y' ODR

$y'(x) = x$ $\quad$ $y(x) = \frac{x^2}{2} + k$

$f' = x$

$y' = y$ $\quad$ $y = ke^x$ $\quad$ $k \in \mathbb{R}$

$y' + y \sin x - 5 = 0$

$\sqrt{y' + 5} = \sin y$

$y' = 2x$ $\quad$ $y = x^2 + k$

$y' = 2x$ $\quad$ $y(0) = 2$ $\quad$ $y(x_0) = y_0$ (čísla)

$x^2 + 2$

$y' = y$ $\quad$ $y = ke^x$

$$y' = y \qquad y = k e^x$$

↑ změna

↓ kolik jich bylo na zač.

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vlci $\qquad V(t)$

králíci $\qquad k(t)$

$$\begin{cases} k'(t) = a\,k(t) - b\,V(t) \\ V'(t) = -c\,V(t) + d\,k(t) \end{cases}$$

$$y' = 3\sqrt[3]{y^2}$$

$y = (x+2)^3$ $\qquad y' = 3(x+2)^2$

$y \equiv 0$ $\qquad 3\sqrt[3]{((x+2)^3)^2} = 3(x+2)^2$

$$y' = y\,x^2$$

$$y' = g(y)\cdot h(x)$$

$$g(y) = y \qquad h(x) = x^2$$

$$\frac{y'}{y} = x^2$$

$y = 0$ ✓

TRIK

$$y' = \frac{dy}{dx}$$

$$\frac{1}{y}\frac{dy}{dx} = x^2$$

$$\int \frac{1}{y}\,dy = \int x^2\,dx$$

$$\ln|y| + c_1 = \frac{x^3}{3} + c_2 \qquad c_{1,2} \in \mathbb{R}$$

$$\ln|y| = \frac{x^3}{3} + c_2 - c_1$$

$$e^{\ln|y|} = e^{\frac{x^3}{3} + c_3} \qquad c_3 \in \mathbb{R}$$

$$|y| = e^{\frac{x^3}{3}} \cdot e^{c_3}$$

$$|y| = c_4\, e^{\frac{x^3}{3}} \qquad c_4 \in \mathbb{R}^+$$

$$y = \pm c_4\, e^{\frac{x^3}{3}}$$

$$y = c_5\, e^{\frac{x^3}{3}}$$

$c_5 \in (-\infty, 0)$

$\cup (0, \infty)$

Závěr

$$y = c_5\, e^{\frac{x^3}{3}}$$

$c_5 \in (-\infty, 0) \cup (0, \infty)$

$y \equiv 0$

$$y = c_5 e^{\frac{x^3}{3}} \qquad c_5 \in \mathbb{R}$$

$$\ln|y| = \frac{x^3}{3} + c$$

$$|y| = e^{\frac{x^3}{3}} \cdot e$$

$$y = \pm e^{\frac{x^3}{3}} \cdot e$$

$e \in (-\infty, 0) \cup (0, \infty)$

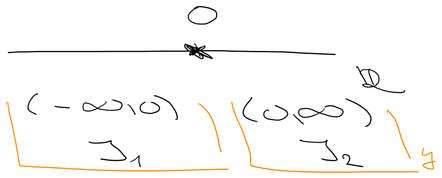
$y' = y x^2$ $\quad g(y) = y \quad h(x) = x^2$

(1) podm na x: $\quad x \in \mathbb{R}$ $\quad \mathbb{R} =: I$

(2) $g \neq 0$ $\quad g(y) = y$ $\quad y = 0$

$y \equiv 0$

(3)



(4) Fix J_1, J_2

$G = \int \frac{1}{g}$ $\quad H = \int h$

$G = \int \frac{1}{y} dy$ $\quad H = \int x^2 dx$

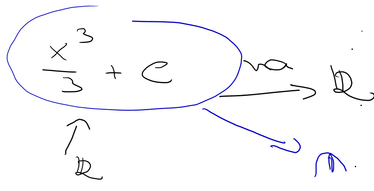
$$\ln|y| = \frac{x^3}{3} + C$$

(5) Fix G

hledáme intervaly: $x \in I : H(x) + C \in G(J)$

$I \subseteq \mathbb{R}$ $\quad y$

$J_1 = (-\infty, 0)$



$x \in \mathbb{R}$

bod- G^{-1} $\quad \ln|y| = \frac{x^3}{3} + c$

$y \in (-\infty, 0)$ $\quad |y| = e^{x^3/3} \cdot e^c$ $\quad c \in \mathbb{R}$

$-y = e^{x^3/3} \cdot e^c$

$y = -e^c e^{x^3/3}$

$y = k e^{x^3/3}$ $\quad k \in (-\infty, 0)$

Ještě jednou J_2 $\quad k \in (0, \infty)$

$|y| = e^{x^3/3} e^c$

$y = k \cdot e^{x^3/3}$ $\quad k \in (0, \infty)$

Závěr $\quad y = k e^{x^3/3}$ $\quad k, x \in \mathbb{R}$

$y \equiv 0$

$y(0) = 10$ $\quad y(0) = 10$

$k e^{0^3/3} = k$ $\quad k = 10$

$y = 10 e^{x^3/3}$ $\quad x \in \mathbb{R}$ $\quad (J)$