Luis Alberto Escalante B. 28457748

Sustituyendo IV, V y VI en I

en cada caso por separado

$$y'' = Ae^{-x} - 9B\cos(3x) - 9C\sin(3x)$$

$$-3y' = 3Ae^{-x} + 9B\sin(3x) - 9C\cos(3x)$$

$$2y = 2Ae^{-x} + 2B\cos(3x) + 2C\sin(3x)$$

$$y'' - 3y' + 2y = 6Ae^{-x} + (-9B - 9C + 2B)\cos(3x) + (9C + 9B + 2C)\sin(3x)$$

$$\boxed{y'' - 3y' + 2y = 6Ae^{-x} + (-7B - 9C)\cos(3x) + (9B - 7C)\sin(3x)} \quad \text{VII}$$

Considerando $\boxed{y'' - 3y' + 2y = 3e^{-x} - 10\cos(3x) + 0\sin(3x)}$ VIII

$$6A = 3$$

$$\boxed{A = 1/2} \quad \text{IX}$$

Igualando VIII y IX

$$-7B - 9C = 10$$

$$9B - 7C = 0$$

$$9(-7B - 9C) = (-10)(9)$$

$$7(9B - 7C) = 0$$

$$\cancel{63B} - 81C = -90$$

$$\cancel{63B} - 49C = 0$$

$$-130C = -90$$

$$\boxed{C = 9/13} \quad \text{X} \rightarrow 9B - 7C = 0$$

$$B = \left(\frac{7}{9}\right)\left(\frac{9}{13}\right)$$

$$\boxed{B = \frac{7}{13}} \quad \text{XI}$$

Sustituyendo IX, X y XI en IV

$$\boxed{y_p = \frac{1}{2}e^{x} + \frac{7}{13}\cos(3x) + \frac{9}{13}\sin(3x)} \quad \text{XII}$$

Luis Alberto Escalante B. C.I. 28457748

1) $y'' - 3y' + 2y = 0$ (I)

Solucion Caracteristica

$$\boxed{y = e^{mx} \quad y' = m e^{mx} \quad y'' = m^2 e^{mx}}$$ (II)

Sustituyendo II en I

$$m^2 e^{mx} - 3m e^{mx} + 2e^{mx} = 0$$

$$e^{mx}(m^2 - 3m + 2) = 0 \qquad e^{mx} \neq 0$$

$$m^2 - 3m + 2 = 0$$

$$m = \frac{3 \pm \sqrt{9-8}}{2 \cdot 1} \begin{cases} m = \frac{3+1}{2} = 2 \\ m = \frac{3-1}{2} = 1 \end{cases}$$

$$y_c = C_1 e^{2x} + C_2 e^{x}$$ (III)

Solucion Particular

$$y_p = A e^{-x} + B \cos(3x) + C \operatorname{Sen}(3x)$$ (IV)

$$y_p' = -A e^{-x} - 3B \operatorname{Sen}(3x) + 3C \cos(3x)$$ (V)

$$y_p'' = A e^{-x} - 9B \cos(3x) - 9C \operatorname{Sen}(3x)$$ (VI)

Luis Alberto Escalante C.I 28457998

De (XI) y (XII) la Solucion General es:

$$\boxed{Y_{(x)} = C_1 e^{2x} + C_2 e^{x} + \frac{1}{2} e^{-x} + \frac{7}{13}\text{Cos}(3x) + \frac{9}{13}\text{Sen}(3x)} \quad \text{(XIII)}$$

bajo las condiciones

$$Y_{(0)} = C_1 e^{0} + C_2 e^{0} + \frac{1}{2} e^{0} + \frac{7}{13}\text{Cos}(0) + \frac{9}{13}\text{Sen}(0)$$

$$1 = C_1 + C_2 + \frac{1}{2} + \frac{7}{13} + \frac{9}{13}(0)$$

$$C_1 + C_2 = 1 - \frac{1}{2} - \frac{7}{13}$$

$$C_1 + C_2 = -\frac{1}{26} \quad \text{(XIV)}$$

la derivada de (XIII)

$$Y'_{(x)} = 2C_1 e^{2x} + C_2 e^{x} - \frac{1}{2} e^{-x} - \frac{21}{13}\text{Sen}(3x) + \frac{27}{13}\text{Cos}(3x)$$

$$Y'_{(0)} = 2C e^{0} + C_1 e^{0} - \frac{1}{2} e^{0} - \cancel{\frac{21}{13}\text{Sen}(0)}^{\,0} + \frac{27}{13}\text{Cos}(0)$$

$$Y'_{(0)} = 2C_1 + C_2 - \frac{1}{2} + \frac{27}{13}$$

$$2 = 2C_1 + C_2 + \frac{41}{26}$$

$$2C_1 + C_2 = 2 - \frac{41}{26}$$

$$\boxed{2C_1 + C_2 = \frac{11}{26}} \quad \text{(XV)}$$

De (XIV) y (XV)

$$-C_1 - C_2 = \frac{1}{26}$$

$$2C_1 + C_2 = \frac{11}{26}$$

$$\boxed{C_1 = 6/13} \quad \text{(XVI)}$$

Sustituyendo (XVI) y (XIV)

$$C_2 = -\frac{1}{26} - \frac{6}{13}$$

$$C_2 = -\frac{1}{2} \quad \text{(XVII)}$$

Sustituyendo XVII XVII en

$$y_{(x)} = \frac{6}{13} e^{2x} - \frac{1}{2} e^{x} + \frac{1}{2} e^{-x} + \frac{7}{13} \cos(3x) + \frac{9}{13} \operatorname{sen}(3x)$$