

$$A = \begin{pmatrix} 3 & -6 & 3 \\ 9 & -6 & 0 \\ -9 & 0 & 3 \end{pmatrix}$$

REGULARNÁ MATICA

$$|A| = -54 \neq 0 \Rightarrow \exists A^{-1}$$

$$A_{11} = (-1)^{1+1} \begin{vmatrix} -6 & 0 \\ 0 & 3 \end{vmatrix} = 1 \cdot (-6 \cdot 3 - 0 \cdot 0) = -18$$

$$A_{12} = (-1)^{1+2} \begin{vmatrix} 9 & 0 \\ -9 & 3 \end{vmatrix} = -1 (9 \cdot 3 - 0 \cdot (-9)) = -27$$

$$A_{13} = (-1)^{1+3} \begin{vmatrix} 9 & -6 \\ -9 & 0 \end{vmatrix} = 1 (9 \cdot 0 - (-6) \cdot (-9)) = -54$$

$$A_{21} = (-1)^{2+1} \begin{vmatrix} -6 & 3 \\ 0 & 3 \end{vmatrix} = -1 (-6 \cdot 3 - 3 \cdot 0) = 18$$

$$A_{22} = (-1)^{2+2} \begin{vmatrix} 3 & 3 \\ -9 & 3 \end{vmatrix} = 1 (3 \cdot 3 - 3 \cdot (-9)) = 36$$

$$A_{23} = (-1)^{2+3} \begin{vmatrix} 3 & -6 \\ -9 & 0 \end{vmatrix} = -1 (3 \cdot 0 - (-6) \cdot (-9)) = +54$$

$$A_{31} = (-1)^{3+1} \begin{vmatrix} -6 & 3 \\ -6 & 0 \end{vmatrix} = 1 (-6 \cdot 0 - 3 \cdot (-6)) = 18$$

$$A_{32} = (-1)^{3+2} \begin{vmatrix} 3 & 3 \\ 9 & 0 \end{vmatrix} = -1 (3 \cdot 0 - 3 \cdot 9) = 27$$

$$A_{33} = (-1)^{3+3} \begin{vmatrix} 3 & -6 \\ 9 & -6 \end{vmatrix} = 1 (3 \cdot (-6) - (-6) \cdot 9) = 36$$

$$A^{-1} = \frac{1}{|A|} \begin{pmatrix} A_{11} & A_{21} & A_{31} \\ A_{12} & A_{22} & A_{32} \\ A_{13} & A_{23} & A_{33} \end{pmatrix} = \frac{1}{-54} \begin{pmatrix} -18 & 18 & 18 \\ -24 & 36 & 27 \\ -54 & 54 & 36 \end{pmatrix} =$$

$$= -\frac{1}{54} \cdot 9 \begin{pmatrix} -2 & 2 & 2 \\ -3 & 4 & 3 \\ -6 & 6 & 4 \end{pmatrix} = -\frac{1}{6} \begin{pmatrix} -2 & 2 & 2 \\ -3 & 4 & 3 \\ -6 & 6 & 4 \end{pmatrix}$$

POMOCOU GAUSSOVEJ ELIMINÁCIE

$$(A|E) \approx \dots \approx (E|A^{-1})$$

$$(A|E) = \left( \begin{array}{ccc|ccc} 3 & -6 & 3 & 1 & 0 & 0 \\ 9 & -6 & 0 & 0 & 1 & 0 \\ -9 & 0 & 3 & 0 & 0 & 1 \end{array} \right) \begin{array}{l} -3R_1 \\ +3R_1 \end{array} \approx \left( \begin{array}{ccc|ccc} 3 & -6 & 3 & 1 & 0 & 0 \\ 0 & 12 & -9 & -3 & 1 & 0 \\ 0 & -18 & 12 & 3 & 0 & 1 \end{array} \right) \begin{array}{l} \cdot 3 \\ \cdot 2 \end{array} \approx$$

$$\approx \left( \begin{array}{ccc|ccc} 3 & -6 & 3 & 1 & 0 & 0 \\ 0 & 36 & -27 & -9 & 3 & 0 \\ 0 & -36 & 24 & 6 & 0 & 2 \end{array} \right) \begin{array}{l} :3 \\ +R_2 \end{array} \approx \left( \begin{array}{ccc|ccc} 3 & -6 & 3 & 1 & 0 & 0 \\ 0 & 12 & -9 & -3 & 1 & 0 \\ 0 & 0 & -3 & -3 & 3 & 2 \end{array} \right) \begin{array}{l} +R_3 \\ -3R_3 \end{array} \approx$$

$$\approx \left( \begin{array}{ccc|ccc} 3 & -6 & 0 & -2 & 3 & 2 \\ 0 & 12 & 0 & 6 & -8 & 6 \\ 0 & 0 & -3 & -3 & 3 & 2 \end{array} \right) \begin{array}{l} :2 \\ \cdot (-1) \end{array} \approx \left( \begin{array}{ccc|ccc} 3 & -6 & 0 & 2 & 3 & 2 \\ 0 & 6 & 0 & 3 & -4 & 3 \\ 0 & 0 & 3 & 3 & -3 & 2 \end{array} \right) \begin{array}{l} +R_2 \end{array} \approx$$

$$\approx \left( \begin{array}{ccc|ccc} 3 & 0 & 0 & 1 & -1 & -1 \\ 0 & 6 & 0 & 3 & -4 & 3 \\ 0 & 0 & 3 & 3 & -3 & 2 \end{array} \right) \begin{array}{l} :3 \\ :6 \\ :3 \end{array} \approx \left( \begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{1}{3} & -\frac{1}{3} & -\frac{1}{3} \\ 0 & 1 & 0 & \frac{3}{6} & -\frac{4}{6} & -\frac{3}{6} \\ 0 & 0 & 1 & \frac{3}{3} & -\frac{3}{3} & \frac{2}{3} \end{array} \right) = (E|A^{-1})$$

$$A^{-1} = \begin{pmatrix} \frac{1}{3} & -\frac{1}{3} & -\frac{1}{3} \\ \frac{3}{6} & -\frac{4}{6} & -\frac{3}{6} \\ \frac{3}{3} & -\frac{3}{3} & -\frac{2}{3} \end{pmatrix} = \begin{pmatrix} \frac{2}{6} & -\frac{2}{6} & -\frac{2}{6} \\ \frac{3}{6} & -\frac{4}{6} & -\frac{3}{6} \\ \frac{6}{6} & -\frac{6}{6} & -\frac{4}{6} \end{pmatrix} = \frac{1}{6} \begin{pmatrix} 2 & -2 & -2 \\ 3 & -4 & -3 \\ 6 & -6 & -4 \end{pmatrix}$$