1.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 + x$, $\quad y(0) = y'(0) = 0$;

b) $y'' + y' - 2y = x + 5$, $\quad y(1) = 0$, $y'(1) = 2$;

c) $x'' + x' = f(t)$, kde $f(t) \stackrel{\text{def.}}{=} \begin{cases} 0, & t \in \langle 0, 1), \\ 1, & t \in \langle 1, 2), \\ 0, & t \geq 2, \end{cases}$ $\quad x(0) = 0$, $x'(0) = 2$.

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2.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 - 2x + 1$, $\quad y(0) = 0$, $y'(0) = 1$;

b) $y'' + y' - 2y = 7 - 2x$, $\quad y(1) = 2$, $y'(1) = 2$;

c) $x'' + 2x' + x = f(t)$, kde $f(t) \stackrel{\text{def.}}{=} \begin{cases} 0, & t < 0, \\ 1, & t \in (0, 2), \\ 3, & t > 2, \end{cases}$ $\quad x(0) = 0$, $x'(0) = 0$.

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3.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 2x^2 - 3x + 1$, $\quad y(0) = y'(0) = 0$;

b) $y'' + y' - 2y = 7 - 2x$, $\quad y(1) = 2$, $y'(1) = 0$;

c) $x'' - x = f(t)$, kde $f(t) \stackrel{\text{def.}}{=} \begin{cases} 0, & t < 0, \\ 1 - t, & t \in (0, 1), \\ 0, & t > 1, \end{cases}$ $\quad x(0) = 0$, $x'(0) = 0$.

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4.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 2x + 3, \quad y(0) = 0, \ y'(0) = 1;$

    b) $y'' + y' - 2y = x - 3, \quad y(1) = 0, \ y'(1) = 2;$

    c) $x'' + x = f(t), \ \text{kde} \ f(t) \overset{\text{def.}}{=} \begin{cases} 0, \ t < 0, \\ t, \ t \in (0,1), \\ 2 - t, \ t \in (1,2), \\ 0, \ t > 2, \end{cases} \quad x(0) = 0, \ x'(0) = 1.$

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5.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = x^2 - 16, \quad y(0) = y'(0) = 0;$

    b) $y'' + y' - 2y = 7 - 2x, \quad y(1) = 0, \ y'(1) = 2;$

    c) $y'' + 2y' + y = f(x), \ \text{kde} \ f(x) \overset{\text{def.}}{=} \begin{cases} 1, \ x \in \langle 0,2), \\ 3, \ x \geq 2, \end{cases} \quad y(0) = y'(0) = 0.$

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6.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = x^2 - 16, \quad y(0) = 0, \ y'(0) = 1;$

    b) $y'' + y' - 2y = 18x - 2, \quad y(1) = 2, \ y'(1) = 2;$

    c) $x'' + x = f(t), \ \text{kde} \ f(t) \overset{\text{def.}}{=} \begin{cases} 1, \ t \in \langle 0,1), \\ -1, \ t \in \langle 1,2), \\ 0, \ t \geq 2, \end{cases} \quad x(0) = x'(0) = 0.$

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7.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 3x$, $\quad y(0) = y'(0) = 0$;

b) $y'' + y' - 2y = x - 3$, $\quad y(1) = 2$, $y'(1) = 0$;

c) $x'' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 2, & t \in \langle 0, 3 \rangle, \\ 1, & t \in (3, 4), \\ 0, & t \geq 4, \end{cases}$ $\quad x(0) = x'(0) = 0.$

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8.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 - 16$, $\quad y(0) = 1$, $y'(0) = 0$;

b) $y'' + y' - 2y = 7x + 8$, $\quad y(1) = 2$, $y'(1) = 2$;

c) $x'' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 0, & t < 1, \\ 2, & t \in \langle 1, 4 \rangle, \\ 0, & t > 4, \end{cases}$ $\quad x(0) = x'(0) = 0.$

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9.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 3x + x^2 - 12$, $\quad y(0) = y'(0) = 0$;

b) $y'' + y' - 2y = x + 5$, $\quad y(1) = 2$, $y'(1) = 2$;

c) $x'' - x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1 - t, & t \in \langle 0, 1 \rangle, \\ 0, & t \geq 1, \end{cases}$ $\quad x(0) = x'(0) = 0.$

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10.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 3x + x^2 - 12$, $\quad y(0) = 0$, $y'(0) = 1$;

b) $y'' + y' - 2y = 7x + 8$, $\quad y(1) = 2$, $y'(1) = 2$;

c) $x'' + 2x' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1, & t \in \langle 0, 2), \\ 3, & t \geq 2, \end{cases}$ $\quad x(0) = x'(0) = 0$.

