... primele două aproximații succesive.

Exercițiul 6 *Se consideră sistemul*

$$\begin{cases} x'(t) = & 2y(t) \\ y'(t) = & -2x(t) \end{cases}$$

Se cere:

0 (a) **(1p)** *Să se determine fluxul*

0,25 (b) **(0,5p)** *Să se determine portretul fazic și să se precizeze stabilitatea și tipul punctului de echilibru* $(0;0)$.

$$\begin{cases} x'(t) = 2y(t) \\ y'(t) = -2x(t) \\ x(0) = \eta_1 \\ y(0) = \eta_2 \end{cases}$$

$$x(t) = \frac{y'(t)}{-2}$$

$$y''(t) = -2x'(t)$$

$$y''(t) = -4y'(t)$$

$$y''(t) + 4y'(t) = 0$$

$$r^2 + 4r = 0$$

$$r(r+4) = 0$$

$$r_1 = 0$$

$$r_2 = -4$$

$$y(t) = c_1 + c_2 \cdot e^{-4t}, \quad c_1, c_2 \in \mathbb{R}$$

$$x(t) = 2c_2 \cdot e^{-4t}$$

$$x(0) = 2c_2 = \eta_1 \Rightarrow c_2 = \frac{\eta_1}{2}$$

$$y(0) = c_1 + \frac{\eta_1}{2} = \eta_2$$

$$\Rightarrow c_1 = \eta_2 - \frac{\eta_1}{2}$$

$$\varphi : W \to \mathbb{R}^2,\ \varphi(t, \eta_1, \eta_2) =$$

$$= \left(\eta_1 \cdot e^{-4t},\ \eta_2 - \frac{\eta_1}{1} + \frac{\eta_1}{2} \cdot e^{-4t} \right)$$

$$W = \{ i_\eta \times \{\eta\} : \eta \in \mathbb{R}^2 \}$$

$$W = \mathbb{R}^3$$

$$i_\eta \overset{\Uparrow}{=} \mathbb{R}$$

$$\begin{cases} \dfrac{dx}{dt} = 2y \\[2ex] \dfrac{dy}{dt} = -2x \end{cases}$$

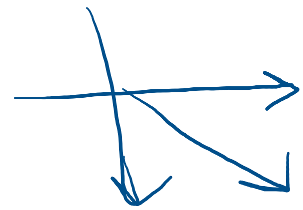
$$\frac{dx}{dy} = \frac{2y}{-2x} = -\frac{y}{x}$$

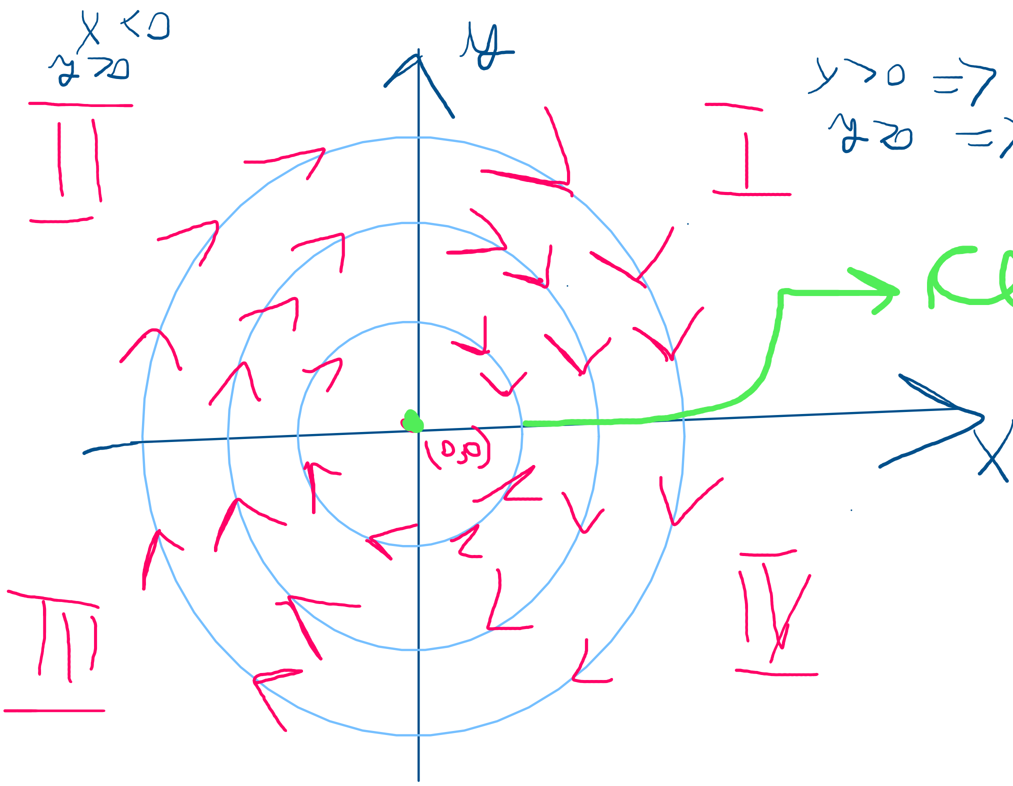
$$dx \cdot x = y \cdot dy$$

$$x^2 = y^2 + c$$

$$\frac{x^2}{2} = -\frac{y^2}{2} + C$$

$$\frac{x^2}{2} + \frac{y^2}{2} = C$$





$y>0 \Rightarrow x'>0$

$y>0 \Rightarrow y'<0$

centru ✓