

Penyelesaian SPL dengan Metode Cramer

“Metode Cramer” untuk Menyelesaikan SPL

$$\begin{cases} a_{11}x_1 + a_{12}x_2 + \dots + a_{1n}x_n = b_1 \\ a_{21}x_1 + a_{22}x_2 + \dots + a_{2n}x_n = b_2 \\ \vdots \\ a_{m1}x_1 + a_{m2}x_2 + \dots + a_{mn}x_n = b_m \end{cases}$$



$$\underbrace{\begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{pmatrix}}_A \underbrace{\begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{pmatrix}}_X = \underbrace{\begin{pmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{pmatrix}}_B$$



$$x_i = \frac{\det(A_i)}{\det(A)}$$

$$x_1 = \frac{\det(A_1)}{\det(A)} = \frac{\begin{vmatrix} b_1 & a_{12} & \dots & a_{1n} \\ b_2 & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ b_n & a_{m2} & \dots & a_{mn} \end{vmatrix}}{\begin{vmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{vmatrix}}$$

$$x_2 = \frac{\det(A_2)}{\det(A)} = \frac{\begin{vmatrix} a_{11} & b_1 & \dots & a_{1n} \\ a_{21} & b_2 & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & b_n & \dots & a_{mn} \end{vmatrix}}{\begin{vmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{vmatrix}}$$

$$x_n = \frac{\det(A_n)}{\det(A)} = \frac{\begin{vmatrix} a_{11} & a_{12} & \dots & b_1 \\ a_{21} & a_{22} & \dots & b_2 \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & b_n \end{vmatrix}}{\begin{vmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{vmatrix}}$$

Keterangan:

$\det(A)$ determinan matriks A ,
 $\det(A_i)$ determinan matriks A yang kolom ke- i diganti dengan matriks B

Contoh - Metode Cramer

$$x_i = \frac{\det(A_i)}{\det(A)}$$

Selesaikan sistem persamaan linear berikut!

$$\text{a. } \begin{cases} x + y = 2 \\ x - y = 2 \end{cases}$$

$$\text{b. } \begin{cases} x + 2y + 3z = 1 \\ 2x + 5y + 3z = 6 \\ x + 8z = -6 \end{cases}$$