

Matheus - Al 15 de abril de 2022
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$$a) y' - y = 0$$

$$y_1 = e^t$$

$$y_2 = \cosh(t)$$

$$y_1 = e^t$$

$$y_2 = \cosh(t)$$

$$\cosh - \cosh t = 0$$

$$\frac{d^2}{dt^2}(e^t) - e^t = 0$$

$$\frac{d^2}{dt^2}(\cosh t) - \cosh t = 0$$

$$e^t - e^t = 0$$

$$\frac{d}{dt}(\sinh t) - \cosh t = 0$$

$$d =$$

$$b) y'' + 2y' - 3y = 0 ; y_1 = e^t, y_2 = e^{-3t}$$

$$\frac{d^2}{dt^2}(e^t) + 2\frac{d}{dt}(e^t) - 3e^t = 0$$

$$\frac{d^2}{dt^2}(e^{-3t}) + 2\frac{d}{dt}(e^{-3t}) - 3e^{-3t} = 0$$

$$de^t + 2e^t - 3e^t = 0$$

$$-3\frac{d}{dt}(e^{-3t}) + 2(e^{-3t}(-3)) - 3e^{-3t} = 0$$

$$0e^t + 2e^t - 3e^t = 0$$

$$\frac{d}{dt}$$

$$3e^t - 3e^t = 0$$

$$-3 \cdot -3e^{-3t} - 6e^{-3t} - 3e^{-3t} = 0$$

$$9e^{-3t} - 9e^{-3t} = 0$$

$$c) t(y' - y) = t^2 ; y = 3t + t^2$$

$$t \left(\frac{d}{dt}(3t + t^2) \right) - (3t + t^2) = t^2$$

$$t(3 + 2t) - 3t - t^2 = t^2$$

$$3t + 2t^2 - 3t - t^2 = t^2$$

$$2t^2 - t^2 = t^2$$

$$t^2 = t^2$$

$$d) y'''' + 4y''' + 3y = t, \quad y_1 = \frac{t}{3} \quad ; \quad y_2 = e^{-t}$$

$$\frac{\partial^4}{\partial t^4} \left(\frac{t}{3} \right) + 4 \frac{\partial^3}{\partial t^3} \left(\frac{t}{3} \right) + 3 \left(\frac{t}{3} \right) = t \quad \quad \frac{d^4}{dt^4} (e^{-t}) + 4 \frac{d^3}{dt^3} (e^{-t}) + 3e^{-t} = t$$

$$\frac{\partial^3}{\partial t^3} \left(\frac{t}{3} \right) + 4 \frac{\partial^2}{\partial t^2} \left(\frac{t}{3} \right) + t = t$$

$$\frac{\partial^3}{\partial t^3} (e^{-t}) + 4 \frac{\partial^2}{\partial t^2} (-e^{-t}) + 3e^{-t} = t$$

$$\frac{\partial^2}{\partial t^2} (e^{-t}) + 4 \frac{\partial}{\partial t} (-e^{-t}) + 3e^{-t} = t$$

$$e^{-t} - 4e^{-t} + 3e^{-t} = t \quad \quad \frac{\partial}{\partial t} (-e^{-t}) + 4(-e^{-t}) + 3e^{-t} = t$$

não satisfaz!

$$c) 2t^2 y'' + 5ty' + 4y = 0; \quad y_1 = t^{-2} \quad ; \quad y_2 = t^{-1}$$

$$2t^2 \frac{\partial^2}{\partial t^2} (t^{-2}) + 5t \frac{\partial}{\partial t} (t^{-2}) + 4t^{-2} = 0$$

$$2t^2 \frac{d}{dt} (-2t^{-3}) + 5t (-2t^{-3}) + 4t^{-2} = 0$$

$$2t^2 \{ 6t^{-4} \} + 5t \{ -2t^{-3} \} + 4t^{-2} = 0$$

$$12t^{-2} - 10t^{-2} + 4t^{-2} = 0$$

$$6t^{-2} \neq 0 \quad (\text{não satisfaz!})$$

$$y_2 = t^{-1}$$

$$2t^2 \frac{\partial^2}{\partial t^2} (t^{-1}) + 5t \frac{\partial}{\partial t} (t^{-1}) + 4t^{-1} = 0$$

$$2t^2 \frac{d}{dt} (-t^{-2}) + 5t (-t^{-2}) + 4t^{-1} = 0$$

$$2t^2 \{ 2t^{-3} \} - 5t^{-1} + 4t^{-1} = 0$$

$$4t^{-1} - 5t^{-1} + 4t^{-1} = 0$$

$$3t^{-1} \neq 0 \quad (\text{não satisfaz!})$$