

$$\begin{array}{cccc|c} 1 & 2 & -1 & 2 & z_1 \\ 2 & 5 & -1 & 5 & z_2 \\ 1 & 3 & 1 & 2 & z_3 \end{array}$$

$$\begin{array}{cccc|c} 1 & 2 & -1 & 2 & z_1 \\ 0 & 1 & 1 & 1 & z_2 - 2z_1 \\ 0 & 1 & 2 & 0 & z_3 - z_1 \end{array}$$

$$\begin{array}{cccc|c} 1 & 2 & -1 & 2 & z_1 \\ 0 & 1 & 1 & 1 & z_2 \\ 0 & 0 & 1 & -1 & z_3 - z_2 \end{array}$$

Basis ^{l.u.} von Kern: $\left(\begin{pmatrix} -3 \\ 2 \\ -1 \\ \mu \end{pmatrix} \right)$

$$\text{Rang}(A) = 3$$

$$\dim(\text{SR}(A)) = 3$$

$$\text{RWE: } -x_4 = \mu \Rightarrow x_4 = -\mu \in \mathbb{R}$$

$$x_3 - x_4 = 0 \Rightarrow x_3 = -\mu$$

$$x_2 + x_3 + x_4 = 0 \Rightarrow x_2 = 2\mu$$

$$x_1 + 2x_2 - x_3 + 2x_4 = 0 \Rightarrow x_1 = -3\mu$$

$$\text{Kern}(A) = \left\{ \mu \begin{pmatrix} -3 \\ 2 \\ -1 \\ \mu \end{pmatrix}, \mu \in \mathbb{R} \right\}$$