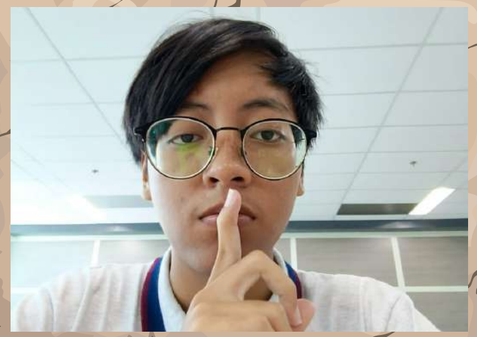
Kelompok Mewing

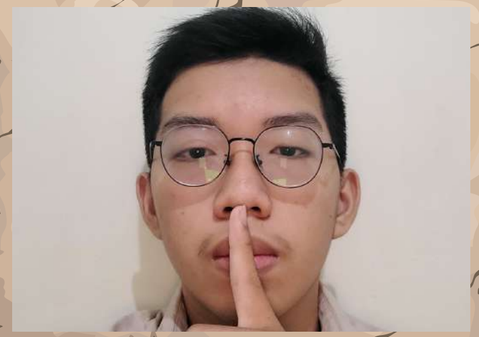
Aljabar Linear

Anggota

I Made Ryan Darmajaya (5025241158)

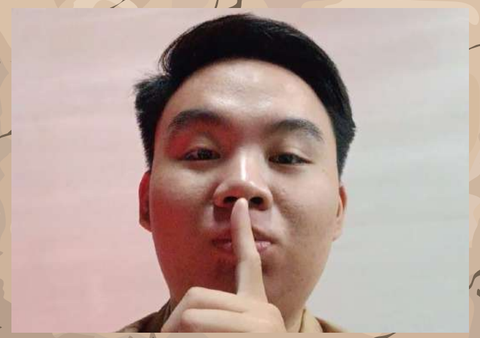


Muhammad Zaky Zein (5025241148)

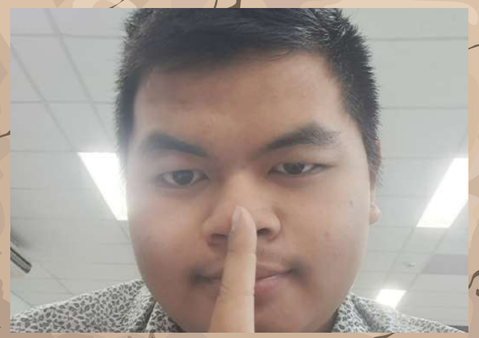


Rennard Filbert Tanjaya (5025241122)

Anggota



William Hans Chandra (5025241138)



Yoseph Kevin Hendrata (5025241146)

01

Soal

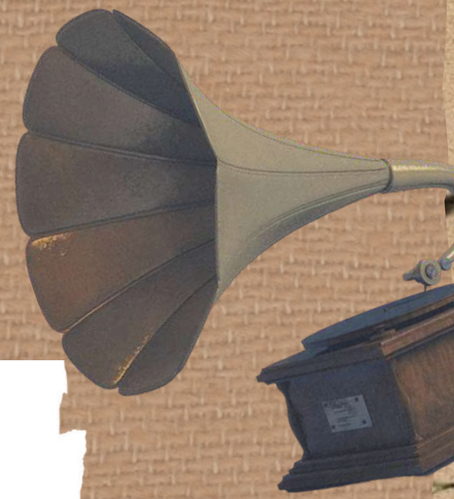
SPL

$$3x + 7y - 3z = -8$$
$$2x - 4y + 5z = 27$$
$$5x + 6y + 7z = 38$$

Matriks Augmented

$$\left(\begin{array}{ccc|c} 3 & 7 & -3 & -8 \\ 2 & -4 & 5 & 27 \\ 5 & 6 & 7 & 38 \end{array}\right)$$

02 Eliminasi Gauss



ITERASI 1:

$$B1 = B1 * \left(\frac{1}{3}\right)$$

$$B1 = \begin{bmatrix} 3 \\ 7 \\ -3 \\ -8 \end{bmatrix} * \left(\frac{1}{3}\right) = \begin{bmatrix} 1 \\ 2.33 \\ -1 \\ -2.67 \end{bmatrix}$$

Iterasi 1	b1 = b1 * (1/3)		
1	2.33	-1	-2.67
2	-4	5	27
5	6	7	38

ITERASI 2:

$$B2 = B1 * (-2) + B2$$

$$B2 = \begin{bmatrix} 1 \\ 2.33 \\ -1 \\ -2.67 \end{bmatrix} * (-2) + \begin{bmatrix} 2 \\ -4 \\ 5 \\ 27 \end{bmatrix}$$

$$B2 = \begin{bmatrix} -2 \\ -4.66 \\ 2 \\ 5.34 \end{bmatrix} + \begin{bmatrix} 2 \\ -4 \\ 5 \\ 27 \end{bmatrix} = \begin{bmatrix} 0 \\ -8.66 \\ 7 \\ 32.34 \end{bmatrix}$$

Iterasi 2	b2 = b1 * (-2) + b2		
1	2.33	-1	-2.67
0	-8.66	7	32.34
5	6	7	38

03 Eliminasi Gauss

ITERASI 3:

B3 = B1 * (-5) + B3

$$B3 = \begin{bmatrix} 1 \\ 2.33 \\ -1 \\ -2.67 \end{bmatrix} * (-5) + \begin{bmatrix} 5 \\ 6 \\ 7 \\ 38 \end{bmatrix}$$

$$B3 = \begin{bmatrix} -5 \\ -11.65 \\ 5 \\ 13.35 \end{bmatrix} + \begin{bmatrix} 5 \\ 6 \\ 7 \\ 38 \end{bmatrix} = \begin{bmatrix} 0 \\ -5.65 \\ 12 \\ 51.35 \end{bmatrix}$$

