

$$x = 1$$

$$y = -1$$

$$z = 4$$

$$\begin{cases} -x + 2y + z = 1 \\ 3x - y - z = 0 \\ 2x - 4y + z = 10 \end{cases}$$

$$\text{nowy wektor} = A \cdot \text{stary wektor}$$

$$\begin{bmatrix} 1 \\ 0 \\ 10 \end{bmatrix} = \begin{bmatrix} -1 & 2 & 1 \\ 3 & -1 & -1 \\ 2 & -4 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

język „skalarów”

„język macierzy”

W domu:

• sprawdź, czy

$$A^{-1}A = I = AA^{-1}$$

• oblicz

$$x = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

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

$$b = Ax$$

$$A^{-1}b = A^{-1}Ax$$

$$A^{-1}b = Ix$$



$$\begin{array}{l} w_1 \\ w_2 \\ w_3 \end{array} \left[\begin{array}{ccc|ccc} -1 & 2 & 1 & 1 & 0 & 0 \\ 3 & -1 & -1 & 0 & 1 & 0 \\ 2 & -4 & 1 & 0 & 0 & 1 \end{array} \right] \begin{array}{l} w_1 \leftarrow w_1 + w_2 \\ w_3 \leftarrow w_3 + w_2 \end{array}$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 2 & 1 & 0 & 1 & 1 & 0 \\ 3 & -1 & -1 & 0 & 1 & 0 \\ 5 & -5 & 0 & 0 & 1 & 1 \end{array} \right] \begin{array}{l} w_2 \leftarrow w_2 + w_1 \\ w_3 \leftarrow w_3 + 5w_1 \end{array}$$

gdzieś jest błąd

$$\left[\begin{array}{ccc} \frac{1}{3} & \frac{2}{5} & \frac{1}{15} \\ \frac{1}{3} & \frac{1}{5} & -\frac{2}{15} \\ \frac{2}{3} & 0 & \frac{1}{3} \end{array} \right]$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 2 & 1 & 0 & 1 & 1 & 0 \\ 5 & 0 & -1 & 1 & 2 & 0 \\ 15 & 0 & 0 & 5 & 2 & 1 \end{array} \right] \xrightarrow{w_3 \leftarrow w_3 / 15}$$

$$\left[\begin{array}{ccc|ccc} I & & & & & \end{array} \right] A^{-1}$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 2 & 1 & 0 & 1 & 1 & 0 \\ 5 & 0 & -1 & 1 & 2 & 0 \\ 1 & 0 & 0 & \frac{1}{3} & \frac{2}{15} & \frac{1}{15} \end{array} \right] \begin{array}{l} w_1 \leftarrow w_1 - 2w_3 \\ w_2 \leftarrow w_2 - 5w_3 \end{array}$$

$$\left[\begin{array}{ccc|ccc} 0 & 1 & 0 & \frac{1}{3} & \frac{11}{15} & -\frac{2}{15} \\ 0 & 0 & -1 & -\frac{2}{3} & \frac{1}{3} & -\frac{1}{3} \\ 1 & 0 & 0 & \frac{1}{3} & \frac{2}{15} & \frac{1}{15} \end{array} \right] \begin{array}{l} w_1 \leftarrow w_3 \\ w_2 \leftarrow w_1 \\ w_3 \leftarrow w_2 \end{array}$$

$$A^{-1}$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{1}{3} & \frac{2}{15} & \frac{1}{15} \\ 0 & 1 & 0 & \frac{1}{3} & \frac{11}{15} & -\frac{2}{15} \\ 0 & 0 & 1 & \frac{2}{3} & -\frac{4}{3} & \frac{1}{3} \end{array} \right]$$