

Zadanie 2

$$A = \{\alpha_1, \alpha_2, \alpha_3\}$$

$$\alpha_1 = (1, 2, 4) \quad \alpha_2 = (1, 3, 4) \quad \alpha_3 = (2, 5, 9)$$

$$A^* = \{\alpha_1^*, \alpha_2^*, \alpha_3^*\}$$

$$\alpha_i^*((x_1, x_2, x_3)) = a_{i1}x_1 + a_{i2}x_2 + a_{i3}x_3$$

$$\alpha_i^*(\alpha_i) = 1 \quad \alpha_i(\alpha_j) = 0 \text{ dla } j \neq i$$

$$\alpha_1^* : \begin{array}{l} \alpha_1^*((1, 2, 4)) = 1 \\ \alpha_1^*((1, 3, 4)) = 0 \\ \alpha_1^*((2, 5, 9)) = 0 \end{array} \quad \left[\begin{array}{ccc|c} 1 & 2 & 4 & 1 \\ 1 & 3 & 4 & 0 \\ 2 & 5 & 9 & 0 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 2 & 4 & 1 \\ 0 & 1 & 0 & -1 \\ 0 & 1 & 1 & -2 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 4 & 3 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \end{array} \right]$$

$$\alpha_1^*((x_1, x_2, x_3)) = 7x_1 - 1x_2 - x_3$$

α_2^* : analogicznie:

$$\left[\begin{array}{ccc|c} 1 & 2 & 4 & 0 \\ 1 & 3 & 4 & 1 \\ 2 & 5 & 9 & 0 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 2 & 4 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 4 & -2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -1 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -1 \end{array} \right]$$

$$\alpha_2^*((x_1, x_2, x_3)) = 2x_1 + x_2 - x_3$$

α_3^* : analogicznie

$$\left[\begin{array}{ccc|c} 1 & 2 & 4 & 0 \\ 1 & 3 & 4 & 0 \\ 2 & 5 & 9 & 1 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 4 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array} \right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & -4 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array} \right]$$

$$\alpha_3^*((x_1, x_2, x_3)) = -4x_1 + x_3$$