M. Masyim Abdillah P.
1101191095 / TT-43-11

1. Diketahui $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 1 \\ -1 & 2 & -2 \end{bmatrix}$, $B = \begin{bmatrix} x & x+y & y+z \\ 2-a & b & b+2c \\ x+d & y-e & e+f \end{bmatrix}$,

$C = \begin{bmatrix} -a & 2b & x \\ 2c-1 & y & -d \\ e-y & x+c & b+y \end{bmatrix}$. Jika $A^T = B$, maka tentukan $(C^{-1})^T (B^T A)$!

2. Tentukan nilai a yang memenuhi $\begin{vmatrix} 1 & 2 & a & 1 \\ 2 & 1 & a & -a \\ 0 & 1 & 1 & 2 \\ 1 & 0 & 2 & -a \end{vmatrix} = 5a$!

3. Tentukan solusi dari SPL berikut dengan menggunakan salah satu metode yang anda ketahui.

$$\begin{aligned} 2x - 4y + z &= 6 \\ -4x + 3z &= -1 \\ y - z &= 3 \end{aligned}$$

4. Pada skala 0% - 100%, berapa skala kejujuran anda dalam mengerjakan soal kuis ini!

Langkah pengerjaan di halaman berikutnya...

1. $A^T = B$

$$\begin{bmatrix} 1 & 0 & -1 \\ 2 & -1 & 2 \\ 3 & 1 & -2 \end{bmatrix} = \begin{bmatrix} x & x+y & y+2 \\ z-a & b & b+2c \\ x+d & y-e & e+f \end{bmatrix}$$

$x = 1$ $\quad$ $z - a = 2$ $\quad$ $x + d = 3$

$x + y = 0$ $\quad$ $a = -2$ $\quad$ $d = 2$

$y = -1$ $\quad$ $b = -1$ $\quad$ $y - e = 1$

$y + 2 = -1$ $\quad$ $b + 2c = 2$ $\quad$ $e = -2$

$z = 0$ $\quad$ $c = 3/2$ $\quad$ $e + f = -2$

$f = 0$

$$C = \begin{bmatrix} -a & 2b & x \\ 2c-1 & y & -d \\ e-y & x+c & b+y \end{bmatrix} = \begin{bmatrix} 2 & -2 & 1 \\ 2 & -1 & -2 \\ -1 & 5/2 & -2 \end{bmatrix}$$

C^{-1} :

$|C| = (2.-1.-2) + (-2.-2.-1) + (1.2.5/2) - (1.-1.-1) - (-2.2.-2) - (2.-2.5/2)$

$|C| = 4 - 4 + 5 - 1 - 8 + 10 = 6$

$$C_c = \begin{bmatrix} C_{11} & C_{12} & C_{13} \\ C_{21} & C_{22} & C_{23} \\ C_{31} & C_{32} & C_{33} \end{bmatrix} = \begin{bmatrix} M_{11} & -M_{12} & M_{13} \\ -M_{21} & M_{22} & -M_{23} \\ M_{31} & -M_{32} & M_{33} \end{bmatrix} = \begin{bmatrix} 7 & 6 & 4 \\ -3/2 & -3 & -3 \\ 5 & 6 & 2 \end{bmatrix}$$

$$C_c^T = adj(C) = \begin{bmatrix} 7 & -3/2 & 5 \\ 6 & -3 & 6 \\ 4 & -3 & 2 \end{bmatrix}$$

$$C^{-1} = \frac{1}{|C|} \cdot adj(C) = \frac{1}{6} \begin{bmatrix} 7 & -3/2 & 5 \\ 6 & -3 & 6 \\ 4 & -3 & 2 \end{bmatrix} = \begin{bmatrix} 7/6 & -1/4 & 5/6 \\ 1 & -1/2 & 1 \\ 2/3 & -1/2 & 1/3 \end{bmatrix}$$

