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Quiz: Differential equation

Day: MTWTFSS

Date: \_\_\_/\_\_\_/\_\_\_

$$\begin{aligned} Q\# \quad & x + 3y + 5z + 2t = 2 \\ & -y + 3z + 4t = 0 \\ & 2x + y + 9z + 6t = -3 \\ & 3x + 2y + 4z + 8t = -1 \end{aligned}$$

Solve Using Gauss Jordan Method

$$x + 3y + 5z + 2t = 2$$

$$-y + 3z + 4t = 0$$

$$2x + y + 9z + 6t = -3$$

$$3x + 2y + 4z + 8t = -1$$

writing in matrix form

$$\left[ \begin{array}{cccc|c} 2 & 0 & 4 & 2 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 2 & 1 & 9 & -3 \\ 8 & 3 & 2 & 4 & -1 \end{array} \right] \begin{array}{l} \text{Multiply row 2 by } -1 \\ \text{and add to row 1} \end{array}$$

$$\left[ \begin{array}{cccc|c} 2 & 0 & 4 & 2 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 0 & 3 & 3 & -3 \\ 8 & 3 & 2 & 4 & -1 \end{array} \right] \begin{array}{l} \text{Multiply row 2 by } -3 \\ \text{and add it with} \\ \text{row \# 4} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 0 & 3 & 3 & -3 \\ 8 & 0 & 5 & -3 & -1 \end{array} \right] \begin{array}{l} \text{Divide row 1} \\ \text{by 2} \end{array}$$



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$$\left[ \begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 2 & 0 & 1 & 1 & -1 \\ 8 & 0 & 5 & -5 & -1 \end{array} \right] \begin{array}{l} \text{Divide row 3} \\ \text{by 3} \end{array}$$


$$\left[ \begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & -3 & -1 & -3 \\ 0 & 0 & -11 & -13 & -9 \end{array} \right] \begin{array}{l} \text{Multiply row 1} \\ \text{by } -8 \text{ \& add it to} \\ \text{row \# 4} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 11 & 13 & 9 \end{array} \right] \begin{array}{l} \text{Multiply the} \\ \text{row 3 by } -1 \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & -1 & 0 & -2 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 11 & 13 & 9 \end{array} \right] \begin{array}{l} \text{Multiply row 3} \\ \text{by } -13 \text{ \& add to} \\ \text{row 4} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 1 & 0 & -2 \\ 0 & 1 & -10 & 0 & -9 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & -28 & 0 & -30 \end{array} \right] \begin{array}{l} \text{Divide row 4} \\ \text{by } -28 \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & 0 & -13/4 \\ 0 & 1 & 0 & 0 & 12/7 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 1 & 0 & 15/14 \end{array} \right] \begin{array}{l} \text{Multiply row 4} \\ \text{by 10 and add} \\ \text{to row 2} \end{array}$$

Checker By: ..... Parents: ..... Excellent  Good  



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$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

Multiply row 4 by  
-3 and add to row

Convert the augmented matrix into  
a system of linear system

$$t = -13/14$$

$$x = 12/7$$

$$z = 3/14$$

$$y = 15/14$$

The possible sol's of system is ordered  
4 types as we simplify eq:

$$2 = 2$$

$$0 = 0$$

$$-3 = -3$$

$$-1 = -1$$

So all the eq's are true

$$(t, x, y, z) = (-13/14, 12/7, 13/14, -3/14)$$

Answer.