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**Kelas : IF3A**

1. Misalkan diberikan SPL sebagai berikut dengan eliminasi Gauss:

$$x + y + 2z = 9$$

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

$$3x + 6y - 5z = 0$$

2. Misalkan diberikan SPL sebagai berikut dengan eliminasi Gauss Jordan:

$$x + y - z = 6$$

$$3x - 4y + 2z = -2$$

$$2x + 5y + z = 0$$

Jawab

$$1. \begin{bmatrix} 1 & 1 & 2 & 9 \\ 2 & 4 & -3 & 1 \\ 3 & 6 & -5 & 0 \end{bmatrix} \begin{bmatrix} i \\ ii \\ iii \end{bmatrix}$$
$$i(-2) + ii = 1(-2) + 2 = 0$$
$$1(-2) + 4 = 2$$
$$2(-2) - 3 = -7$$
$$9(-2) + 1 = -17$$

$$\begin{bmatrix} 1 & 1 & 2 & 9 \\ 0 & 2 & -7 & -17 \\ 3 & 6 & -5 & 0 \end{bmatrix}$$
$$i(-3) + iii = 1(-3) + 3 = 0$$
$$1(-3) + 6 = 3$$
$$2(-3) - 5 = -11$$
$$9(-3) + 0 = -27$$

$$\begin{bmatrix} 1 & 1 & 2 & 9 \\ 0 & 2 & -7 & -17 \\ 0 & 3 & -11 & -27 \end{bmatrix}$$
$$ii(\frac{1}{2}) = 0(\frac{1}{2}) = 0$$
$$2(\frac{1}{2}) = 1$$
$$-7(\frac{1}{2}) = -\frac{7}{2}$$
$$-17(\frac{1}{2}) = -\frac{17}{2}$$

$$\begin{bmatrix} 1 & 1 & 2 & 9 \\ 0 & 1 & -\frac{7}{2} & -\frac{17}{2} \\ 0 & 3 & -11 & -27 \end{bmatrix}$$
$$ii(-3) + iii = 1(-3) + 3 = 0$$
$$-\frac{7}{2}(-3) - 11 = -\frac{1}{2}$$

$$-\frac{17}{2}(-3)-27=-\frac{3}{2}$$

$$\begin{bmatrix} 1 & 1 & 2 & 9 \\ 0 & 1 & -\frac{7}{2} & -\frac{17}{2} \\ 0 & 0 & -\frac{1}{2} & -\frac{3}{2} \end{bmatrix}$$

$$iii(-2)=-\frac{1}{2}(-2)=1$$

$$-\frac{3}{2}(-2)=3$$

$$\begin{bmatrix} 1 & 1 & 2 & 9 \\ 0 & 1 & -\frac{7}{2} & -\frac{17}{2} \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

*solusi sistem diperoleh dengan teknik penyulihan mundur sebagai berikut :*

$$z=3$$

$$y-\frac{7}{2}z=-\frac{17}{2}$$

$$y-\frac{7}{2}(3)=-\frac{17}{2}$$

$$y=(-\frac{17}{2})+\frac{21}{2}$$

$$y=2$$

$$x+y+2z=9$$

$$x+2+2(3)=9$$

$$x+8=9$$

$$x=1$$

*Diperoleh penyelesaian  $x=1, y=2, z=3$*

$$2. \begin{bmatrix} 1 & 1 & -1 & 6 \\ 3 & -4 & 2 & -2 \\ 2 & 5 & 1 & 0 \end{bmatrix} \begin{bmatrix} i \\ ii \\ iii \end{bmatrix}$$

$$i(-3)+ii=1(-3)+3=0$$

$$1(-3)-4=-7$$

$$-1(-3)+2=5$$

$$6(-3)-2=-20$$

$$\begin{bmatrix} 1 & 1 & -1 & 6 \\ 0 & -7 & 5 & -20 \\ 2 & 5 & 1 & 0 \end{bmatrix}$$

$$i(-2)+iii=1(-2)+2=0$$

$$1(-2)+5=3$$

$$-1(-2)+1=3$$

$$6(-2)+0=-12$$

$$\begin{bmatrix} 1 & 1 & -1 & 6 \\ 0 & -7 & 5 & -20 \\ 0 & 3 & 3 & -12 \end{bmatrix}$$

$$ii(-\frac{1}{7}) = -7(-\frac{1}{7}) = 1$$

$$5(-\frac{1}{7}) = -\frac{5}{7}$$

$$-20(-\frac{1}{7}) = \frac{20}{7}$$

$$\begin{bmatrix} 1 & 1 & -1 & 6 \\ 0 & 1 & -\frac{5}{7} & \frac{20}{7} \\ 0 & 3 & 3 & -12 \end{bmatrix}$$

$$ii(-3) + iii = 1(-3) + 3 = 0$$

$$(-\frac{5}{7})(-3) + 3 = \frac{36}{7}$$

$$(\frac{20}{7})(-3) - 12 = -\frac{144}{7}$$

$$\begin{bmatrix} 1 & 1 & -1 & 6 \\ 0 & 1 & -\frac{5}{7} & \frac{20}{7} \\ 0 & 0 & \frac{36}{7} & -\frac{144}{7} \end{bmatrix}$$

$$iii(\frac{7}{36}) = \frac{36}{7}(\frac{7}{36}) = 1$$

$$(-\frac{144}{7})\frac{7}{36} = -4$$

$$\begin{bmatrix} 1 & 1 & -1 & 6 \\ 0 & 1 & -\frac{5}{7} & \frac{20}{7} \\ 0 & 0 & 1 & -4 \end{bmatrix}$$

$$ii(-1) + i = 1(-1) + 1 = 0$$

$$-\frac{5}{7}(-1) - 1 = -\frac{2}{7}$$

$$\frac{20}{7}(-1) + 6 = \frac{22}{7}$$

$$\begin{bmatrix} 1 & 0 & -\frac{2}{7} & \frac{22}{7} \\ 0 & 1 & -\frac{5}{7} & \frac{20}{7} \\ 0 & 0 & 1 & -4 \end{bmatrix}$$

$$iii(\frac{2}{7}) + i = 1(\frac{2}{7}) - \frac{2}{7} = 0$$

$$-4(\frac{2}{7}) + \frac{22}{7} = 2$$

$$\begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & -\frac{5}{7} & \frac{20}{7} \\ 0 & 0 & 1 & -4 \end{bmatrix}$$

$$iii(\frac{5}{7})-ii=1(\frac{5}{7})-\frac{5}{7}=0$$

$$-4(\frac{5}{7})+\frac{20}{7}=0$$

$$\begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & -4 \end{bmatrix}$$

diperoleh penyelesaian  $x=2, y=0, z=-4$