

Solución de fila A y Rúbrica del 2º p de EDO. Marzo 2019.

1) a) $y'' - 4y' + 6y = 0$

$$m^2 - 4m + 6 = 0 \quad \leftarrow 0.2$$

$$m = \frac{4 \pm \sqrt{16 - 24}}{2} = \frac{4 \pm \sqrt{-8}}{2} = \frac{4 \pm 2\sqrt{2}i}{2} = 2 \pm \sqrt{2}i \quad \leftarrow 0.4$$

$$y = e^{2x}(c_1 \cos(\sqrt{2}x) + c_2 \sin(\sqrt{2}x)) \quad \leftarrow 0.4$$

b) $y'' - 6y' + 5y = -9e^{2x}$

$$y_p = 3e^{2x}, \quad y_p' = 6e^{2x}, \quad y_p'' = 12e^{2x}$$

$$y_p'' - 6y_p' + 5y_p = 12e^{2x} - 36e^{2x} + 15e^{2x} = -9e^{2x} \Rightarrow y_p \text{ solución ED.} \quad \leftarrow 0.2$$

$$y'' - 6y' + 5y = 0 \quad (\text{ED homogénea asociada})$$

$$m^2 - 6m + 5 = 0 \quad \leftarrow 0.2$$

$$(m - 5)(m - 1) = 0 \Rightarrow m_1 = 5, m_2 = 1 \quad \leftarrow 0.2$$

$$y = c_1 e^{5x} + c_2 e^x + 3e^{2x}$$

solución general de la ED. $\leftarrow 0.4$

c) $y''' + 12y'' + 36y' = 0$

$$m^3 + 12m^2 + 36m = 0 \quad \leftarrow 0.2$$

$$m(m^2 + 12m + 36) = 0 \Rightarrow m(m + 6)^2 = 0 \Rightarrow m_1 = 0, m_2 = m_3 = -6 \quad \leftarrow 0.4$$

$$y = c_1 + c_2 e^{-6x} + c_3 x e^{-6x} \quad \text{solución general de la ED.} \quad \leftarrow 0.4$$

2) $y'' + \frac{2x}{4-x^2} y' = 0, \quad p(x) = \frac{2x}{4-x^2}$

$$y_2 = 3 \int \frac{e^{\int \frac{2x}{4-x^2} dx}}{3^2} dx = \frac{3}{9} \int e^{\frac{\ln(4-x^2)}{2}} dx \quad \leftarrow 0.1$$

$$= \frac{1}{3} \int e^{\ln(4-x^2)} dx$$

$$= \frac{1}{3} \int (4-x^2) dx = \frac{1}{3} (4x - \frac{1}{3}x^3) \quad \leftarrow 0.5$$

$$y = c_1 \cdot 3 + c_2 \frac{1}{3} (4x - \frac{1}{3}x^3)$$

$$y = c_1 + c_2 (12x - x^3) \quad \text{solución general de la ED.} \quad \leftarrow 0.4$$

$$3) A(0) = 25$$

← 0.2

$$V_e = 4 \frac{\text{Lb}}{\text{gal}} \cdot 6 \frac{\text{gal}}{\text{min}} = 24 \frac{\text{Lb}}{\text{min}}$$

← 0.2

$$V_s = \frac{A(t)}{600-2t} \frac{\text{Lb}}{\text{gal}} \cdot 8 \frac{\text{gal}}{\text{min}} = \frac{8A}{2(300-t)} = \frac{4A}{300-t} \frac{\text{Lb}}{\text{min}}$$

← 0.2

$$\text{ED es: } \frac{dA}{dt} = 24 - \frac{4A}{300-t}$$

← 0.2

El PVI es:

$$\begin{cases} \frac{dA}{dt} = 24 - \frac{4A}{300-t} \\ A(0) = 25. \end{cases}$$

← 0.2