Iterasi 3	b3 = b1 * (-5) + b3		
1	2.33	-1	-2.67
0	-8.66	7	32.34
0	-5.65	12	51.35

ITERASI 4:

$$B2 = B2 * \left(-\frac{1}{8.66}\right)$$

$$B2 = \begin{bmatrix} 0 \\ -8.66 \\ 7 \\ 32.34 \end{bmatrix} * \left(-\frac{1}{8.66}\right) = \begin{bmatrix} 0 \\ 1 \\ -0.81 \\ -3.73 \end{bmatrix}$$

Iterasi 4	b2 = b2 * (-1/8.66)		
1	2.33	-1	-2.67
0	1	-0.81	-3.73
0	-5.65	12	51.35

04 Eliminasi Gauss

ITERASI 5:

B3 = B2 * (5.65) + B3

$$B3 = \begin{bmatrix} 0 \\ 1 \\ -0.81 \\ -3.73 \end{bmatrix} * (5.65) + \begin{bmatrix} 0 \\ -5.65 \\ 12 \\ 51.35 \end{bmatrix}$$

$$B3 = \begin{bmatrix} 0 \\ 5.65 \\ -4.58 \\ -21.07 \end{bmatrix} + \begin{bmatrix} 0 \\ -5.65 \\ 12 \\ 51.35 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 7.42 \\ 30.28 \end{bmatrix}$$

Iterasi 5	b3 = b2 * (5.65) + b3		
1	2.33	-1	-2.67
0	1	-0.81	-3.73
0	0	7.42	30.28

ITERASI 6:

$$B3 = B3 * \left(\frac{1}{7.42}\right)$$

$$B3 = \begin{bmatrix} 0 \\ 0 \\ 7.42 \\ 30.28 \end{bmatrix} * \left(\frac{1}{7.42}\right) = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 4.08 \end{bmatrix}$$

Iterasi 6	b3 = b3 * (1/7.42)		
1	2.33	-1	-2.67
0	1	-0.81	-3.73
0	0	1	4.08

05 Subtitusi Balik

Ditulis kembali ke bentuk SPL

$$x + 2{,}33\,y - z = -2{,}67$$
$$y - 0{,}81\,z = -3{,}73$$
$$z = 4{,}08$$

$$y - 0{,}81\,(4{,}08) = -3{,}73$$
$$y - 3{,}30 = -3{,}73$$
$$y = -0{,}43$$

$$x + 2{,}33\,(-0{,}43) - 4{,}08 = -2{,}67$$
$$x - 5.08 = -2.67$$
$$x = 2{,}41$$

Didapat $x = 2{,}41$, $y = -0{,}43$, dan $z = 4{,}08$

06

Gauss-Jordan

ITERASI 7:

B2 = B3 * (0.81) + B2

$$B2 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 4.08 \end{bmatrix} * (0.81) + \begin{bmatrix} 0 \\ 1 \\ -0.81 \\ -3.73 \end{bmatrix}$$

$$B2 = \begin{bmatrix} 0 \\ 0 \\ 0.81 \\ 3.30 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \\ -0.81 \\ -3.73 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \\ -0.43 \end{bmatrix}$$

Iterasi 7	b2 = b3 * (0.81) + b2		
1	2.33	-1	-2.67
0	1	0	-0.43
0	0	1	4.08

ITERASI 8:

B1 = B3 * (1) + B1

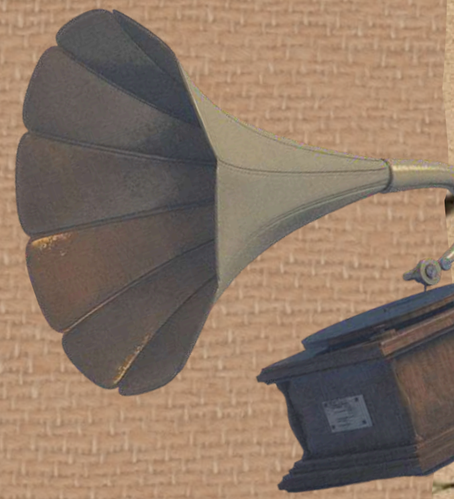
$$B1 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 4.08 \end{bmatrix} * (1) + \begin{bmatrix} 1 \\ 2.33 \\ -1 \\ -2.67 \end{bmatrix}$$

$$B1 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 4.08 \end{bmatrix} + \begin{bmatrix} 1 \\ 2.33 \\ -1 \\ -2.67 \end{bmatrix} = \begin{bmatrix} 1 \\ 2.33 \\ 0 \\ 1.41 \end{bmatrix}$$

Iterasi 8	b1 = b3 * (1) + b1		
1	2.33	0	1.41
0	1	0	-0.43
0	0	1	4.08

07

Gauss-Jordan



ITERASI 9:

B1 = B2 * (-2.33) + B1

$$B1 = \begin{bmatrix} 0 \\ 1 \\ 0 \\ -0.43 \end{bmatrix} * (-2.33) + \begin{bmatrix} 1 \\ 2.33 \\ 0 \\ 1.41 \end{bmatrix}$$

$$B1 = \begin{bmatrix} 0 \\ -2.33 \\ 0 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 \\ 2.33 \\ 0 \\ 1.41 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 2.41 \end{bmatrix}$$

Iterasi 9	b1 = b2 * (-2.33) + b1		
1	0	0	2.41
0	1	0	-0.43
0	0	1	4.08

Didapat:

x = 2,41

y = -0,43

z = 4,08

Sigma men once said

Thank you