ALJABAR LINIER # 3

① $3x - 2y + z = 5$

$4x + 3x - 3z = 1$ $\longrightarrow$ $\begin{pmatrix} 3 & -2 & 1 & | & 5 \\ 4 & 3 & -3 & | & 1 \\ -6 & 4 & -7 & | & 3 \end{pmatrix}$ $\dfrac{b_1}{3}$ $\begin{pmatrix} 1 & -\frac{2}{3} & \frac{1}{3} & | & \frac{5}{3} \\ 4 & 3 & -3 & | & 1 \\ -6 & 4 & -7 & | & 3 \end{pmatrix}$

$-6x + 4y - 7z = 3$

$b_2 - 4b_1$ $\begin{pmatrix} 1 & \frac{2}{3} & \frac{1}{3} & | & \frac{5}{3} \\ 0 & \frac{17}{3} & -\frac{13}{3} & | & -\frac{17}{3} \\ -6 & 4 & -7 & | & 3 \end{pmatrix}$ $b_3 + 6b_1$ $\begin{pmatrix} 1 & -\frac{2}{3} & \frac{1}{3} & | & \frac{5}{3} \\ 0 & \frac{17}{3} & -\frac{13}{3} & | & \frac{17}{3} \\ 0 & 6 & -5 & | & 13 \end{pmatrix}$ $b_2 / \dfrac{17}{3}$

$\begin{pmatrix} 1 & -\frac{2}{3} & \frac{1}{3} & | & \frac{5}{3} \\ 0 & 1 & -\frac{13}{17} & | & -1 \\ 0 & 0 & -5 & | & 13 \end{pmatrix}$ $b_3 \cdot \dfrac{1}{-5}$ $\begin{pmatrix} 1 & \frac{2}{3} & \frac{1}{3} & | & \frac{5}{3} \\ 0 & 1 & -\frac{13}{17} & | & -1 \\ 0 & 0 & 1 & | & -\frac{13}{5} \end{pmatrix}$ Maka $x, y, z = \left(\frac{5}{3}, -1, \frac{-13}{5}\right)$

(Metode gauss)

② $x + 2y + z = 6$

$x + 3y + 2z = 9$ $\longrightarrow$ $\begin{pmatrix} 1 & 2 & 1 & | & 6 \\ 1 & 3 & 2 & | & 9 \\ 0 & 6 & 3 & | & 12 \end{pmatrix}$ $b_2 - b_1$ $\begin{pmatrix} 1 & 2 & 1 & | & 6 \\ 0 & 1 & 1 & | & 3 \\ 2 & 1 & 2 & | & 12 \end{pmatrix}$ $b_3 - 2b_1$

$2x + y + 2z = 12$

$\begin{pmatrix} 1 & 2 & 1 & | & 6 \\ 0 & 1 & 1 & | & 3 \\ 0 & -3 & 0 & | & 0 \end{pmatrix}$ $b_3 + 3b_2$ $\begin{pmatrix} 1 & 2 & 1 & | & 6 \\ 0 & 1 & 1 & | & 3 \\ 0 & 0 & 3 & | & 9 \end{pmatrix}$ $b_1 - 2b_2$ $\begin{pmatrix} 1 & 0 & -1 & | & 0 \\ 0 & 1 & 1 & | & 3 \\ 0 & 0 & 3 & | & 9 \end{pmatrix}$

$\begin{pmatrix} 1 & 0 & -1 & | & 0 \\ 0 & 1 & 1 & | & 3 \\ 0 & 0 & 1 & | & 3 \end{pmatrix}$ $b_2 - b_3$ $\begin{pmatrix} 1 & 0 & -1 & | & 0 \\ 0 & 1 & 0 & | & 0 \\ 0 & 0 & 1 & | & 3 \end{pmatrix}$ $b_1 + b_3$ $\begin{pmatrix} 1 & 0 & 0 & | & 3 \\ 0 & 1 & 0 & | & 0 \\ 0 & 0 & 1 & | & 3 \end{pmatrix}$

Maka terbukti nilai x, y, z adalah $(3, 0, 3)$

(Metode Gauss Jordan)

③ $x - x + 2x - x = -1$

$2x + x - 2x - 2x = -2$

$-x + 2x - 4x + x = 1$

$3x \quad 0 \quad 0 \quad -3x = -3$

$\longrightarrow$

$$\left(\begin{array}{cccc|c} 1 & -1 & 2 & -1 & -1 \\ 2 & 1 & -2 & -2 & -2 \\ -1 & 2 & -4 & 1 & 1 \\ 3 & 0 & 0 & -3 & -3 \end{array}\right) \begin{array}{l} \\ b_2 - 2b_1 \\ b_3 + b_1 \\ b_4 - 3b_1 \end{array}$$

$$\left(\begin{array}{cccc|c} 1 & -1 & 2 & -1 & -1 \\ 0 & 3 & -6 & 0 & 0 \\ 0 & 1 & -2 & 0 & 0 \\ 0 & 3 & -6 & 0 & 0 \end{array}\right) b_2 \longleftrightarrow b_2 \left(\begin{array}{cccc} 1 & -1 & 2 & -1 \\ 0 & 1 & -2 & 0 \\ 0 & 3 & -6 & 0 \\ 0 & 3 & -6 & 0 \end{array}\right)$$

$b_3 - 3b_2$

$$\left(\begin{array}{ccc|c} 1 & -1 & 2 & -1 \\ 0 & 1 & -2 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right)$$

Jadi $x_1 = -1 + x_4$

$x_2 = 2x_3$

$x_3 = x_4 - \text{free}$