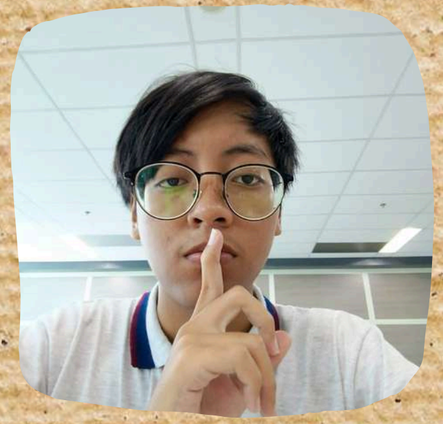
Aljabar Linear 2

Presented by Mewing Team

Our Team

I Made Ryan Darmajaya (50252411158)



Muhammad Zaky Zein (5025241148)

Rennard Filbert Tanjaya (5025241122)

William Hans Chandra (5025241138)

Yoseph Kevin Hendrata (5025241146)

Soal

SPL

$$8X_1 - 4X_2 + 5X_3 + 4X_4 - 2X_5 = 3$$

$$-3X_1 + 2X_2 + 1X_3 + 9X_4 + 6X_5 = 7$$

$$-7X_1 + 6X_2 + 3X_3 - 3X_4 + 5X_5 = -1$$

Matriks Augmented

$$\left(\begin{array}{ccccc|c} 8 & -4 & 5 & 4 & -2 & 3 \\ -3 & 2 & 1 & 9 & 6 & 7 \\ -7 & 6 & 3 & -3 & 5 & -1 \end{array}\right)$$

Eliminasi Gauss

Iterasi 1		b1 = b1 * (1/8)			
1	-0.50	0.63	0.50	-0.25	0.38
-3	2	1	9	6	7
-7	6	3	-3	5	-1

ITERASI 1:

$$B1 = B1 * \left(\frac{1}{8}\right)$$

$$B1 = \begin{bmatrix} 8 \\ -4 \\ 5 \\ 4 \\ -2 \\ 3 \end{bmatrix} * \left(\frac{1}{8}\right) = \begin{bmatrix} 1 \\ -0.50 \\ 0.63 \\ 0.50 \\ -0.25 \\ 0.38 \end{bmatrix}$$

Iterasi 2		b2 = b1 * (3) + b2			
1	-0.50	0.63	0.50	-0.25	0.38
0	0.50	2.89	10.50	5.25	8.14
-7	6	3	-3	5	-1

ITERASI 2:

$$B2 = B1 * (3) + B2$$

$$B2 = \begin{bmatrix} 1 \\ -0.50 \\ 0.63 \\ 0.50 \\ -0.25 \\ 0.38 \end{bmatrix} * (3) + \begin{bmatrix} -3 \\ 2 \\ 1 \\ 9 \\ 6 \\ 7 \end{bmatrix}$$

$$B2 = \begin{bmatrix} 3 \\ -1.50 \\ 1.89 \\ 1.50 \\ -0.75 \\ 1.14 \end{bmatrix} + \begin{bmatrix} -3 \\ 2 \\ 1 \\ 9 \\ 6 \\ 7 \end{bmatrix} = \begin{bmatrix} 0 \\ 0.50 \\ 2.89 \\ 10.50 \\ 5.25 \\ 8.14 \end{bmatrix}$$

Eliminasi Gauss

Iterasi 3		b3 = b1 * (7) + b3			
1	-0.50	0.63	0.50	-0.25	0.38
0	0.50	2.89	10.50	5.25	8.14
0	2.50	7.41	0.50	3.25	1.66

ITERASI 3:

$$B3 = B1 * (7) + B3$$

$$B3 = \begin{bmatrix} 1 \\ -0.50 \\ 0.63 \\ 0.50 \\ -0.25 \\ 0.38 \end{bmatrix} * (7) + \begin{bmatrix} -7 \\ 6 \\ 3 \\ -3 \\ 5 \\ -1 \end{bmatrix}$$

$$B3 = \begin{bmatrix} 7 \\ -3.50 \\ 4.41 \\ 3.50 \\ -1.75 \\ 2.66 \end{bmatrix} + \begin{bmatrix} -7 \\ 6 \\ 3 \\ -3 \\ 5 \\ -1 \end{bmatrix} = \begin{bmatrix} 0 \\ 2.50 \\ 7.41 \\ 0.50 \\ 3.25 \\ 1.66 \end{bmatrix}$$

Iterasi 4		b2 = b2 * (2)			
1	-0.50	0.63	0.50	-0.25	0.38
0	1	5.78	21	10.50	16.28
0	2.50	7.41	0.50	3.25	1.66

ITERASI 4:

$$B2 = B2 * (2)$$

$$B2 = \begin{bmatrix} 0 \\ 0.50 \\ 2.89 \\ 10.50 \\ 5.25 \\ 8.14 \end{bmatrix} * (2) = \begin{bmatrix} 0 \\ 1 \\ 5.78 \\ 21 \\ 10.50 \\ 16.28 \end{bmatrix}$$

Eliminasi Gauss

Iterasi 5		b3 = b2 * (-2.5) + b3			
1	-0.50	0.63	0.50	-0.25	0.38
0	1	5.78	21	10.50	16.28
0	0	-7.04	-52	-23	-39.04

ITERASI 5:

