

Name : Syed Waheed Shah

Semester : 11th

I.D : 7497

Subject : Differential equation

Submitted to : Ma'am Shumaila

Solve system of equations:

$$x + 3y + 5z + 2t = 2 \rightarrow (I)$$

$$-y + 3z + 4t = 0 \rightarrow (II)$$

$$2x + y + 9z + 6t = -3 \rightarrow (III)$$

$$3x + 2y + 4z + 8t = -1 \rightarrow (IV)$$

Soln:

$$\begin{array}{l} R \\ \left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 2 & 1 & 9 & 6 & -3 \\ 3 & 2 & 4 & 8 & -1 \end{array} \right] \end{array} \quad \begin{array}{l} R_3 - 2R_1 \\ R_4 - 3R_1 \end{array}$$

$$\begin{array}{l} R \\ \left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & -5 & -1 & 2 & -7 \\ 0 & -7 & -11 & 2 & -7 \end{array} \right] \end{array} \quad \begin{array}{l} -1 \cdot R_3 \\ -1 \cdot R_4 \end{array}$$

$$\begin{array}{l} R \\ \left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 5 & 1 & -2 & 7 \\ 0 & 7 & 11 & -2 & 7 \end{array} \right] \end{array} \quad \begin{array}{l} R_3 + 5R_2 \\ R_4 + 7R_2 \end{array}$$

$$R_2 \left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & 16 & 18 & 7 \\ 0 & 0 & 32 & 26 & -7 \end{array} \right] \quad R_4 - 2R_3$$

$$R_2 \left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & 16 & 18 & 7 \\ 0 & 0 & 0 & -10 & -7 \end{array} \right]$$

From eq (iv) $+10t = -7$, $t = -7/10$

$$t = -0.7$$

put in eq (iii)

$$16z + 18(-0.7) = 7$$

$$16z + 12.6 = 7$$

$$\Rightarrow 16z = 7 - 12.6 = -5.6$$

$$z = -5.6 / 16$$

$$z = -0.35$$

put in eq (ii):

$$-y + 3(-0.35) + 4(0.7) = 0$$

$$-y - 0.105 + 2.8 = 0$$

$$-y + 2.695 = 0$$

$$y = 2.695$$

put in eq (i)

$$x + 3(2.695) + 5(0.35) + 2(0.7) = 2$$

$$x + 0.085 - 1.75 + 1.4 = 2$$

$$x + 6.335 + 1.4 = 2$$

$$x + 7.735 = 2$$

$$x = 2 - 7.735$$

$$x = -5.735$$

Solve: (Ans)