

Bsp 2:

$$\text{I } x + y + z = 18$$

$$\text{II } 10x + y - 8z = 0$$

$$\text{III } x + 2y + z = 0$$

$$\begin{array}{ccc|c} \text{A2} & 1 & 1 & 18 \\ & 10 & 1 & 0 \\ & 1 & 2 & 0 \end{array} \quad \begin{array}{l} \downarrow \cdot 10 \\ \downarrow \end{array}$$

$$\begin{array}{ccc|c} & 1 & 1 & 18 \\ & 0 & 9 & 180 \\ & 0 & -1 & 18 \end{array} \quad \begin{array}{l} \cdot 9! \text{EV} \\ \downarrow \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & 1 & 1 & 18 \\ & 0 & 1 & 20 \\ & 0 & -1 & 18 \end{array} \quad \downarrow +$$

$$\begin{array}{ccc|c} \text{Trippel} & 1 & 1 & 18 \\ & 0 & 1 & 20 \\ & 0 & 0 & 38 \end{array} \quad \begin{array}{l} \cdot 2 \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & 1 & 1 & 18 \\ & 0 & 1 & 20 \\ & 0 & 0 & 19 \end{array} \quad \begin{array}{l} \uparrow + \\ \cdot (-1) \cdot (-2) \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & 1 & 1 & 0 \\ & 0 & 1 & 0 \\ & 0 & 0 & 1 \end{array} \quad \begin{array}{l} \uparrow + \\ \cdot (-1) \end{array}$$

$$\begin{array}{ccc|c} & 1 & 0 & 17 \\ & 0 & 1 & -18 \\ & 0 & 0 & 19 \end{array}$$

$$\begin{array}{l} x = 17 \\ y = -18 \\ z = 19 \end{array}$$

$$L = \{(17 | -18 | 19)\}$$

Bsp 3:

$$\text{I } 2x - 4y + 5z = 3$$

$$\text{II } 3x + 3y + 7z = 13$$

$$\text{III } 4x - 2y - 3z = -1$$

$$\begin{array}{ccc|c} \text{A2} & 2 & -4 & 5 \\ & 3 & 3 & 7 \\ & 4 & -2 & -3 \end{array} \quad \begin{array}{l} \downarrow \cdot 3 \\ \downarrow \cdot 2 \\ \downarrow \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & 2 & -4 & 5 \\ & 0 & -18 & 1 \\ & 0 & -6 & 13 \end{array} \quad \begin{array}{l} \downarrow \cdot 3 \\ \downarrow \end{array}$$

$$\begin{array}{ccc|c} \text{Trippel} & 2 & -4 & 5 \\ & 0 & -18 & 1 \\ & 0 & 0 & -38 \end{array} \quad \begin{array}{l} \cdot (-38) \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & 2 & -4 & 5 \\ & 0 & -18 & 1 \\ & 0 & 0 & 1 \end{array} \quad \begin{array}{l} \cdot 5 \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} & -2 & -4 & 0 \\ & 0 & 18 & 0 \\ & 0 & 0 & 1 \end{array} \quad \begin{array}{l} \cdot 18 \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} \text{A2} & -2 & -4 & 0 \\ & 0 & 1 & 0 \\ & 0 & 0 & 1 \end{array} \quad \begin{array}{l} \uparrow \cdot 4 \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} & -2 & 0 & 0 \\ & 0 & 1 & 0 \\ & 0 & 0 & 1 \end{array} \quad \begin{array}{l} \cdot 2 \\ \uparrow \end{array}$$

$$\begin{array}{ccc|c} & 1 & 0 & 0 \\ & 0 & 1 & 0 \\ & 0 & 0 & 1 \end{array}$$

$$\begin{array}{l} x = 1 \\ y = 1 \\ z = 1 \end{array}$$

$$L = \{(1 | 1 | 1)\}$$

HA

①

1) LGS mit CRAMER-Formel lösen

$$\text{I} \quad x + y + z = 6$$

$$\text{II} \quad 2x - y + 3z = 9$$

$$\text{III} \quad -x + y - z = -2$$

$$x = \frac{D_x}{D} = \frac{\begin{vmatrix} 6 & 1 & 1 \\ 9 & -1 & 3 \\ -2 & 1 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 & 1 \\ 2 & -1 & 3 \\ -1 & 1 & -1 \end{vmatrix}} = \frac{-2}{-2} = 1$$

$$y = \frac{D_y}{D} = \frac{\begin{vmatrix} 1 & 6 & 1 \\ 2 & 9 & 3 \\ -1 & -2 & -1 \end{vmatrix}}{-2} = \frac{-4}{-2} = 2$$

$$z = \frac{D_z}{D} = \frac{\begin{vmatrix} 1 & 1 & 6 \\ 2 & -1 & 9 \\ -1 & 1 & -2 \end{vmatrix}}{-2} = \frac{-6}{-2} = 3$$

$$\rightarrow \underline{\underline{L = \{(x|y|z); (1|2|3)\}}}}$$

$$2) \text{ a) } A + B = \begin{pmatrix} 0 & 3 & 6 \\ 0 & -2 & 2 \end{pmatrix} \quad \text{b) } A - B = \begin{pmatrix} 4 & 3 & -4 \\ -8 & 4 & -2 \end{pmatrix}$$

$$\text{c) } 2 \cdot A = \begin{pmatrix} 4 & 6 & 2 \\ -8 & 2 & 0 \end{pmatrix} \quad \text{d) } 2 \cdot A - B = \begin{pmatrix} 6 & 6 & -3 \\ -12 & 5 & -2 \end{pmatrix}$$

$$\text{e) } 10 \cdot A + 20 \cdot B = \begin{pmatrix} -20 & 30 & 10 \\ 40 & -50 & 40 \end{pmatrix}$$

$$3) \text{ a) } A = 22 \cdot \begin{pmatrix} 2 & 1 & 4 \\ 8 & 3 & -1 \\ 7 & -2 & 11 \end{pmatrix}$$

$$\text{b) } B = b \cdot \begin{pmatrix} b & a & 1 \\ a^2 & ab & b^2 \\ 1 & b^3 & a^4 \end{pmatrix}$$

4) a) $X = \begin{pmatrix} -1 & -1 & -3 \\ 1 & -1 & 2 \\ -1 & 2 & 1 \end{pmatrix}$

b) $X = M - 3N = \begin{pmatrix} 1 & -1 & 1 \\ -3 & 1 & -6 \\ -1 & -6 & -7 \end{pmatrix}$

c) $M \cdot X = N$, nach FALK folgt:

			a	d	g	
			b	e	h	← X
			c	f	i	
1	2	4	0	1	1	
0	1	0	1	0	2	
2	0	2	1	2	3	

↖ M

↙ -N

↘

$1a + 2b + 4c = 0$
$0a + 1b + 0c = 1$
$2a + 0b + 2c = 1$

$L = \{(a|b|c); (\frac{4}{3} | 1 | -\frac{5}{6})\}$

$1d + 2e + 4f = 1$
$0d + 1e + 0f = 0$
$2d + 0e + 2f = 2$

$L = \{(d|e|f); (1 | 0 | 0)\}$

$1g + 2h + 4i = 1$
$0g + 1h + 0i = 2$
$2g + 0h + 2i = 3$

$L = \{(g|h|i); (3 | 2 | -\frac{3}{2})\}$