

LINAG Ü3

6.3.9 a)

$\alpha: \mathbb{R}^{3 \times 1} \rightarrow \mathbb{R}^{4 \times 1}$

$$\begin{array}{c}
 \text{a)} \quad \left( \begin{array}{cccc|cccc}
 1 & 2 & 3 & 2 & 1 & 0 & 1 & 1 \\
 0 & 0 & 2 & -1 & 0 & 0 & 2 & -1 \\
 1 & 2 & 2 & 1 & 1 & 0 & 0 & 0 \\
 -1 & -3 & -5 & -3 & -1 & -1 & -2 & -2 \\
 3 & 4 & 6 & 2 & 3 & -2 & 3 & -1 \\
 0 & 1 & 2 & 1 & 0 & 1 & 0 & 1 \\
 6 & 11 & 14 & 6 & 6 & -1 & 3 & 0
 \end{array} \right) \rightsquigarrow \left( \begin{array}{cccc|cccc}
 1 & 0 & 1 & 1 & 1 & 0 & 0 & 1 \\
 0 & 0 & 2 & -1 & 0 & 0 & 2 & -1 \\
 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
 -1 & -1 & -2 & -2 & -1 & -1 & 0 & -2 \\
 3 & -2 & 2 & -1 & 3 & -2 & 3 & -1 \\
 0 & 1 & 1 & 1 & 0 & 1 & 0 & 1 \\
 6 & -1 & 3 & 0 & 6 & -1 & 3 & 0
 \end{array} \right) \rightsquigarrow \left( \begin{array}{cccc|cccc}
 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\
 0 & 0 & 3 & -1 & 0 & 0 & 3 & -1 \\
 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
 -1 & -1 & 0 & -2 & -1 & -1 & 0 & -2 \\
 3 & -2 & 3 & -1 & 3 & -2 & 3 & -1 \\
 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\
 6 & -1 & 3 & 0 & 6 & -1 & 3 & 0
 \end{array} \right) \rightsquigarrow \left( \begin{array}{cccc|cccc}
 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \\
 -1 & 1 & 0 & 0 & -1 & 1 & 0 & 0 \\
 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
 -2 & 0 & -1 & -1 & -2 & 0 & -1 & -1 \\
 -1 & 1 & 3 & -2 & -1 & 1 & 3 & -2 \\
 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\
 0 & 1 & 6 & -1 & 0 & 1 & 6 & -1
 \end{array} \right) \rightsquigarrow \left( \begin{array}{cccc|cccc}
 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \\
 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\
 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
 -2 & 0 & -1 & -1 & -2 & 0 & -1 & -1 \\
 0 & 1 & 3 & -2 & 0 & 1 & 3 & -2 \\
 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\
 1 & 1 & 6 & -1 & 1 & 1 & 6 & -1
 \end{array} \right) \rightsquigarrow \left( \begin{array}{cccc|cccc}
 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\
 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
 -2 & 0 & -1 & -1 & -2 & 0 & -1 & -1 \\
 0 & 1 & 3 & -2 & 0 & 1 & 3 & -2 \\
 1 & 0 & -1 & 1 & 1 & 0 & -1 & 1 \\
 1 & 1 & 5 & -1 & 1 & 1 & 5 & -1
 \end{array} \right)
 \end{array}$$

$$\alpha = \tau_+ \circ f_\alpha \text{ mit } t = \begin{pmatrix} -1 \\ -2 \\ 1 \\ -1 \end{pmatrix} \text{ und } f_\alpha \text{ festgelegt durch } \begin{pmatrix} -2 & 0 & 1 \\ 0 & 1 & 3 \\ 1 & 0 & -1 \\ 1 & 1 & 5 \end{pmatrix}$$

$$\text{b) } a = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \quad \alpha(a) = \begin{pmatrix} -2 \\ 0 \\ 1 \\ 1 \end{pmatrix} + \begin{pmatrix} 0 \\ 1 \\ 0 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ 3 \\ -1 \\ 5 \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \\ 0 \\ 7 \end{pmatrix}$$

$$\alpha = \tau_{\begin{pmatrix} -1 \\ 4 \\ 0 \\ 7 \end{pmatrix}} \circ f_\alpha \circ \tau_{\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}}$$