>

Задание 1

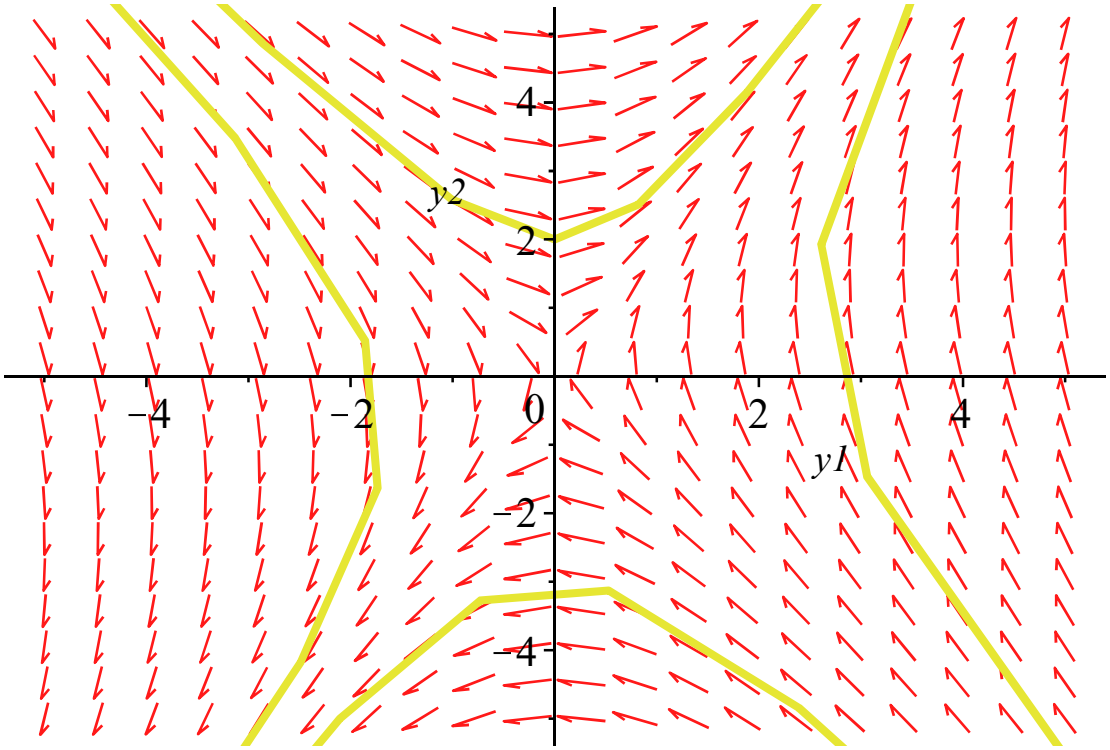
```
> syst := {y1'(x) = -y1(x) + 2 y2(x), y2'(x) = 6 y1(x)} :
  dsolve(syst, {y1(x), y2(x)});
  A := Matrix([[-1, 2], [6, 0]]);
  LinearAlgebra[Eigenvectors](A);
```

$$\left\{y1(x) = -\frac{2\_C1\, e^{-4x}}{3} + \frac{\_C2\, e^{3x}}{2},\ y2(x) = \_C1\, e^{-4x} + \_C2\, e^{3x}\right\}$$

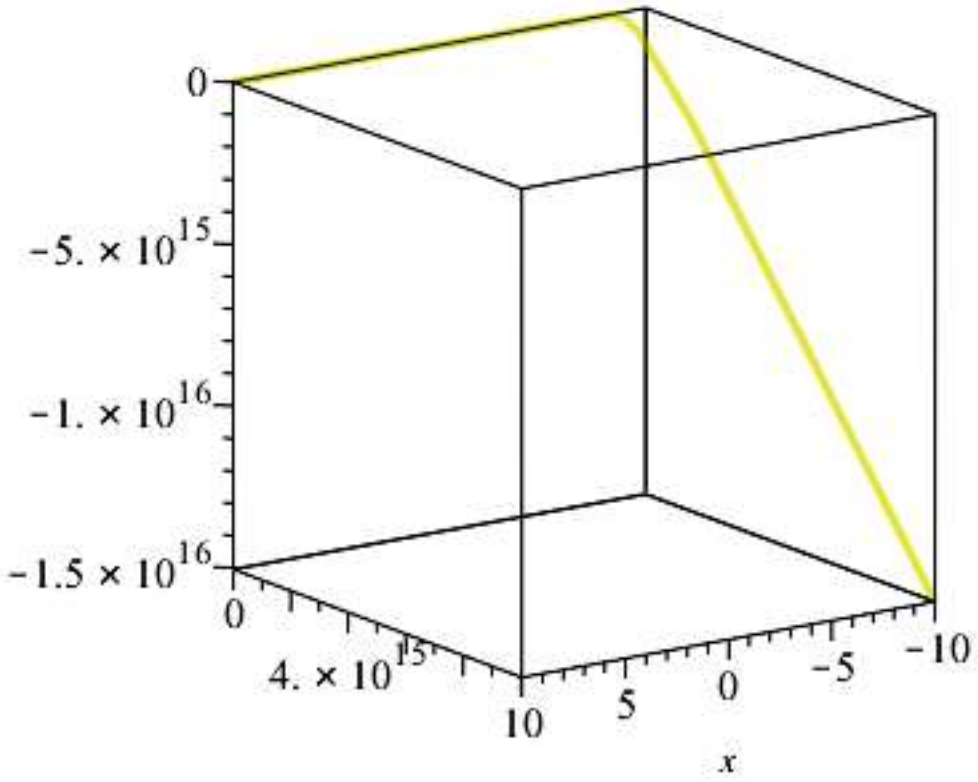
$$A := \begin{bmatrix} -1 & 2 \\ 6 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 3 \\ -4 \end{bmatrix}, \begin{bmatrix} \frac{1}{2} & -\frac{2}{3} \\ 1 & 1 \end{bmatrix} \qquad \textbf{(1)}$$

```
> DEtools[phaseportrait](syst, [y1(x), y2(x)], x = -5..5, [[0, 0, 2], [3, 0, -3], [1, -2, 1], [2,
    3, 4]], y1 = -5..5, y2 = -5..5);
```




```
> DEtools[DEplot3d](syst, [y1(x), y2(x)], x = -10..10, [[0.1, 0.1, 0.1]]);
```



