

Lösungen zu LS, S. 13, Nr. 11

11a)

$\begin{array}{cccccc c} -1 & 2 & -2 & 1 & 5 & 0 & \\ 0 & 2 & 1 & 1 & 4 & 0 & \\ 2 & -2 & 5 & -1 & -6 & 0 & +2\cdot I \\ 1 & 0 & 3 & 0 & -1 & 0 & +I \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} -1 & 2 & -2 & 1 & 5 & 0 & -II \\ 0 & 2 & 1 & 1 & 4 & 0 & \\ 0 & 2 & 1 & 1 & 4 & 0 & -II \\ 0 & 2 & 1 & 1 & 4 & 0 & -II \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} -1 & 0 & -3 & 0 & 1 & 0 & \cdot(-1) \\ 0 & 2 & 1 & 1 & 4 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 0 & 3 & 0 & -1 & 0 & \\ 0 & 2 & 1 & 1 & 4 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \end{array}$
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$L = \{ (x=-1-3r; y=2 - 0,5r - 0,5s) \}$

11b)

$\begin{array}{cccccc c} 1 & 2 & -3 & 1 & 0 & 0 & \\ 0 & 1 & 0 & 1 & 2 & 0 & \\ 2 & 3 & -3 & 5 & -3 & 0 & -2\cdot I \\ -1 & 1 & 4 & 0 & 4 & 0 & +I \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 2 & -3 & 1 & 0 & 0 & -2\cdot II \\ 0 & 1 & 0 & 1 & 2 & 0 & \\ 0 & -1 & 3 & 3 & -3 & 0 & +II \\ 0 & 3 & 1 & 1 & 4 & 0 & -3\cdot II \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 0 & -3 & -1 & -4 & 0 & \\ 0 & 1 & 0 & 1 & 2 & 0 & \\ 0 & 0 & 3 & 4 & -1 & 0 & =IV \\ 0 & 0 & 1 & -2 & -2 & 0 & =III \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 0 & -3 & -1 & -4 & 0 & +3\cdot III \\ 0 & 1 & 0 & 1 & 2 & 0 & \\ 0 & 0 & 1 & -2 & -2 & 0 & \\ 0 & 0 & 3 & 4 & -1 & 0 & -3\cdot III \end{array}$
$\begin{array}{cccccc c} 1 & 0 & 0 & -7 & -10 & 0 & \\ 0 & 1 & 0 & 1 & 2 & 0 & \\ 0 & 0 & 1 & -2 & -2 & 0 & \\ 0 & 0 & 0 & 10 & 5 & 0 & :5 \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 0 & 0 & -7 & -10 & 0 & 2\cdot I + 7\cdot IV \\ 0 & 1 & 0 & 1 & 2 & 0 & 2\cdot II - IV \\ 0 & 0 & 1 & -2 & -2 & 0 & +IV \\ 0 & 0 & 0 & 2 & 1 & 0 & \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 2 & 0 & 0 & 0 & -13 & 0 & :2 \\ 0 & 2 & 0 & 0 & 3 & 0 & :2 \\ 0 & 0 & 1 & 0 & -1 & 0 & \\ 0 & 0 & 0 & 2 & 1 & 0 & :2 \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 0 & 0 & 0 & -\frac{13}{2} & 0 & \\ 0 & 1 & 0 & 0 & \frac{3}{2} & 0 & \\ 0 & 0 & 1 & 0 & -1 & 0 & \\ 0 & 0 & 0 & 1 & \frac{1}{2} & 0 & \end{array}$

$L = \{ (-6,5; 1,5; -1; 0,5) \}$

11c)

$\begin{array}{cccccc c} 0 & 0 & 2 & -1 & 1 & 0 & =II \\ 1 & 1 & 1 & 1 & 4 & 0 & =I \\ 2 & 2 & -4 & 5 & 5 & 0 & \\ 1 & 1 & -7 & 5 & 0 & 0 & \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 1 & 1 & 1 & 4 & 0 & \\ 0 & 0 & 2 & -1 & 1 & 0 & \\ 2 & 2 & -4 & 5 & 5 & 0 & -2\cdot I \\ 1 & 1 & -7 & 5 & 0 & 0 & -I \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 1 & 1 & 1 & 4 & 0 & \\ 0 & 0 & 2 & -1 & 1 & 0 & \\ 0 & 0 & -6 & 3 & -3 & 0 & :3 \\ 0 & 0 & -8 & 4 & -4 & 0 & :4 \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 1 & 1 & 1 & 1 & 4 & 0 & 2\cdot I - II \\ 0 & 0 & 2 & -1 & 1 & 0 & \\ 0 & 0 & -2 & 1 & -1 & 0 & +II \\ 0 & 0 & -2 & 1 & -1 & 0 & +II \end{array}$	$\frac{3}{4} \textcircled{B}$	$\begin{array}{cccccc c} 2 & 2 & 0 & 3 & 7 & 0 & \\ 0 & 0 & 2 & -1 & 1 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & \end{array}$
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$L = \{ (x = 3,5 - r - 1,5s; z = 0,5 + 0,5r) \}$