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11.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 + x$, $\quad y(0) = 0$, $y'(0) = 1$;

b) $y'' + y' - 2y = 2x + 1$, $\quad y(1) = y'(1) = 2$;

c) $x'' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 2, & t \in \langle 0, 3), \\ -2, & t \in \langle 3, 4), \\ 0, & t \geq 4, \end{cases}$ $\quad x(0) = x'(0) = 0$.

....

12.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 - 2x + 1$, $\quad y(0) = y'(0) = 0$;

b) $y'' + y' - 2y = 3x + 6$, $\quad y(1) = y'(1) = 2$;

c) $x'' + x' = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1, & t \in \langle 3, 4), \\ 0, & t \notin \langle 3, 4), \end{cases}$ $\quad x(0) = 0$, $x'(0) = 2$.

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13.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 2x + 3$, $y(0) = y'(0) = 0$;

    b) $y'' + y' - 2y = 2x + 1$, $y(1) = 0$, $y'(1) = 2$;

    c) $x'' + x' = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 2, & t \in \langle 1, 2 \rangle, \\ 0, & t \notin \langle 1, 2 \rangle, \end{cases}$ $x(0) = x'(0) = 1$.

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14.

    a) $y'' + y' - 6y = 3x$, $y(0) = 0$, $y'(0) = 1$;

    b) $y'' + y' - 2y = 18x - 2$, $y(1) = 0$, $y'(1) = 2$;

    c) $x'' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 3, & t \in (0, 6), \\ 2, & t \in \langle 6, 7 \rangle, \\ 0, & t \notin (0, 7 \rangle, \end{cases}$ $x(0) = x'(0) = 0$.

....

15.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 2x^2 - 3x + 1$, $y(0) = 0$, $y'(0) = 1$;

    b) $y'' + y' - 2y = 3x + 6$, $y(1) = 0$, $y'(1) = 2$;

    c) $x'' - x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1 - t, & t \in \langle 0, 1 \rangle, \\ 0, & t \geq 1, \end{cases}$ $x(0) = x'(0) = 0$.

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16.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 + x, \quad y(0) = 1, \ y'(0) = 0;$

b) $y'' + y' - 2y = 2x + 1, \quad y(1) = 2, \ y'(1) = 0;$

c) $x'' - x = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 1 - t, \ t \in \langle 0, 2\rangle, \\ 0, \ t \geq 2, \end{cases} \quad x(0) = x'(0) = 0.$

....

17.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = x^2 - 2x + 1, \quad y(0) = 1, \ y'(0) = 0;$

b) $y'' + y' - 2y = 3x + 6, \quad y(1) = 2, \ y'(1) = 0;$

c) $x'' + 2x' + x = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 1, \ t \in \langle 0, 2\rangle, \\ 3, \ t \geq 2, \end{cases} \quad x(0) = x'(0) = 0.$

....

18.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 2x + 3, \quad y(0) = 1, \ y'(0) = 0;$

b) $y'' + y' - 2y = 7x + 8, \quad y(1) = 0, \ y'(1) = 2;$

c) $x'' + x = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 2t, \ t \in \langle 1, 2\rangle, \\ 0, \ t \notin \langle 1, 2\rangle, \end{cases} \quad x(0) = x'(0) = 0.$

....

19.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 3x, \quad y(0) = 1, \ y'(0) = 0;$

    b) $y'' + y' - 2y = x - 3, \quad y(1) = y'(1) = 2;$

    c) $x'' + x = f(t),$ kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1, \ t \in \langle 0, 1), \\ -1, \ t \in \langle 1, 3), \\ 0, \ t \geq 3, \end{cases} \quad x(0) = x'(0) = 0.$

....

20.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 2x^2 - 3x + 1, \quad y(0) = 1, \ y'(0) = 0;$

    b) $y'' + y' - 2y = x + 5, \quad y(1) = 2, \ y'(1) = 0;$

    c) $x'' + x = f(t),$ kde $f(t) \overset{\text{def.}}{=} \begin{cases} 1, \ t \in \langle 0, 1), \\ -1, \ t \in \langle 1, 2), \\ 0, \ t \geq 2, \end{cases} \quad x(0) = 1, \ x'(0) = 0.$

....