Задание 2

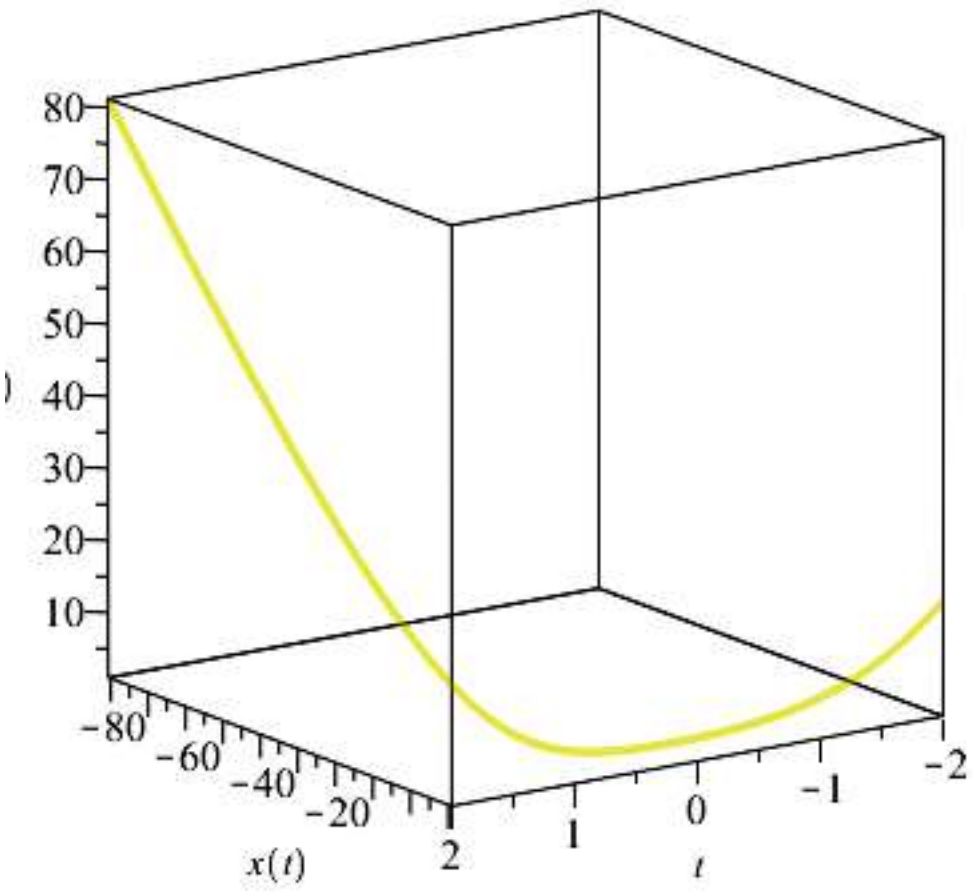
```
> syst := {y1'(x) = 3 y1(x) + 12 y2(x), y2'(x) = y1(x) + 7 y2(x)} :
  dsolve(syst, {y1(x), y2(x)});
```

$$\left\{y1(x) = \_C1\, e^{9x} + \_C2\, e^{x},\ y2(x) = \frac{\_C1\, e^{9x}}{2} - \frac{\_C2\, e^{x}}{6}\right\} \qquad \textbf{(2)}$$

Задание 3

```
> syst := x'(t) = x(t) - 2 y(t) + 1, y'(t) = -3 x(t) :
  cond := x(0) = 0, y(0) = 1 :
  s := dsolve({syst, cond}, {x(t), y(t)});
  DEtools[DEplot3d]({syst}, [x(t), y(t)], t = -2..2, [[0, 0, 1]]);
```

$$s := \left\{x(t) = \frac{e^{-2t}}{5} - \frac{e^{3t}}{5},\ y(t) = \frac{3\, e^{-2t}}{10} + \frac{e^{3t}}{5} + \frac{1}{2}\right\}$$


80
70
60
50
40
30
20
10
-80
-60
-40
-20
x(t)
2
1
0
-1
-2
t

>