



edo's primeira ordem separáveis

Consulte o ficheiro 'Folha5.nb'.

Exercício 1.

(a) Soluções constantes

$$\begin{array}{ll} \mathbb{R}^+ \rightarrow \mathbb{R} & \text{e} \quad \mathbb{R}^- \rightarrow \mathbb{R} \\ x \mapsto 0 & x \mapsto 0 \end{array}$$

Soluções não constantes

$$\begin{array}{ll} \mathbb{R}^+ \rightarrow \mathbb{R} & \text{e} \quad \mathbb{R}^- \rightarrow \mathbb{R}, \\ x \mapsto cx^2 & x \mapsto cx^2 \end{array} \quad c \in \mathbb{R} \setminus \{0\}$$

(b) Solução constante

$$\begin{array}{l} \mathbb{R} \rightarrow \mathbb{R} \\ x \mapsto 0 \end{array}$$

Soluções não constantes

$$\begin{array}{ll} \mathbb{R} \rightarrow \mathbb{R}, & c \in \mathbb{R} \setminus \{0\} \\ x \mapsto \frac{c}{(x^2 + 1)^2} \end{array}$$

(c) Soluções não constantes

$$\begin{array}{llll} \mathbb{R}^+ \rightarrow \mathbb{R} & \text{e} & \mathbb{R}^+ \rightarrow \mathbb{R} & \text{e} & \mathbb{R}^- \rightarrow \mathbb{R} & \text{e} & \mathbb{R}^- \rightarrow \mathbb{R} \\ x \mapsto -x & & x \mapsto x & & x \mapsto -x & & x \mapsto x \end{array}$$

$$\begin{array}{ll} \mathbb{R} \rightarrow \mathbb{R} & \text{e} \quad \mathbb{R} \rightarrow \mathbb{R}, \\ x \mapsto -\sqrt{x^2 + 2c} & x \mapsto \sqrt{x^2 + 2c} \end{array} \quad c \in \mathbb{R}^+$$

$$\begin{array}{ll}]-\infty, -\sqrt{-2c}[\rightarrow \mathbb{R}, &]\sqrt{-2c}, +\infty[\rightarrow \mathbb{R}, \\ x \mapsto -\sqrt{x^2 + 2c} & x \mapsto -\sqrt{x^2 + 2c} \end{array}$$

$$\begin{array}{ll}]-\infty, -\sqrt{-2c}[\rightarrow \mathbb{R} & \text{e} \quad]\sqrt{-2c}, +\infty[\rightarrow \mathbb{R}, \\ x \mapsto \sqrt{x^2 + 2c} & x \mapsto \sqrt{x^2 + 2c} \end{array} \quad c \in \mathbb{R}^-$$

(d) Solução constante

$$\begin{aligned}\mathbb{R} &\rightarrow \mathbb{R} \\ x &\mapsto 0\end{aligned}$$

Soluções não constantes

$$\begin{aligned}\mathbb{R} &\rightarrow \mathbb{R}, & c \in \mathbb{R} \setminus \{0\} \\ x &\mapsto c e^{x^2/2}\end{aligned}$$

(e) Solução constante

$$\begin{aligned}\mathbb{R} &\rightarrow \mathbb{R} \\ x &\mapsto 0\end{aligned}$$

Soluções não constantes

$$\begin{aligned}]-\infty, c[&\rightarrow \mathbb{R} & \text{e} &]c, +\infty[\rightarrow \mathbb{R}, & c \in \mathbb{R} \\ x &\mapsto \frac{1}{x-c} & & x &\mapsto \frac{1}{x-c}\end{aligned}$$

Exercício 2.

$$(a) \quad \begin{aligned}]-2, 3[&\rightarrow \mathbb{R} \\ t &\mapsto \frac{1}{t^2 - t - 6}\end{aligned}$$

$$(b) \quad \begin{aligned}\mathbb{R} &\rightarrow \mathbb{R} \\ t &\mapsto \frac{1}{t^2 - t + 6}\end{aligned}$$

$$(c) \quad \begin{aligned}\left] \frac{\sqrt{15}}{2}, +\infty \right[&\rightarrow \mathbb{R} \\ x &\mapsto \frac{-1 + \sqrt{4x^2 - 15}}{2}\end{aligned}$$

Exercício 3.

$$\begin{aligned} \text{(a)} \quad \mathbb{R} &\rightarrow \mathbb{R} \\ x &\mapsto -2e^{3x^2} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \mathbb{R} &\rightarrow \mathbb{R} \\ t &\mapsto e^{t^2} - 1 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \mathbb{R} &\rightarrow \mathbb{R} \\ x &\mapsto 2e^{\text{sen}(x+1)} \end{aligned}$$

Exercício 4.

$$\text{(a)} \quad y(x) = \frac{1}{c - \cos(x)}, \quad c \in \mathbb{R}$$

$$\text{(b)} \quad y(x) = 0; \quad y(x) = 1; \quad \log \left| \frac{y-1}{y} \right| = e^x + c, \quad c \in \mathbb{R}$$

$$\text{(c)} \quad y(x) = \frac{\pi}{2} + k\pi, \quad k \in \mathbb{Z}; \quad \text{tg}(y) = 2\text{sen}(2x) - 4x + c, \quad c \in \mathbb{R}$$

$$\text{(d)} \quad y + \frac{y^2}{2} = \frac{x \text{sen}(2x)}{2} + \frac{\cos(2x)}{4} + c, \quad c \in \mathbb{R}$$

$$\text{(e)} \quad y(x) = \log(\text{sen}(x) + c), \quad c \in \mathbb{R}$$

$$\text{(f)} \quad \frac{3y}{2} - \frac{1}{4} \text{sen}(2y) = x \text{sen}(x) + \cos(x) + c, \quad c \in \mathbb{R}$$

Exercício 5. A solução maximal que passa no ponto $P = (1, 1)$ é:

$$\begin{aligned} \mathbb{R} &\rightarrow \mathbb{R} \\ x &\mapsto 1 \end{aligned}$$

A solução maximal que passa no ponto $Q = (0, \frac{1}{2})$ é:

$$\begin{aligned}] - \sqrt[3]{2}, +\infty[&\rightarrow \mathbb{R} \\ x &\mapsto 1 - \frac{1}{x^3 + 2} \end{aligned}$$