

Introdução às Equações Diferenciais Ordinárias

Lista de Exercícios 3 - Respostas

1. (a) LI (b) LD (c) LI (d) LD (e) LI (f) LD

3. $g(t) = te^t + ct$

4. (a) Sim; (b) Sim.

5.

(a) $y(t) = c_1 + c_2e^{-t/4}$

(b) $y(t) = c_1 \cos 4t + c_2 \sin 4t$

(c) $y(t) = c_1e^t + c_2e^{-3t}$

(d) $y(t) = c_1e^t + c_2e^{t/2}$

(e) $y(t) = e^{2t}(c_1 \cos t + c_2 \sin t)$

(f) $y(t) = c_1e^{-t} + c_2te^{-t}$

(g) $y(t) = c_1e^{3t} + c_2e^{-2t}$

(h) $y(t) = c_1e^{2t\sqrt{2}} + c_2e^{-2t\sqrt{2}}$

(i) $y(t) = e^t(c_1 \cos t + c_2 \sin t)$

(j) $y(t) = c_1e^{5t} + c_2te^{5t}$

(k) $y(t) = c_1e^{-t/3} + c_2te^{-t/3}$

(l) $y(t) = e^{-3t}(c_1 \cos 2t + c_2 \sin 2t)$

6.

(a) $y(t) = 1/2 \sin 2t$

(b) $y(t) = 2te^{3t}$

(c) $y(t) = 5/2e^{-t} - 1/2e^{-3t}$

(d) $y(t) = e^{-3t/2} - (5/2)te^{-3t/2}$

(e) $y(t) = -e^{t-(\pi/2)} \sin 2t$

(f) $y(t) = e^{-2t}(\cos t + 2 \sin t)$

(g) $y(t) = 1/10e^{-9(t-1)} + 9/10e^{t-1}$

7. (a) $y(t) = c_1e^{2t/3} + c_2e^{t/2}$; (b) $y(t) = c_1e^{4t} + c_2te^{4t}$; (c) $y(t) = c_1e^t \sin(2t) + c_2e^t \cos(2t)$,

$\lim_{t \rightarrow -\infty} y(t) = 0$ e o limite não existe quando $t \rightarrow +\infty$.

8. (a) $y'' - 2y' - 15y = 0$; (b) $y'' + 4y' + 4y = 0$; (c) $y'' + 9y = 0$;

9.

(a) $y_2(t) = e^{-5t}$ (b) $y_2(t) = te^{2t}$

(c) $y_2(t) = t^3$ (d) $y_2(t) = t^{-2}$

11. (b) $\mu = (n\pi/L)^2$ e $y_n(t) = \sin((n\pi t)/L)$ $n = 1, 2, 3, 4, \dots$