21.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = 3x + x^2 - 12, \quad y(0) = 1, \ y'(0) = 0;$

    b) $y'' + y' - 2y = 7x + 8, \quad y(1) = 2, \ y'(1) = 0;$

    c) $x'' + x = f(t),$ kde $f(t) \overset{\text{def.}}{=} \begin{cases} t, \ t \in \langle 0, 1), \\ 2 - t, \ t \in \langle 1, 2), \\ 0, \ t \geq 2, \end{cases} \quad x(0) = 0, \ x'(0) = 1.$

....

22.

Vypočtěte pomocí L – transformace:

a) $y'' + 6y' - y = x^2 + x, \quad y(0) = y'(0) = 0;$

b) $y'' + 2y' - y = x + 5, \quad y(1) = 0, \ y'(1) = 2;$

c) $x'' + x' = f(t), \ \text{kde} \ f(t) \overset{\text{def.}}{=} \begin{cases} 0, \ t \in \langle 0, 2), \\ 1, \ t \in \langle 2, 3), \\ 0, \ t \geq 3, \end{cases} \quad x(0) = 0, \ x'(0) = 2.$

....

23.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 2x^2 - 2x + 1, \quad y(0) = 0, \ y'(0) = 1;$

b) $y'' + y' - 2y = 14 - 2x, \quad y(1) = 2, \ y'(1) = 2;$

c) $x'' + 2x' + x = f(t), \ \text{kde} \ f(t) \overset{\text{def.}}{=} \begin{cases} 2, \ t \in (0, 2), \\ 3, \ t > 2, \end{cases} \quad x(0) = x'(0) = 0.$

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24.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 3x^2 + 5x - 1, \quad y(0) = y'(0) = 0;$

b) $y'' + y' - 2y = 8 - x, \quad y(1) = 2, \ y'(1) = 0;$

c) $x'' - x = f(t), \ \text{kde} \ f(t) \overset{\text{def.}}{=} \begin{cases} 0, \ t < 0, \\ 2 - t, \ t \in (0, 1), \\ 0, \ t > 1, \end{cases} \quad x(0) = x'(0) = 0.$

....

25.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = x^2 + x + 6$, $y(0) = y'(0) = 0$;

    b) $y'' + y' - 2y = 7 - 3x$, $y(1) = 2$, $y'(1) = 0$;

    c) $x'' + x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 2t, \ t \in (0,1), \\ 2 - t, \ t \in (1,2), \\ 0, \ t > 2, \end{cases}$ $x(0) = 0$, $x'(0) = 1$.

....

26.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = x^2 - 2x + 8$, $y(0) = 0$, $y'(0) = 1$;

    b) $y'' + y' - 2y = -2x$, $y(1) = y'(1) = 2$;

    c) $x'' - x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 0, \ t < 0, \\ 7 - 2t, \ t \in (0,1), \\ 0, \ t > 1, \end{cases}$ $x(0) = x'(0) = 0$.

....

27.

Vypočtěte pomocí L – transformace:

    a) $y'' + y' - 6y = x^2 + x + 15$, $y(0) = 1$, $y'(0) = 0$;

    b) $y'' + y' - 2y = 3x + 8$, $y(1) = 2$, $y'(1) = 0$;

    c) $x'' - x = f(t)$, kde $f(t) \overset{\text{def.}}{=} \begin{cases} 2 - 3t, \ t \in \langle 0,2), \\ 0, \ t \geq 2, \end{cases}$ $x(0) = x'(0) = 0$.

....

28.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 3x^2, \quad y(0) = 1, \ y'(0) = 0;$

b) $y'' + y' - 2y = 2x + 6, \quad y(1) = 2, \ y'(1) = 0;$

c) $x'' - x = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 2 - 3t, \ t \in \langle 0, 2), \\ 0, \ t \geq 2, \end{cases} \quad x(0) = x'(0) = 0.$

....

29.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 7x - 16x^2, \quad y(0) = 0, \ y'(0) = 1;$

b) $y'' + y' - 2y = 3x - 20, \quad y(1) = 0, \ y'(1) = 2;$

c) $x'' - x = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 1 - t, \ t \in \langle 0, 3), \\ 0, \ t \geq 3, \end{cases} \quad x(0) = x'(0) = 0.$

....

30.

Vypočtěte pomocí L – transformace:

a) $y'' + y' - 6y = 13x, \quad y(0) = 1, \ y'(0) = 1;$

b) $y'' + y' - 2y = 3x - 2, \quad y(1) = 2, \ y'(1) = 1;$

c) $x'' - x' = f(t), \ \text{kde} \ f(t) \stackrel{\text{def.}}{=} \begin{cases} 1 - t, \ t \in \langle 0, 4), \\ 0, \ t \geq 4, \end{cases} \quad x(0) = x'(0) = 0.$

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