

4.3 Cvičení - Hodnost matice

1. Určete hodnosti daných matic:

$$\text{a) } \begin{bmatrix} 1 & 3 & 2 & 4 \\ 0 & 2 & 1 & 3 \\ 0 & 1 & 0 & 2 \end{bmatrix}; \{3\}, \quad \text{b) } \begin{bmatrix} 0 & -3 & 4 \\ 1 & -6 & 8 \\ 0 & 3 & -4 \\ 0 & -\frac{3}{2} & 2 \end{bmatrix}; \{2\}, \quad \text{c) } \begin{bmatrix} 1 & -1 & 0 \\ 0 & -2 & 1 \\ 2 & 4 & -3 \end{bmatrix}; \{2\},$$

$$\text{d) } \begin{bmatrix} 1 & 0 & 2 & 3 \\ -2 & 1 & 0 & -1 \\ -1 & 1 & 2 & 2 \\ -1 & 2 & 6 & 7 \end{bmatrix}; \{2\}, \quad \text{e) } \begin{bmatrix} 3 & -1 & 5 & 2 \\ 1 & -4 & 6 & 1 \\ 7 & 5 & 3 & 4 \\ 9 & -14 & 28 & 7 \end{bmatrix}; \{2\},$$

$$\text{f) } \begin{bmatrix} 1 & -4 & 2 & 0 \\ 2 & -3 & -1 & 5 \\ 3 & -7 & 1 & -5 \\ 0 & 1 & -1 & -1 \end{bmatrix}; \{3\}, \quad \text{g) } \begin{bmatrix} 1 & -2 & 3 & 4 \\ 5 & 1 & 1 & -2 \\ -2 & -7 & 8 & 14 \\ 4 & 3 & -2 & -6 \\ -3 & -5 & 4 & 7 \end{bmatrix}; \{3\},$$

$$\text{h) } \begin{bmatrix} 2 & 1 & 11 & 2 \\ -1 & 0 & 4 & 1 \\ 5 & 4 & 56 & 11 \\ 6 & -1 & 5 & 2 \end{bmatrix}; \{3\}, \quad \text{i) } \begin{bmatrix} 0 & 1 & 0 & 1 & 0 \\ 2 & 0 & 2 & 0 & 2 \\ 0 & 1 & 0 & 1 & 0 \\ 2 & 1 & 0 & 2 & 1 \end{bmatrix}; \{3\},$$

$$\text{j) } \begin{bmatrix} 0 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 \end{bmatrix}; \{5\}, \quad \text{k) } \begin{bmatrix} 0 & 0 & 1 & 3 & 6 & 0 \\ 1 & 2 & 3 & 14 & 32 & 3 \\ 1 & 0 & 0 & 1 & 4 & 1 \\ 4 & 5 & 6 & 32 & 77 & 9 \\ 0 & 1 & 0 & 2 & 5 & 1 \end{bmatrix}, \{3\}.$$

2. Dané soustavy řešte Gaussovou (Gaussovou–Jordanovou) eliminací:

$$\begin{array}{lll} \text{a)} & 2x - y + 3z = 5, & \text{b)} \quad x + y + z = 0, & \text{c)} \quad x + 2y - z = 0, \\ & 4x + y = 13, & x - y + z = 2, & -x + y = 5, \\ & 3x + 4z = 4, & x - y - z = 10, & x + 2z = 6, \end{array}$$

$$\begin{array}{lll} \text{d)} & x - 2y + z = 9, & \text{e)} \quad x + 2y + 3z = 3, & \text{f)} \quad 2x + y + z = 3, \\ & 3x + y = 1, & 2x + 3y + 4z = 2, & 4x + 3z = 5, \\ & -2x - 3y - z = 0, & -3x - 5y + 2z = 4, & 3x + 2y = 1. \end{array}$$

$$\begin{array}{l} \text{g)} \quad 2x - y - 2z = 5, \\ \quad \quad 3x - y = 1, \\ \quad \quad 5x + 4z = -2. \end{array}$$