28 mai 2021

Bucă Adriana, grupa 000

Lab test

1. $$\begin{cases} x = c_1 e^{3t} + c_2 e^{2t} + \frac{1}{2} e^t - \frac{2}{3} t + \frac{5}{18} \\ y = 2c_1 e^{3t} + c_2 e^{2t} - \frac{1}{3} t + \frac{1}{18} \end{cases}, \quad c_1, c_2 \in \mathbb{R}.$$

2. a) the only equilibrium point is $(0,0)$.

b) $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ $\quad \lambda_{1,2} = \pm i \Rightarrow$ $(0,0)$ is not hyperbolic.

c) $y = \frac{1}{2c}\left(2c+1 \pm \sqrt{2cx^2+2c+1}\right)$, $c \in \mathbb{R}$

d) $H(x,y) = \frac{1}{2} \cdot \frac{x^2+2y-1}{y^2-2y+1}$ $\quad \frac{\partial H}{\partial x} \cdot (y+x^2) + \frac{\partial H}{\partial y} \cdot (-x+xy) = 0$

So, H is a first integral in a domain where it is well-defined.

e)