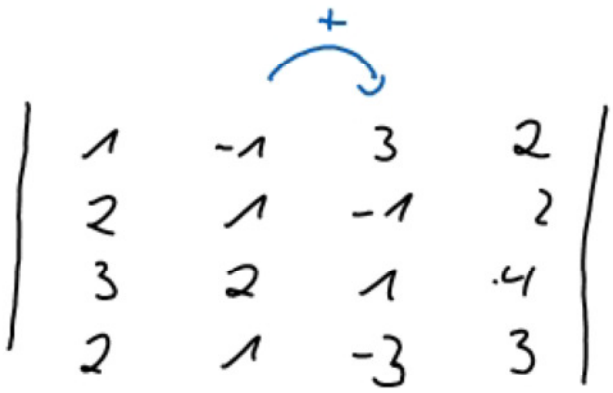

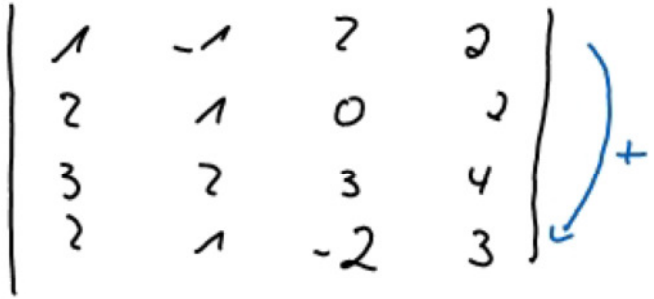

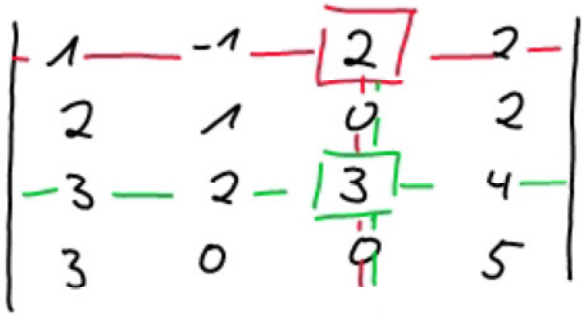

Entwicklung nach der 3. Spalte

Adjunkte

$2 \cdot A_{13} + 3 \cdot A_{33}$

$2 \cdot (-1)^{1+3} \cdot \begin{vmatrix} 2 & 1 & 2 \\ 3 & 2 & 4 \\ 3 & 0 & 5 \end{vmatrix} + 3 \cdot (-1)^{3+3} \begin{vmatrix} 1 & -1 & 2 \\ 2 & 1 & 2 \\ 3 & 0 & 5 \end{vmatrix}$

$$\begin{vmatrix} 2 & 1 & 2 \\ 3 & 2 & 4 \\ 3 & 0 & 5 \end{vmatrix} = \begin{matrix} 20 + 12 + 0 \\ \ominus \\ 12 + 15 + 0 \end{matrix} \quad 32 - 27 = 5$$

$$\begin{vmatrix} 1 & -1 & 2 \\ 2 & 1 & 2 \\ 3 & 0 & 5 \end{vmatrix} = \begin{matrix} 5 - 6 + 0 \\ \ominus \\ 6 - 10 + 0 \end{matrix} \quad -1 - (-4) = 3$$

$$\begin{aligned} \text{Det}(A) &= 2 \cdot (-1)^4 \cdot 5 + 3 \cdot (-1)^6 \cdot 3 \\ &= 10 + 9 \\ &= 19 \neq 0 \end{aligned}$$

$\Rightarrow$ regulär

$\Rightarrow$ Dimension 4 (Basis)

$\Rightarrow$ Rang $(A) = 4$

$$A = \begin{pmatrix} 1 & 3 & 3 \\ 2 & -2 & 1 \\ 1 & 3 & 2 \end{pmatrix}, \quad \det(A) = \begin{matrix} -4 + 18 + 3 \\ \ominus \\ -6 + 12 + 3 \end{matrix} \Big\} \begin{matrix} 17 \\ - \\ 9 \end{matrix} \Big\} 8$$

$$\det(A) = 8 \neq 0 \Rightarrow A \text{ ist regulär}$$

$$A_{11} = +\begin{vmatrix} -2 & 1 \\ 3 & 2 \end{vmatrix} = -7 \quad A_{12} = -\begin{vmatrix} 2 & 1 \\ 1 & 2 \end{vmatrix} = -3 \quad A_{13} = +\begin{vmatrix} 2 & -2 \\ 1 & 3 \end{vmatrix} = 8$$

$$A_{21} = -\begin{vmatrix} 3 & 3 \\ 3 & 2 \end{vmatrix} = +3 \quad A_{22} = +\begin{vmatrix} 1 & 3 \\ 1 & 2 \end{vmatrix} = -1 \quad A_{23} = -\begin{vmatrix} 1 & 3 \\ 1 & 3 \end{vmatrix} = 0$$

$$A_{31} = +\begin{vmatrix} 3 & 3 \\ -2 & 1 \end{vmatrix} = 9 \quad A_{32} = -\begin{vmatrix} 1 & 3 \\ 2 & 1 \end{vmatrix} = +5 \quad A_{33} = +\begin{vmatrix} 1 & 3 \\ 2 & -2 \end{vmatrix} = -8$$

$$A^{-1} = \frac{1}{8} \cdot \begin{pmatrix} -7 & -3 & 8 \\ 3 & -1 & 0 \\ 9 & 5 & -8 \end{pmatrix}^T$$

$$A \cdot \vec{x} = \vec{b}$$

$$\vec{x} = A^{-1} \cdot \vec{b}$$

$$\vec{x} = \frac{1}{18} \cdot \begin{pmatrix} -7 & 3 & 9 \\ -3 & -1 & 5 \\ 8 & 0 & -8 \end{pmatrix} \cdot \begin{pmatrix} 24 \\ -16 \\ 32 \end{pmatrix}$$

$$\begin{pmatrix} -7 & 3 & 9 \\ -3 & -1 & 5 \\ 8 & 0 & -8 \end{pmatrix} \cdot \begin{pmatrix} 3 \\ -2 \\ 4 \end{pmatrix} = \begin{pmatrix} -21 - 6 + 36 \\ -9 + 2 + 20 \\ 24 + 0 - 32 \end{pmatrix} = \begin{pmatrix} 9 \\ 13 \\ -8 \end{pmatrix}$$