

$$\text{Nr. 1) } E_1: x_1 - x_2 + 2x_3 = 7 \quad | \cdot 1$$

$$\text{a) } E_2: 6x_1 + x_2 - x_3 = -7 \quad | \cdot 1$$

$$x_1 - x_2 + 2x_3 = 7$$

$$7x_1 + x_3 = 0 \Rightarrow 7x_1 = -x_3 \Rightarrow x_1 = -\frac{1}{7}x_3$$

$$\text{wähle } x_3 = 7t \Rightarrow x_1 = -t$$

$$x_2 = -7 + x_1 + 2x_3 \Rightarrow x_2 = -7 - t + 2 \cdot 7t \Rightarrow x_2 = -7 + 13t$$

$$g: \vec{x} = \begin{pmatrix} 0 \\ -7 \\ 0 \end{pmatrix} + \begin{pmatrix} -t \\ 13t \\ 7t \end{pmatrix} = \begin{pmatrix} 0 \\ -7 \\ 0 \end{pmatrix} + t \begin{pmatrix} -1 \\ 13 \\ 7 \end{pmatrix}$$

$$\text{b) } E_1: x_1 + 5x_3 = 8 \Rightarrow x_1 = 8 - 5x_3 \text{ wähle } x_3 = t$$

$$E_2: x_1 + x_2 + x_3 = 1 \Rightarrow x_2 = 1 - x_1 - x_3$$

$$x_1 = 8 - 5t$$

$$x_2 = 1 - (8 - 5t) - t = -7 + 4t$$

$$x_3 = 0 + 1 \cdot t$$

$$g: \vec{x} = \begin{pmatrix} 8 \\ -7 \\ 0 \end{pmatrix} + t \begin{pmatrix} -5 \\ 4 \\ 1 \end{pmatrix}$$

$$\text{c) } E_1: 3x_1 + 2x_2 - 2x_3 = -1 \quad | \cdot 1$$

$$E_2: x_1 - 4x_2 - 2x_3 = 9 \quad | \cdot (-1)$$

$$3x_1 + 2x_2 - 2x_3 = -1$$

$$2x_1 + 6x_2 = -10 \Rightarrow 2x_1 = -10 - 6x_2 \Rightarrow x_1 = -5 - 3x_2$$

$$x_2 = 1 \cdot t$$

$$x_1 = -5 - 3t$$

$$-2x_3 = -1 - 3x_1 - 2x_2 \Rightarrow x_3 = +\frac{1}{2} + \frac{3}{2}(-5 - 3t) + 1 \cdot (t) = -7 - \frac{7}{2}t$$

$$g: \vec{x} = \begin{pmatrix} -5 \\ 0 \\ -7 \end{pmatrix} + t \begin{pmatrix} -3 \\ 1 \\ -\frac{7}{2} \end{pmatrix} = \begin{pmatrix} -5 \\ 0 \\ -7 \end{pmatrix} + t \begin{pmatrix} -6 \\ 2 \\ -7 \end{pmatrix}$$

$$\text{d) } E_1: 4x_2 = 5 \Rightarrow x_2 = \frac{5}{4}$$

$$E_2: 6x_1 + 5x_3 = 0 \Rightarrow x_1 = -\frac{5}{6}x_3; \text{ für } x_3 = 6t \Rightarrow x_1 = -5t$$

$$\Rightarrow g: \vec{x} = \begin{pmatrix} 0 \\ \frac{5}{4} \\ 0 \end{pmatrix} + t \begin{pmatrix} -5 \\ 0 \\ 6 \end{pmatrix}$$