

# LINAC Ü11

4.7.7.  $a_i^*: \mathbb{R}^{6 \times 1} \rightarrow \mathbb{R} \quad i \in \{1, 2, 3\}$

$$\langle a_1^*, \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{pmatrix} \rangle = x_1 + 2x_2 - x_4 + 3x_5 + 6x_6$$

$$\langle a_2^*, \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{pmatrix} \rangle = 2x_1 + x_2 + 4x_3 + 3x_4 + x_6$$

$$\langle a_3^*, \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{pmatrix} \rangle = x_2 - x_4 - x_5$$

ges: Basis von  $\ker a_1^* \cap \ker a_2^* \cap \ker a_3^*$

$$\left( \begin{array}{cccccc|c} 1 & 2 & 0 & -1 & 3 & 6 & 0 \\ 2 & 1 & 4 & 3 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 & -1 & 0 & 0 \end{array} \right) \xrightarrow{-2 \cdot \text{III}} \left( \begin{array}{cccccc|c} 1 & 0 & 0 & 1 & 5 & 6 & 0 \\ 2 & 0 & 4 & 4 & 1 & 1 & 0 \\ 0 & 1 & 0 & -1 & -1 & 0 & 0 \end{array} \right)$$

$$\xrightarrow{-2 \cdot \text{I}} \left( \begin{array}{cccccc|c} 1 & 0 & 0 & 1 & 5 & 6 & 0 \\ 0 & 0 & 4 & 2 & -9 & -11 & 0 \\ 0 & 1 & 0 & -1 & -1 & 0 & 0 \end{array} \right) \xrightarrow{(-4) \cdot \text{III}} \left( \begin{array}{cccccc|c} 1 & 0 & 0 & 1 & 5 & 6 & 0 \\ 0 & 0 & 1 & \frac{1}{2} & -\frac{9}{4} & -\frac{11}{4} & 0 \\ 0 & 1 & 0 & -1 & -1 & 0 & 0 \end{array} \right)$$

$$r=3 \quad n=6 \quad \dim = n-r=3$$

$$\left( \begin{array}{ccc|c} -1 & -5 & -6 \\ -\frac{1}{2} & \frac{9}{4} & \frac{11}{4} \\ 1 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array} \right) \Rightarrow \left( \begin{array}{ccc|c} -1 & -5 & -6 \\ -\frac{1}{2} & \frac{9}{4} & \frac{11}{4} \\ 1 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array} \right) \text{ bilden eine Basis von } \ker a_1^* \cap \ker a_2^* \cap \ker a_3^*$$