# BONUS 2 – ŘEŠENÍ

① a)
$$\left(\begin{array}{ccc|c} \textcircled{1} & 1 & 2 & 4 \\ 1 & 3 & 1 & 5 \\ 1 & 5 & -1 & 3 \end{array}\right) \begin{matrix} \\ \cdot(-1) \\ \cdot(-1) \end{matrix} \sim \left(\begin{array}{ccc|c} 1 & 1 & 2 & 4 \\ 0 & \textcircled{2} & -1 & 1 \\ 0 & 4 & -3 & -1 \end{array}\right) \begin{matrix} \\ \\ \cdot(-2) \end{matrix} \sim \left(\begin{array}{ccc|c} 1 & 1 & 2 & 4 \\ 0 & 2 & -1 & 1 \\ 0 & 0 & -1 & -3 \end{array}\right)$$

$x_3 = 3$ | $2x_2 - 3 = 1$ | $x_1 + 2 + 6 = 4$

$2x_2 = 4$

$x_2 = 2$

$x_1 = -4$

b)
$$\begin{pmatrix} 1 & 1 & 2 \\ 1 & 3 & 1 \\ 1 & 5 & -1 \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \\ 3 \end{pmatrix}$$

② $$\begin{vmatrix} 2-\lambda & 3 \\ 1 & 4-\lambda \end{vmatrix} = (2-\lambda)(4-\lambda) - 3 = \lambda^2 - 6\lambda + 5 = (\lambda - 1)(\lambda - 5)$$

$\lambda_1 = 1$ | $\lambda_2 = 5$

VLASTNÍ VEKTORY:

$\lambda_1 = 1$: $\begin{pmatrix} 1 & 3 \\ 1 & 3 \end{pmatrix} \cdot \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \Rightarrow u_1 + 3u_2 = 0$

$u_1 = -3u_2 \Rightarrow \begin{pmatrix} -3 \\ 1 \end{pmatrix}$

$\lambda_2 = 5$: $\begin{pmatrix} -3 & 3 \\ 1 & -1 \end{pmatrix} \cdot \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \Rightarrow u_1 - u_2 = 0 \Rightarrow \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$u_1 = u_2$