** bronsard@mcmaster.ca **)**
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