(1) $F(t, y(t), y'(t)) = 0$

$F: \mathbb{R}^3 \to \mathbb{R}$

(2) $y' = f(t, y(t))$

$f: \mathbb{R}^2 \to \mathbb{R}$.

$F(\alpha, \beta, \gamma) = \alpha + \beta + \gamma$

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

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

$y'(t) = f(t, y(t))$

$f(\alpha, \beta) = -\alpha - \beta$.

$F(t, y, y') = 0$ $\qquad$ $y' = f(t, y)$

$y'' = y - y'$.

$F(t, y, y') = 0$ $\qquad$ $\varphi: \mathbb{R} \to \mathbb{R}$ $\qquad$ $D\varphi = J$

$\forall t \in J: \quad F(t, \varphi(t), \varphi'(t)) = 0 \implies$

φ je řešením na J.

Př. $\varphi(t) = 1 - t$ je na $J = (-\infty, \infty)$ řešení

ODR tvaru $t + y + y' = 0$.

$\forall t \in (-\infty, \infty)$;

$t + \varphi(t) + \varphi'(t) = t + (1-t) + (-1) = 0.$

$\psi(t) = e^{-t} + (1-t)$

$\forall t \in (-\infty, \infty)$;

$t + \psi(t) + \psi'(t) = t + e^{-t} + (1-t) + (-e^{-t} - 1) =$

$= 0.$

$t + y + y' = 0$

$y(t) = C \cdot e^{-t} + (1-t), \quad C \in \mathbb{R}.$

$(y')^2 + 1 = 0 \qquad \forall t \in J : (\varphi'(t))^2 = -1.$

$\underline{F(t, y, y') = 0} \qquad \underline{y(t_0) = y_0.}$

Cauchyova úloha

$t + y + y' = 0, \quad y(0) = 2$

$\psi(t) = e^{-t} + (1-t), \quad \psi(0) = 2.$

$F(t, y, y') = 0 \qquad \varphi_1$ na J_1

φ na J

$J_1 \subset J, \; J_1 \neq J$

$\forall t \in J_1 : \; \varphi_1(t) = \varphi(t) \qquad \varphi$ je prodloužením φ_1 na J