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GLEICHUNGSSYSTEME (II)

1)

$$\begin{array}{cccc|c} -1 & 2 & 6c & & 2 \\ 2 & -3 & -9c & & -4 \\ -1 & 3 & 3c^2 & & 11-c^2 \end{array} \quad \begin{array}{l} \\ \text{II} + 2\cdot\text{I} \\ \\ \end{array} \quad \begin{array}{l} \\ \\ \text{III} - \text{I} \end{array}$$

$$\begin{array}{cccc|c} -1 & 2 & 6c & & 2 \\ 0 & 1 & 3c & & 0 \\ 0 & 1 & 3c^2-6c & & 9-c^2 \end{array} \quad \begin{array}{l} \\ \\ \text{III} - \text{II} \end{array}$$

$$\begin{array}{cccc|c} -1 & 2 & 6c & & 2 \\ 0 & 1 & 3c & & 0 \\ 0 & 0 & 3c^2-9c & & 9-c^2 \end{array} \quad \Leftrightarrow \quad 3c\,(c-3)\,x_3 = -(c+3)(c-3)$$

1. Fall: $c = 0$: $0x_3 = 9$ (f) ; k. Lsg ; $L = \{\}$

2. Fall: $c = 3$: $0x_3 = 0$ (w) ; ∞ viele Lsgen

3. Fall: $c \in \mathbb{R} \setminus \{0; 3\}$: genau eine Lsg.

Lösungsmengen: 1. Fall: $c = 0$: $L = \{\}$

2. Fall: $c = 3$

$$\begin{array}{cccc|c} -1 & 2 & 18 & & 2 \\ 0 & 1 & 9 & & 0 \\ 0 & 0 & 0 & & 0 \end{array}$$

$-x_1 - 18\lambda + 18\lambda = 2 \Leftrightarrow x_1 = -2$

$x_2 + 9\lambda = 0 \Leftrightarrow x_2 = -9\lambda$

Setze $x_3 = \lambda$ $\quad L = \{(-2; -9\lambda; \lambda)\}$

3. Fall: sonst

$$x_3 = \frac{-(c+3)}{3c} \quad ;$$

$$L = \left\{\left(-2; c+3; -\frac{c+3}{3c}\right)\right\}$$

$$\text{II}: \; x_2 + 3c \cdot \frac{-(c+3)}{3c} = 0 \Leftrightarrow x_2 = c+3$$

$$\text{III} \; -x_1 + 2(c+3) + 6c \cdot \frac{-(c+3)}{3c} = 2 \Leftrightarrow x_1 = -2$$