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EDO - Capítulos 1

1.1)

$$x^2 = 2 \ (\mathbb{Q})$$

$$x^2 = 2 \ (\mathbb{R})$$

$$S = \emptyset$$

$$x = \sqrt{2} \quad x = -\sqrt{2}$$

$$T^2 = 2I$$

$$T = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$T^2 = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} a^2+bc & ab+bd \\ ac+dc & cb+d^2 \end{pmatrix}$$

$$\begin{pmatrix} a^2+bc & ab+bd \\ ac+dc & cb+d^2 \end{pmatrix} = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

$$\begin{cases} a^2+bc = 2 \\ ac+dc = 0 \end{cases} \quad (S_1)$$

$$\begin{cases} ab+bd = 0 \\ cb+d^2 = 2 \end{cases} \quad (S_2)$$

$$S_1 \Rightarrow a \pm \sqrt{2}, b=0=c, d \pm \sqrt{2}$$

$$S_2 \Rightarrow a=d=0, c \neq 0, b = \frac{2}{c}$$

1.2) $\frac{dy(x)}{dx} = \cos x$ $\frac{dy(x)}{dx} = \sin(x)$

$$\frac{dy(x)}{dx} = 2y(x) \quad \frac{dy(x)}{dx} = e^{2x}$$

$$\frac{d^2 y(x)}{dx^2} = -y(x) \xrightarrow{\frac{dx}{dx}} \frac{dy(x)}{dx} = \sin(x) \text{ ou } \cos(x)$$

1.3) $F(x, y(x), y'(x)) = (y'(x))^2 + xy'(x) + 4y(x)$

$$F(x, y(x), y'(x)) = 0 \quad y' = f(x, y)$$

$$\Delta = x^2 - 4 \cdot 1 \cdot 4y$$

$$\frac{-b \pm \sqrt{\Delta}}{2a} = y' = \frac{-x \pm \sqrt{x^2 - 16y}}{2}$$

1.4) $F(x, y(x), y'(x), y''(x), y^{(3)}(x), \dots, y^{(n-1)}(x), y^{(n)}(x))$

$$f(x, y, y', y'', y''', \dots, y^{(n-1)})$$

$$\text{seja } F(x, y, y', \dots, y^{(n-1)}, y^{(n)}) = f(x, y, y', \dots, y^{(n-1)}) - y^{(n)}$$

então as funções são equivalentes.

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