

Clave Tarea 2a.

S.P.
(A)

4.1

(18)

$$f_1(x) = \cos 2x = 1 - 2 \sin^2 x = 2 \cos^2 x - 1$$

$$f_2(x) = 1$$

$$f_3(x) = \cos^2 x$$

$$2f_3(x) - f_1(x) = f_2(x)$$

$$2 \cos^2 x - (2 \cos^2 x - 1) = 1$$

$$1 = 1$$

No son L.I.

(35)

a) $y_{p1} = 3e^{2x} \neq y_{p2} = x^2 + 3x$

$$\rightarrow y'' - 6y' + 5y = -9e^{2x}$$

$$\rightarrow y'' - 6y' + 5y = 5x^2 + 3x - 16$$

$$\begin{array}{l|l} y_{p1}' = 6e^{2x} & 12e^{2x} - 36e^{2x} + 15e^{2x} = -24e^{2x} + 15e^{2x} = -9e^{2x} \\ y_{p1}'' = 12e^{2x} & \end{array}$$

$$\begin{array}{l|l} y_{p2}' = 2x + 3 & 2 - 12x - 18 + 5x^2 + 15x = 5x^2 + 3x - 16 \\ y_{p2}'' = 2 & \end{array}$$

b) $y'' - 6y' + 5y = 5x^2 + 3x - 16 - 9e^{2x}$

(i) $y_p = 3e^{2x} + x^2 + 3x$ / según principio de superposición

$$y'' - 6y' + 5y = \underbrace{-10x^2 - 6x + 32}_{-2y_{p1} - \frac{1}{9}y_{p2}} + e^{2x}$$

de la ec. (i)

$$y_p = -2x^2 - 6x - \frac{1}{3}e^{2x}$$

4.2

$$(A) \quad y'' - 4y = 2$$

$$y_1 = e^{-2x}$$

$$y = u(x)e^{-2x}$$

$$y' = u'e^{-2x} - 2ue^{-2x}$$

$$y'' = u''e^{-2x} - 2u'e^{-2x} - 2u'e^{-2x} + 4ue^{-2x} = u''e^{-2x} - 4u'e^{-2x} + 4ue^{-2x}$$

$$\Rightarrow u''e^{-2x} - 4u'e^{-2x} + 4ue^{-2x} - 4ue^{-2x} = u''e^{-2x} - 4u'e^{-2x} = 0$$

$$\Rightarrow u'' - 4u' = 0$$

$$w = u'$$

$$\hookrightarrow w' - 4w = 0$$

$$e^{4 \int dx} = e^{-4x}$$

$$\Rightarrow e^{-4x} w' - 4e^{-4x} w = 0$$

$$\int \frac{d}{dx} [e^{-4x} w] = 0$$

$$\Rightarrow e^{-4x} w = c$$

$$\Rightarrow w = u' = c_1 e^{4x}$$

$$\Rightarrow y_2 = e^{4x} \cdot e^{-2x}$$

$$y_2 = e^{2x}$$

$$\left. \begin{aligned} y_p &= A \\ y_p' &= 0 \\ y_p'' &= 0 \end{aligned} \right\}$$

$$-4A = 2 \Rightarrow A = -\frac{1}{2}$$

$$\Rightarrow y_p = -\frac{1}{2}$$