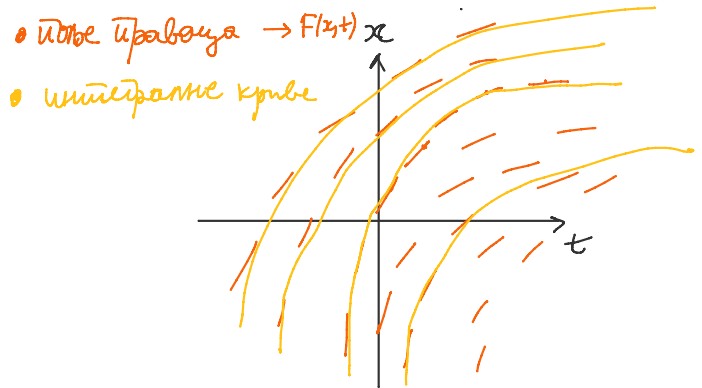
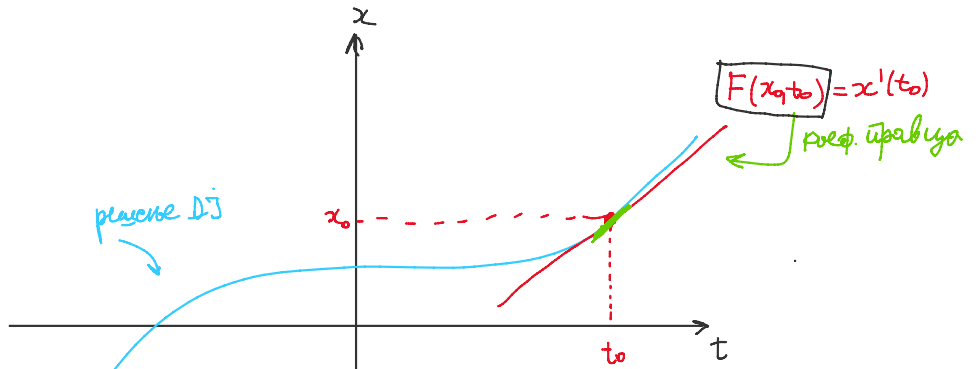


1) Скиндрати поне управља

ДЗ $x' = F(x, t)$. Не прелазити ДЗ скиндрати поне интегралне криве.

а) $F(x, t) = -\frac{t}{x}$

б) $F(x, t) = 1 + t - x$

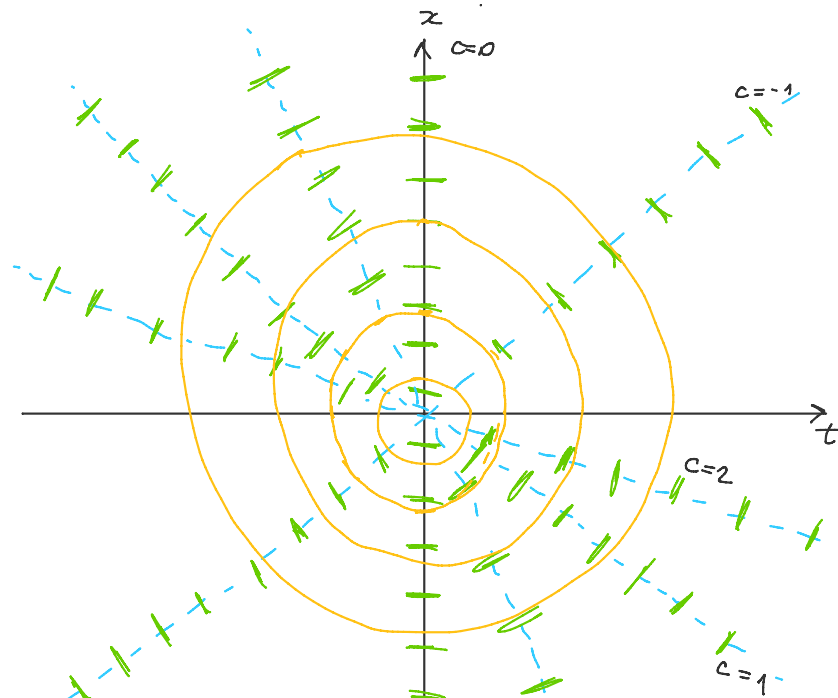


а) $x' = -\frac{t}{x}$

Изолиније (t, x) : $x' = c \in \mathbb{R}$ (изоклине)
 \hookrightarrow ниво

$-\frac{t}{x} = c \Rightarrow \underline{c \cdot x = -t}$
 \hookrightarrow управне криве $(0, 0)$

