

Journal Entry
 10/21/2023
 Dec 31
 2023

1) 10/21/2023

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2) 10/21/2023

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$$37) \frac{dy}{dx} + 2 \frac{y}{x} + y = e^{-x}$$

Sol

$$m^2 + 2m + 1 = 0$$

$$m^2 + m + m + 1 = 0$$

$$(m+1)(m+1)$$

$$m = -1 \text{ (Chosen)}$$

$$\text{D.F. } e^{-x} (C_1 + C_2 x)$$

$$P.I. = y = C e^{-x}$$

$$\frac{dy}{dx} = -C e^{-x}$$

$$-C e^{-x} = C e^{-x}$$

$$-C e^{-x} + 2(-C e^{-x}) + C e^{-x} = e^{-x}$$

$$-C e^{-x} - 2C e^{-x} + C e^{-x} = e^{-x}$$

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

$$C = -\frac{1}{2}$$

$$P.I. = y = \frac{1}{2} e^{-x}$$

$$y = e^{-x} (A + Bx) + \frac{1}{2} e^{-x}$$

$$38) \frac{dy}{dx} + 25y = 5x^{1/2}$$

$$\frac{dy}{dx} + 25y = 0$$

$$m^2 + 25 = 0$$

$$m^2 = -25$$

$$m = \pm 5i$$

$$m = 5i$$

$$\text{D.F. } y = e^{(5i)x} (C_1 \cos x + C_2 \sin x)$$

$$P.I. = y = (A + Bx) e^{-x}$$

$$\frac{dy}{dx} = 20(A + Bx) \quad \frac{dy}{dx} = -2C$$

$$20(A + Bx) + 20(A + Bx) + 20C = 5x^{1/2}$$

$$20A + 20Bx + 20A + 20Bx + 20C = 5x^{1/2}$$

$$40A + 40Bx + 20C = 5x^{1/2}$$

$$40A + 20C = 0$$

$$200x = 5$$

$$C = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$D = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$E = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$F = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$G = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$H = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$22) \frac{1}{x^2} = \frac{1}{x^2} + 0 = x^{-2}$$

$$= 2x^{-3} = 2 \cdot \frac{1}{x^3} = \frac{2}{x^3}$$

$$= \frac{2}{x^3} = \frac{2}{x^3}$$

$$P.E = \frac{2}{x^3}$$

$$y = \frac{2}{x^3} + P.E$$

Handwritten notes, possibly a list or set of instructions, written in a cursive or semi-cursive script. The text is extremely faint and illegible due to the low resolution and high noise of the scan.

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$$(c) \frac{dy}{dx} + 4 \frac{y}{x} = 8x^2 \quad \text{--- (1)}$$

$$x = 0, y = 1 \text{ and } \frac{dy}{dx} = -2$$

$$m^2 + 4m + 5 = 0$$

$$m = -2 \pm j$$

$$m = \alpha \pm j\beta$$