$(C^{-1})^T(B^TA) =$ karena $A^T = B$, maka $B^T = A$

$$\begin{bmatrix} 7/6 & 1 & 2/3 \\ -1/4 & -1/2 & -1/2 \\ 5/6 & 1 & 1/3 \end{bmatrix} \left(\begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 1 \\ -1 & 2 & -2 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 1 \\ -1 & 2 & -2 \end{bmatrix} \right) =$$

$$\begin{bmatrix} 7/6 & 1 & 2/3 \\ -1/4 & -1/2 & -1/2 \\ 5/6 & 1 & 1/3 \end{bmatrix} \begin{bmatrix} -2 & 6 & -1 \\ -1 & 3 & -3 \\ 1 & -8 & 3 \end{bmatrix} = \begin{bmatrix} -7/3 - 1 + 2/3 & 7 + 3 - 16/3 & -7/6 - 3 + 2 \\ 1/2 + 1/2 - 1/2 & -3/2 - 3/2 + 4 & 1/4 + 3/2 - 3/2 \\ -5/3 - 1 + 1/3 & 5 + 3 - 8/3 & -5/6 - 3 + 1 \end{bmatrix}$$

$$(C^{-1})^T(B^TA) = \begin{bmatrix} -8/3 & 14/3 & -13/6 \\ 1/2 & 1 & 1/4 \\ -7/3 & 16/3 & -17/6 \end{bmatrix}$$

2. $$\begin{vmatrix} 1 & 2 & a & 1 \\ 2 & 1 & a & -a \\ 0 & 1 & 1 & 2 \\ 1 & 0 & 2 & -a \end{vmatrix} = 5a$$

$$a_{31}C_{31} + a_{32}C_{32} + a_{33}C_{33} + a_{34}C_{34} = 5a$$

$$0 \cdot M_{31} - 1 \cdot M_{32} + 1 \cdot M_{33} - 2M_{34} = 5a$$

$$-1 \cdot \begin{vmatrix} 1 & a & 1 \\ 2 & a & -a \\ 1 & 2 & -a \end{vmatrix} + 1 \begin{vmatrix} 1 & 2 & 1 \\ 2 & 1 & -a \\ 1 & 0 & -a \end{vmatrix} - 2 \begin{vmatrix} 1 & 2 & a \\ 2 & 1 & a \\ 1 & 0 & 2 \end{vmatrix} = 5a$$

$-1(-a^2-a^2+4-a+2a^2+3a)+1(-a-2a+0-1+4a-0)-$

$2(2+2a+0-a-8-0)=5a$

$-(a+4)+(a-1)-2(a-6)=5a$

$-a-4+a-1-2a+12=5a$

$7=7a$

$a=1$ //

3. $\begin{bmatrix} 2 & -4 & 1 \\ -4 & 0 & 3 \\ 0 & 1 & -1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 6 \\ -1 \\ 3 \end{bmatrix}$

Metode crammer :

$D=(2.0.-1)+(-4.3.0)+(1.-4.1)-(1.0.0)-(-4.-4.-1)-(2.3.1)$

$D=0+0-4-0+16-6$

$D=6$

$D_x=\begin{vmatrix} 6 & -4 & 1 \\ -1 & 0 & 3 \\ 3 & 1 & -1 \end{vmatrix}=(6.0.-1)+(-4.3.3)+(1.-1.1)-(1.0.3)-(-4.-1.-1)-(6.3.1)$

$=0-36-1-0+4-18=-51$

$D_y=\begin{vmatrix} 2 & 6 & 1 \\ -4 & -1 & 3 \\ 0 & 3 & -1 \end{vmatrix}=(2.-1.-1)+(6.3.0)+(1.-4.3)-(1.-1.0)-(6.-4.-1)-(2.3.3)$

$=2+0-12-0-24-18=-52$

$D_z=\begin{vmatrix} 2 & -4 & 6 \\ -4 & 0 & -1 \\ 0 & 1 & 3 \end{vmatrix}=(2.0.3)+(4.-1.0)+(6.-4.1)-(6.0.0)-(4.-4.3)-(2.-1.1)$

$$= 0 + 0 - 24 - 0 - 40 + 2 = -70$$

$$x = \frac{D_x}{D} = \frac{-61}{6} = -\frac{17}{2}$$

$$y = \frac{D_y}{D} = \frac{-52}{6} = -\frac{26}{3}$$

$$z = \frac{D_z}{D} = \frac{-70}{6} = -\frac{35}{3}$$

4. 100% kerja mandiri