B3 = B2 * (-2.50) + B3

$$B3 = \begin{bmatrix} 0 \\ 1 \\ 5.78 \\ 21 \\ 10.50 \\ 16.28 \end{bmatrix} * (-2.50) + \begin{bmatrix} 0 \\ 2.50 \\ 7.41 \\ 0.50 \\ 3.25 \\ 1.66 \end{bmatrix}$$

$$B3 = \begin{bmatrix} 0 \\ -2.50 \\ -14.45 \\ -52.50 \\ -26.25 \\ -40.7 \end{bmatrix} + \begin{bmatrix} 0 \\ 2.50 \\ 7.41 \\ 0.50 \\ 3.25 \\ 1.66 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ -7.04 \\ -52 \\ -23 \\ -39.04 \end{bmatrix}$$

Iterasi 6		b3 = b3 * (-1/7.04)			
1	-0.50	0.63	0.50	-0.25	0.38
0	1	5.78	21	10.50	16.28
0	0	1	7.39	3.27	5.55

ITERASI 6 :

$$B3 = B3 * \left(-\frac{1}{7,04}\right)$$

$$B3 = \begin{bmatrix} 0 \\ 0 \\ -7,04 \\ -52 \\ -23 \\ -39,04 \end{bmatrix} * \left(-\frac{1}{7,04}\right) = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 7,39 \\ 3,27 \\ 5,55 \end{bmatrix}$$

Subtitusi Balik

Ditulis kembali dalam bentuk SPL

$$X1 - 0.5\,X2 + 0.63\,X3 + 0.5\,X4 - 0.25\,X5 = 0.38$$
$$X2 + 5.78\,X3 + 21\,X4 + 10.5\,X5 = 16.28$$
$$X3 + 7.39\,X4 + 3.27\,X5 = 5.55$$

$X5 = K$, $X4 = P$

maka, $X3 = 5.55 - 7.39P - 3.27K$

$$X2 + 5.78\,(5.55 - 7.39P - 3.27K) + 21P + 10.5K = 16.28$$
$$X2 + 32.08 - 42.71P - 18.9K + 21P + 10.5K = 16.28$$
$$X2 = 16.28 - 32.08 + 21.71P + 8.4K$$
$$X2 = 21.71P + 8.4K - 15.8$$

Subtitusi Balik

$$X1 - 0.5 (21.71P + 8.4K - 15.8) + 0.63 (5.55 - 7.39P - 3.27K) + 0.5P - 0.25K = 0.38$$

$$X1 - 10.86P - 4.2K + 7.9 + 3.49 - 4.66P - 2.06K + 0.5P - 0.25K = 0.38$$

$$X1 - 15.02P - 6.51K + 11.39 = 0.38$$

$$X1 = 15.02P + 6.51K - 11.01$$

Jadi, $X1 = 15.02P + 6.51K - 11.01$

$X2 = 21.71P + 8.4K - 15.8$

$X3 = 5.55 - 7.39P - 3.27K$

$X4 = P$

$X5 = K$

Gauss-Jordan

Iterasi 7		b2 = b3 * (-5.78) + b2			
1	-0.50	0.63	0.50	-0.25	0.38
0	1	0	-21.71	-8.40	-15.80
0	0	1	7.39	3.27	5.55

ITERASI 7 :

$$B2 = B3 * (-5{,}78) + B2$$

$$B2 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 7{,}39 \\ 3{,}27 \\ 5{,}55 \end{bmatrix} * (-5{,}78) + \begin{bmatrix} 0 \\ 1 \\ 5{,}78 \\ 21 \\ 10{,}5 \\ 16{,}28 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \\ -21{,}71 \\ -8{,}40 \\ -15{,}80 \end{bmatrix}$$

Iterasi 8		b1 = b3 * (-0.63) + b1			
1	-0.50	0	-4.16	-2.31	-3.12
0	1	0	-21.71	-8.40	-15.80
0	0	1	7.39	3.27	5.55

ITERASI 8 :

$$B1 = B3 * (-0{,}63) + B1$$

$$B1 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 7{,}39 \\ 3{,}27 \\ 5{,}55 \end{bmatrix} * (-0{,}63) + \begin{bmatrix} 1 \\ -0{,}50 \\ 0{,}63 \\ 0{,}50 \\ -0{,}25 \\ 0{,}38 \end{bmatrix} = \begin{bmatrix} 1 \\ -0{,}50 \\ 0 \\ -4{,}16 \\ -2{,}31 \\ -3{,}12 \end{bmatrix}$$

Gauss-Jordan

Iterasi 9			b1 = b2 * (0.5) + b1		
1	0	0	-15.02	-6.51	-11.01
0	1	0	-21.71	-8.40	-15.80
0	0	1	7.39	3.27	5.55

ITERASI 9 :

$$B1 = B2 * (0{,}50) + B1$$

$$B1 = \begin{bmatrix} 0 \\ 1 \\ 0 \\ -21{,}71 \\ -8{,}40 \\ -15{,}78 \end{bmatrix} * (0{,}50) + \begin{bmatrix} 1 \\ -0{,}50 \\ 0 \\ -4{,}16 \\ -2{,}31 \\ -3{,}12 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ -15{,}02 \\ -6{,}51 \\ -11{,}01 \end{bmatrix}$$

Didapat

X1 = 15.02P + 6.51K - 11.01

X2 = 21.71P + 8.4K - 15.8

X3 = 5.55 - 7.39P - 3.27K

X4 = P

X5 = K

Thank You!