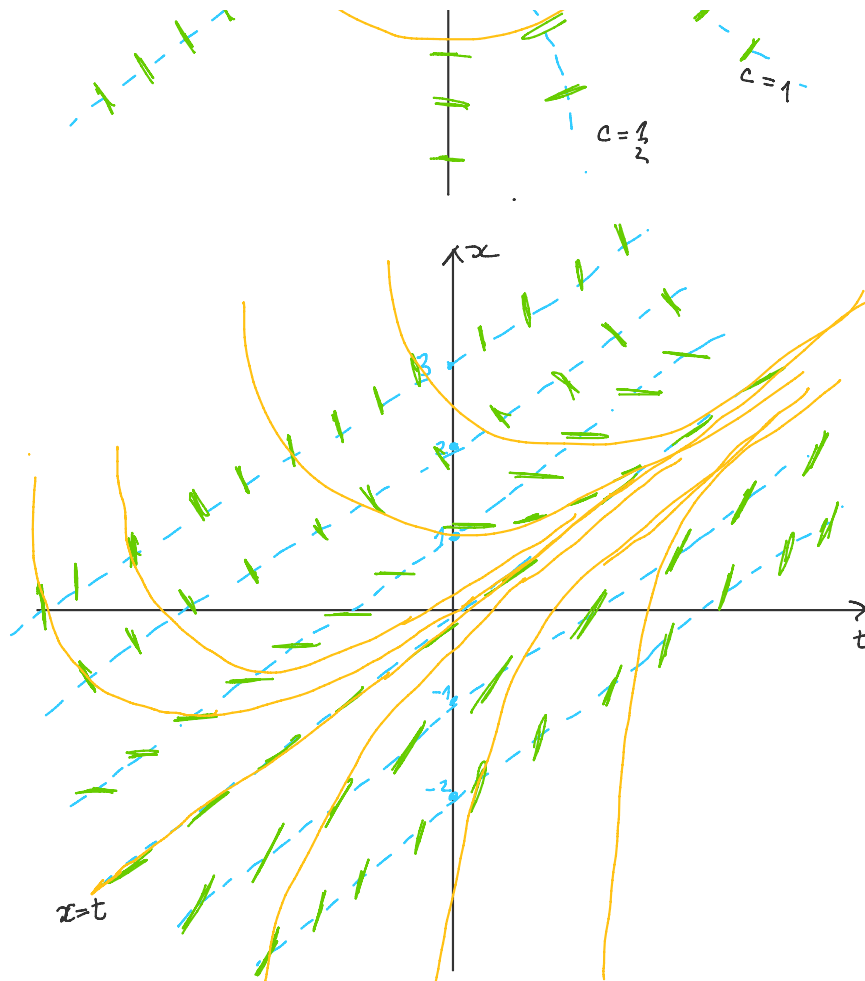
- $c=0$: $t=0$
- $c=1$: $x=-t$
- $c=-1$: $x=t$
- $c=2$: $x=-\frac{t}{2}$
- $c=\frac{1}{2}$: $x=-2t$



$$c = \frac{1}{2} : x = -2t$$

$$c = \frac{1}{2}$$

$$c = 3$$



$$b) x' = 1 + t - x$$

$$1 + t - x = c$$

$$x = t + (1 - c) \rightarrow \text{řpáve } \parallel \text{ co } x = t$$

$$c = 0 : x = t + 1$$

$$c = 1 : x = t \leftarrow \text{řpáve řpáve}$$

$$c = 2 : x = t - 1$$

$$c = 3 : x = t - 2$$

$$c = -1 : x = t + 2$$

$$c = -2 : x = t + 3$$

řešená se ne čerá!

→ dva řešená úvážky kocy čerátnosti $x = t$.

In[1]:= (*Řešenje običné D3*)

solution1 = DSolve[x'[t] == x[t] + 2*t - 3, x[t], t]

Out[1]> {{x[t] -> 1 - 2*t + e^t c1}}

In[2]:=

(*Košijjevo řešenje*)

solution2 = DSolve[{x'[t] == x[t] + 2*t - 3, x[0] == 2}, x[t], t]

Out[2]> {{x[t] -> 1 + e^t - 2*t}}

In[3]:=

(*Još jedna D3*)

solution3 = DSolve[t*x'[t] - 2*t*sqrt[x[t]] == 4*x[t], x[t], t]

Out[3]> {{x[t] -> t^2 - 2*t^3 c1 + t^4 c1^2}}

In[4]:=

(*Uprošćavanje*)

solution4 = FullSimplify[solution3]

Out[4]> {{x[t] -> t^2 (-1 + t c1)^2}}

In[5]:=

(*Sistem D3*)

solution5 = FullSimplify[DSolve[{x'[t] == y[t] - z[t], y'[t] == x[t]^2 + y[t], z'[t] == x[t]^2 + z[t]}, {x[t], y[t], z[t]}, t]]

Out[5]> {{x[t] -> e^{t^3} + c1, y[t] -> e^{2t^3} - c1^2 + e^{t^3} (c1 + c2 + 2 c1 Log[e^{t^3}])}, z[t] -> e^{2t^3} - c1^2 + e^{t^3} (-1 + c1 + c2 + 2 c1 Log[e^{t^3}])}}

In[6]:=

(*Bez FullSimplify*)

solution6 = DSolve[{x'[t] == y[t] - z[t], y'[t] == x[t]^2 + y[t], z'[t] == x[t]^2 + z[t]}, {x[t], y[t], z[t]}, t]

Out[6]> {{x[t] -> e^{t^3} (e^t + e^{t^3} c1), y[t] -> (-c1 + e^{t^3} (e^t + e^{t^3} c1)) c2 + (-c1 + e^{t^3} (e^t + e^{t^3} c1)) (e^{t^3} (e^t + e^{t^3} c1) - \frac{c1^2}{-c1 + e^{t^3} (e^t + e^{t^3} c1)} + 2 c1 Log[-c1 + e^{t^3} (e^t + e^{t^3} c1)]}, z[t] -> c1 - e^{t^3} (e^t + e^{t^3} c1) + (-c1 + e^{t^3} (e^t + e^{t^3} c1)) c2 + (-c1 + e^{t^3} (e^t + e^{t^3} c1)) (e^{t^3} (e^t + e^{t^3} c1) - \frac{c1^2}{-c1 + e^{t^3} (e^t + e^{t^3} c1)} + 2 c1 Log[-c1 + e^{t^3} (e^t + e^{t^3} c1)]}}