

Análise Complexa e Equações Diferenciais

Respostas à Ficha de Trabalho 8

1. a) $\arctan t + C$; b) Ce^{-et} ; c) $2x + Ce^{-x}$; d) $t + 1 + Ce^t$; e) $\frac{e^x(x-2)^2+C}{x^2}$;
f) $Ce^{6t} - \frac{\cos(2t)+3\sin(2t)}{2}$; g) $(t+C)t \cos t$; h) $\arctan y - 1 + Ce^{-\arctan y}$.

(Em todos os casos $C \in \mathbb{R}$).

2. a) $x^2(e^x - e)$; b) $\frac{u+1}{u^2+1}$; c) $x(t) = \begin{cases} \frac{t^2+3}{2} & \text{se } t \leq 0 \\ 1 + \frac{1}{2}e^{-t^2/2} & \text{se } t > 0 \end{cases}$.

3. $t = -\frac{\log 7}{4 \log(4/7)} = \frac{1}{4(1-\log 4/\log 7)} \approx 0,8693\text{h} \approx 52\text{m}$.

4. $y(x) = \arcsin\left(\frac{1}{3x} + cx^2\right) + 2k\pi$ ou $y(x) = \pi - \arcsin\left(\frac{1}{3x} + cx^2\right) + 2k\pi$ com $k \in \mathbb{Z}$.

5. (a) $y(t) = \pm \sqrt{\frac{5t}{2+5ct^5}}$;

(b) $y(t) = \sqrt{\frac{5t}{2+3t^5}}$ em $]0, +\infty[$.

6. (a) $y(t) = \sqrt{\frac{20t}{8-3t^5}}$;

(b) $y(t) = \frac{1}{t(\log t+1)}$.

7. (b) $x(t) = \frac{1}{t} + \frac{e^{-t}}{t^2 \left(\int \frac{e^{-t}}{t^2} dt + K \right)}$, $K \in \mathbb{R}$.