Lin. diferenciální rovnice:

$$y' - \cos(x)\, y = -\cos(x)$$

1. homogenní dif. rovnice:

$$y' - \cos(x) \cdot y = 0 \quad \Big/ \, y \neq 0$$

$$\frac{y'}{y} = \cos(x)$$

$$\ln|y| = \sin(x) + C$$

homogenní řešení: $y_h = D \cdot e^{\sin(x)}, \; D \in \mathbb{R}$

2. $y_p = D(x) \cdot e^{\sin(x)}$

$$y_p' = D'(x) \cdot e^{\sin(x)} + D(x) \cdot e^{\sin(x)} \cdot \cos(x)$$

dosazení:

$$D'(x) \cdot e^{\sin(x)} + \cancel{D(x) \cdot e^{\sin(x)} \cdot \cos(x)} - \cancel{\cos(x) \cdot D(x) \cdot e^{\sin(x)}} = -\cos(x)$$

$$D'(x)\, e^{\sin(x)} = -\cos(x)$$

$$D'(x) = -e^{-\sin(x)} \cdot \cos(x)$$

$$D(x) = -\int e^{-\sin(x)} \cdot \cos(x)\, dx = \int e^t\, dt = e^t = e^{-\sin(x)}$$

$$\left| \begin{array}{l} t = -\sin(x) \\ dt = -\cos(x)\, dx \end{array} \right.$$

$$y_p = D(x) \cdot e^{\sin(x)} = e^{-\sin(x)} \cdot e^{\sin(x)} = 1$$

$y(x) = y_p + y_h = 1 + D \cdot e \quad , D \in \mathbb{R}, x \in \mathbb{R}$

	sep.	lin
$y' = \frac{x^2}{y}$	✓	✗
$y' = (y+1)e^x$	✓	✓
$y' = x + e^y$	✗	✗
$y' = y + 13$	✓	✓
$y' - x = 4y^2$	✓	✗
$y' = y - xy + 13$	✗	✓

y musí být v 1. mocnině

$$y' = (x-2)(\ln(x) - y) \quad \to x > 0$$

$x = 2 \qquad y = \log(x)$

$(1,1) \to y' = -1 \cdot (-1) = 1$

Samostatně:

Lin. dif. rovnice

$$y' = 1 - y$$

$$y' + y = 1$$

$$y' + y = 0$$

$$y' = -y$$

$$\int \frac{y'}{y} = \int -1$$

$$\ln|y| = -x + C$$

$y_h = D \cdot e^{-x}$ ← homogenní řešení

Partikulární řešení:

$$y'_p = D(x)\, e^{-x}$$

$$y_p = D'(x) \cdot e^{-x} - D(x) \cdot e^{-x}$$

dosazení:

$$y' = 1 - y$$

$$-D'(x) \cdot e^{-x} + D(x) \cdot e^{-x} = 1 - D \cdot e^{-x}$$

$$D'(x) \cdot e^{-x} = 1$$

$$D'(x) = e^{x}$$

$$D(x) = e^{x}$$

$$y_p = D(x) \cdot e^{x} = e^{-x} \cdot e^{x} = 1$$

$$y(x) = y_p + y_h = 1 + D \cdot e^{-x}, \; D \in \mathbb{R}, \; x \in \mathbb{R}$$

