Thema 7: Lineares Gleichungssystem

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Gaußsches Eliminationsverfahren:

$$
\begin{aligned}
&\text{I: } 2x - 1y + z = -8\\
&\text{II: } 3x + y - 2z = 1\\
&\text{III: } -5x + 2y - z = 15
\end{aligned}
\Rightarrow
\left(\begin{array}{ccc|c} 2 & -1 & 1 & -8 \\ 3 & 1 & -2 & 1 \\ -5 & 2 & -1 & 15 \end{array}\right) \cdot 2 \cdot 2
=
\left(\begin{array}{ccc|c} 2 & -1 & 1 & -8 \\ 6 & 2 & -4 & 2 \\ -10 & 4 & -2 & 30 \end{array}\right) -3\cdot I \; +5\cdot I
\Rightarrow
\left(\begin{array}{ccc|c} 2 & -1 & 1 & -8 \\ 0 & 5 & -7 & 26 \\ 0 & -1 & 3 & -10 \end{array}\right)
\Rightarrow
\left(\begin{array}{ccc|c} 2 & -1 & 1 & -8 \\ 0 & -1 & 3 & -10 \\ 0 & 5 & -7 & 26 \end{array}\right) +5\cdot II
\Rightarrow
\left(\begin{array}{ccc|c} 2 & -1 & 1 & -8 \\ 0 & -1 & 3 & -10 \\ 0 & 0 & 8 & -24 \end{array}\right)
$$

$8 \cdot z = -24 \quad |:8$

$z = -3$

$-y + 3 \cdot (-3) = -10$

$-y + (-9) = -10 \quad |+9$

$-y = -1 \quad |\cdot(-1)$

$y = 1$

$2x - 1 - 3 = -8 \quad |+1|+3$

$2x = -4 \quad |:2$

$x = -2$

$x = -2$
$y = 1$
$z = -3$