Einführungsbeispiel

$$\begin{array}{cccc|c} \mathbb{R} & 2 & -1 & 1 & 2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 2 & -6 & 0 & :2 \\ \hline \mathbb{R} & 2 & -1 & 1 & 2 & \ddot{=} + II \\ \hline \mathbb{R} & 0 & 1 & -3 & 0 & \ddot{=} \\ \hline \mathbb{R} & 2 & 0 & -2 & 2 & \ddot{=} :2 \\ \hline \mathbb{R} & 0 & 1 & -3 & 0 & \ddot{=} \\ \hline \mathbb{R} & 1 & 0 & -1 & 1 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & -3 & 0 & \ddot{=} \end{array}$$

Beispiel 1

$$\begin{array}{cccc|c} \mathbb{R} & 1 & -3 & 1 & 1 & \ddot{=} \\ \hline \mathbb{R} & 2 & -4 & 1 & 6 & \ddot{=} - 2 \cdot I \\ \hline \mathbb{R} & 1 & -3 & 1 & 1 & \ddot{=} 2 \cdot I + 3 \cdot II \\ \hline \mathbb{R} & 0 & 2 & -1 & 4 & \ddot{=} \\ \hline \mathbb{R} & 2 & 0 & -1 & 14 & \ddot{=} \\ \hline \mathbb{R} & 0 & 2 & -1 & 4 & \ddot{=} \end{array}$$

LS, S. 13, Nr. 3a)

$$\begin{array}{cccc|c} \mathbb{R} & 1 & 1 & 1 & 3 & \ddot{=} \\ \hline \mathbb{R} & 1 & 2 & 3 & 6 & \ddot{=} - I \\ \hline \mathbb{R} & 1 & 1 & 1 & 3 & \ddot{=} - II \\ \hline \mathbb{R} & 0 & 1 & 2 & 3 & \ddot{=} \\ \hline \mathbb{R} & 1 & 0 & -1 & 0 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 2 & 3 & \ddot{=} \end{array}$$

LS, S. 13, Nr. 5a)

$$\begin{array}{cccc|c} \mathbb{R} & 1 & 0 & 1 & 2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 1 & 4 & \ddot{=} \\ \hline \mathbb{R} & 1 & 1 & 0 & 5 & \ddot{=} - I \\ \hline \mathbb{R} & 1 & 1 & 1 & 0 & \ddot{=} - I \\ \hline \mathbb{R} & 1 & 0 & 1 & 2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 1 & 4 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & -1 & 3 & \ddot{=} - II \\ \hline \mathbb{R} & 0 & 1 & 0 & -2 & \ddot{=} - II \\ \hline \mathbb{R} & 1 & 0 & 1 & 2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 1 & 4 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & -2 & -1 & \ddot{=} = IV \\ \hline \mathbb{R} & 0 & 0 & -1 & -6 & \ddot{=} = III \\ \hline \mathbb{R} & 1 & 0 & 1 & 2 & \ddot{=} + III \\ \hline \mathbb{R} & 0 & 1 & 1 & 4 & \ddot{=} + III \\ \hline \mathbb{R} & 0 & 0 & -1 & -6 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & -2 & -1 & \ddot{=} - 2 \cdot III \\ \hline \mathbb{R} & 1 & 0 & 0 & -4 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 0 & -2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & 1 & 6 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & 0 & 1 & \ddot{=} \\ \hline \mathbb{R} & 1 & 0 & 0 & -4 & \ddot{=} \\ \hline \mathbb{R} & 0 & 1 & 0 & -2 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & 1 & 6 & \ddot{=} \\ \hline \mathbb{R} & 0 & 0 & 0 & 11 & \ddot{=} :11 \end{array}$$

L = { (-4; -2 ; 6) } aber 0 = 1, also unlösbar!

Ändere das LGS so ab, dass es lösbar ist: z. B. **3. Gl.:** **x + y = -6** (statt 5)