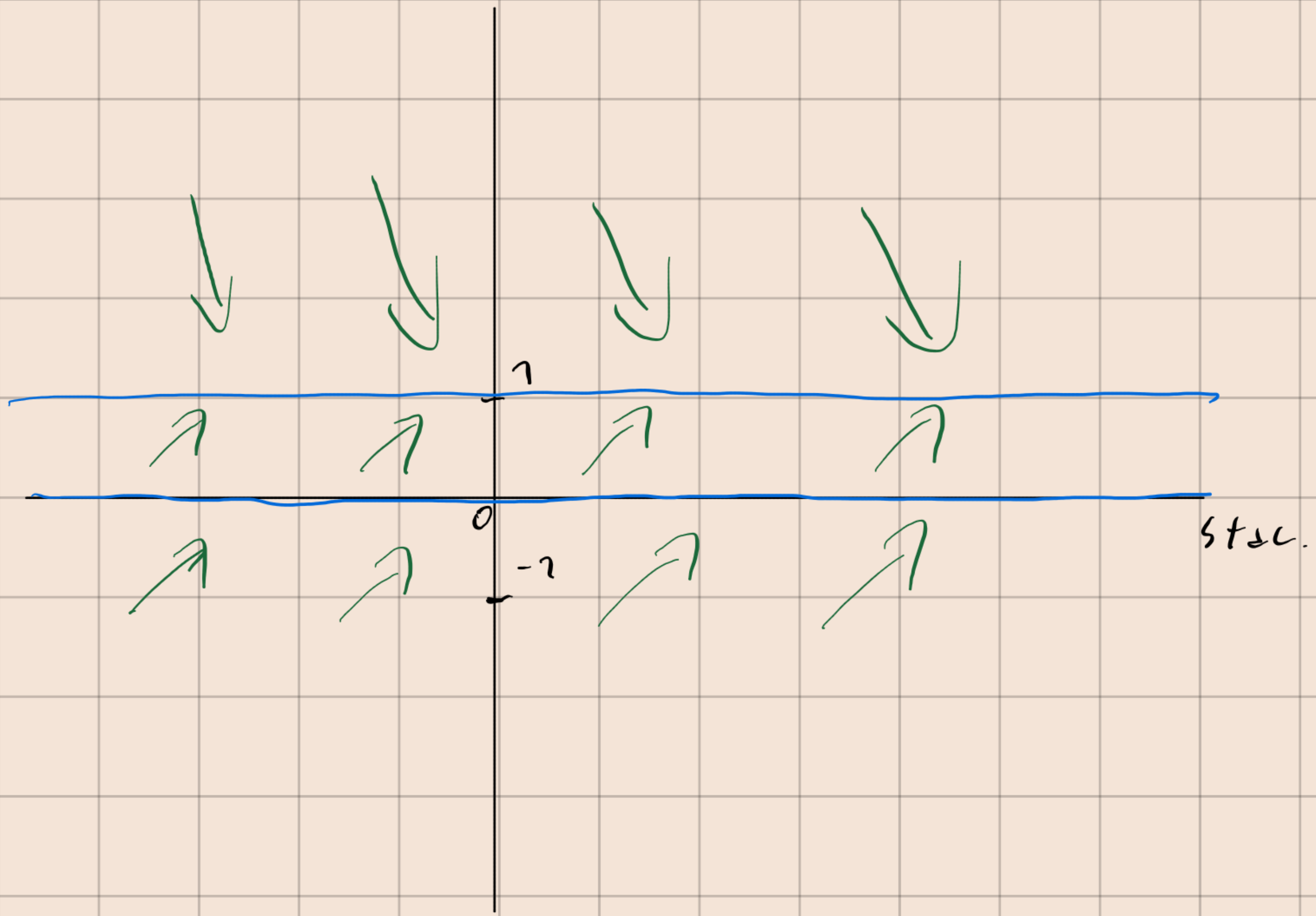
$$y' = \frac{y^2}{1-y}$$

$1 - y \neq 0$

$y \neq -1$

$y \neq \pm 1$

$$y' = \frac{4}{1-2} =$$



$$y' = \frac{\sqrt{y} - 1}{x^2 - 1} \rightarrow \quad y \geq 0 \qquad \sqrt{y} - 1 \neq 0$$

$$\sqrt{y} \neq 1$$

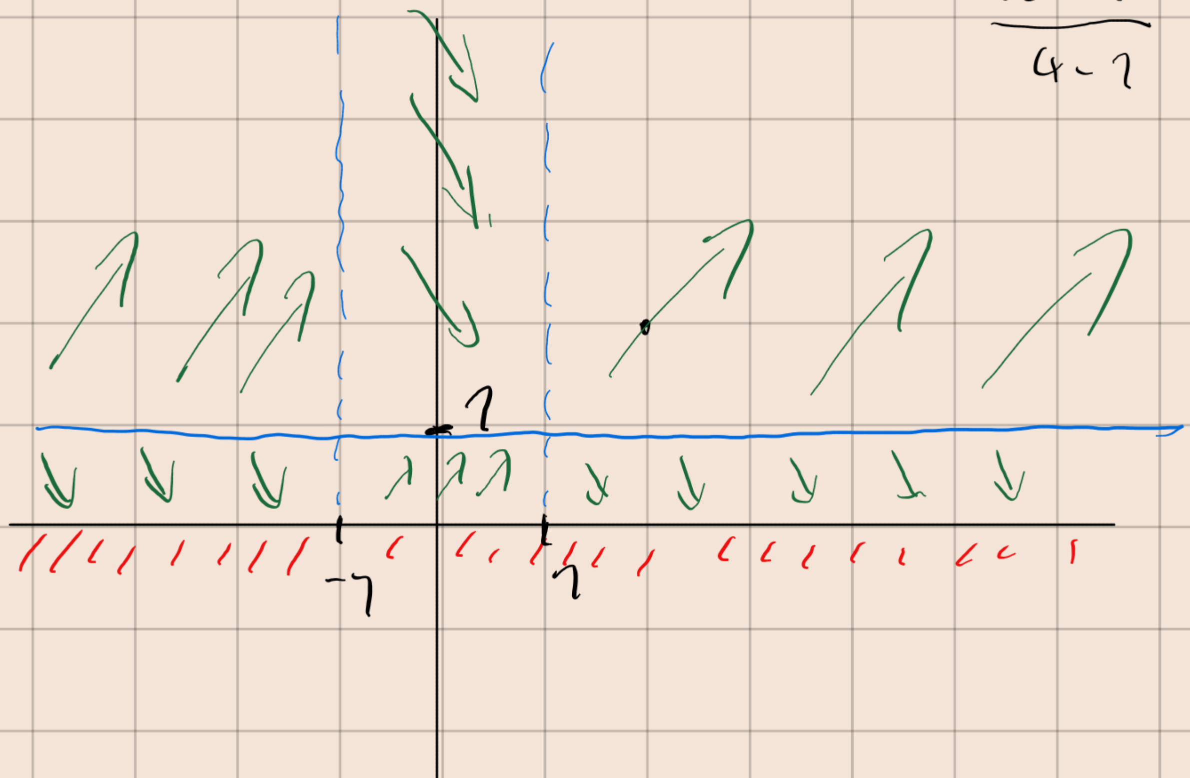
$$\underbrace{y \neq 1}$$

$$\rightarrow x^2 - 1 \neq 0$$

$$x^2 \neq 1$$

$$x \neq \pm 1$$

$$\frac{\sqrt{2} - 1}{4 - 1} \quad \frac{+}{+}$$



$$y' = y(x - y) \quad \to \quad y \neq 0$$

$$x \neq y$$