

$$1) \text{a) I} 3x - 8y - 5z = 0$$

$$\text{II} 2x - 2y + z = -1 \quad | \text{II} \cdot 1,5 - \text{I}$$

$$\text{III} 7x + 4y + 7z = 2 \quad | \text{III} \cdot 3 - \text{I}$$

$$3x - 8y - 5z = 0$$

$$5y + 6,5z = -1,5 \uparrow$$

$$20y + 26z = 6 \quad | \text{III} - 4 \cdot \text{II}$$

$$3x - 8y - 5z = 0$$

$$5y + 6,5z = -1,5$$

$$0z = 12 \Rightarrow \text{Widerspruch}$$

keine Lösung

$$\text{b) I} 2x - 2y - 3z = -1$$

$$\text{II} -2y + 7z = -3$$

$$\text{III} -x - y - 3z = -4 \quad | \text{III} \cdot 2 + \text{I}$$

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

$$\text{II} -2y + 7z = -3$$

$$\text{III} -4y - 9z = -4 \quad | \text{III} \cdot (-\frac{1}{2}) + \text{II}$$

$$2x - 2y - 3z = -1 \Rightarrow x = y + 1,5z - 0,5 = \underline{\underline{\underline{0,5}} \frac{17}{22}}$$

$$-2y + 7z = -3 \Rightarrow y = 0,5z + 1,5 = \underline{\underline{\underline{1,5}} \frac{18}{22}}$$

$$5,5z = \underline{\underline{\underline{7,5}}} \Rightarrow z = \underline{\underline{\underline{3}} \frac{3}{22}}$$

$$C) \text{I} 4x - y + 2z = 6$$

$$\text{II } x + 2y - z = 6 \quad | \text{II} \cdot 4 - \text{I}$$

$$\text{III } 6x + 3y = 18 \quad | \text{III} \cdot \frac{2}{3} - \text{I}$$

$$4x - y + 2z = 6$$

$$9y - 6z = 78$$

$$3y - 2z = 6 \quad | \text{III} \cdot 3 - \text{I}$$

$$4x - y + 2z = 6 \Rightarrow x = \frac{1}{4}y - \frac{1}{2}z + 1,5 = \left(\frac{1}{4}\left(\frac{2}{3}t + 2\right)\right) - \left(\frac{1}{2}(t)\right) + 1,5 = -\frac{1}{3}t + 2$$

$$9y - 6z = 78 \Rightarrow y = \frac{2}{3}z + 2 = \frac{2}{3}t + 2$$

$$0 = 0 \Rightarrow z = t$$

$$L = \{(x, y, z) \mid x = -\frac{1}{3}t + 2, y = \frac{2}{3}t + 2, z = t \text{ und } t \in \mathbb{R}\}$$

$$2) M: U_1 + U_2 = U_0$$

$$N: U_3 - U_2 = 0V$$

$$I) I_1 - I_2 - I_3 = 0V$$

$$II) 50I_1 + 150I_2 + 0 = 220V \quad | II/50 - I$$

$$III) 0 - 150I_2 + 100I_3 = 0V$$

$$I_1 - I_2 - I_3 = 0V$$

$$4I_2 + I_3 = \cancel{22} \frac{22}{5}$$

$$-150I_2 + 100I_3 = 0V \quad | III \cdot \frac{4}{150} + II$$

$$I_1 - I_2 - I_3 = 0V \Rightarrow I_1 = I_2 + I_3 = 2A$$

$$4I_2 + I_3 = \frac{22}{5} \Rightarrow I_2 = \frac{\left(\frac{22}{5} - I_3\right)}{4} = \frac{4}{5}A$$

~~I<sub>3</sub>~~

$$\frac{22}{3}I_3 = \frac{22}{5} \Rightarrow I_3 = \frac{6}{5}A$$

$$\left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 2 & 5 & 3 & 9 & 4 & 112 \\ 3 & 5 & 7 & 6 & 4 & 116 \\ 7 & 6 & 4 & 5 & 3 & 128 \\ 9 & 7 & 3 & 2 & 5 & 140 \end{array} \right) \xrightarrow{\cdot(-2)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & -1 & -7 & -6 & -78 \\ 3 & 5 & 7 & 6 & 4 & 116 \\ 7 & 6 & 4 & 5 & 3 & 128 \\ 9 & 7 & 3 & 2 & 5 & 140 \end{array} \right) \xrightarrow{\cdot(-3)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & -1 & -7 & -6 & -78 \\ 0 & 2 & -2 & -21 & -12 & -234 \\ 7 & 6 & 4 & 5 & 3 & 128 \\ 9 & 7 & 3 & 2 & 5 & 140 \end{array} \right) \xrightarrow{\cdot(-7)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & -1 & -7 & -6 & -78 \\ 0 & 2 & -2 & -21 & -12 & -234 \\ 0 & 6 & -6 & -147 & -84 & -372 \\ 9 & 7 & 3 & 2 & 5 & 140 \end{array} \right) \xrightarrow{\cdot(-9)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & -1 & -7 & -6 & -78 \\ 0 & 2 & -2 & -21 & -12 & -234 \\ 0 & 6 & -6 & -147 & -84 & -372 \\ 0 & 7 & -7 & -141 & -81 & -372 \end{array} \right)$$

$\frac{62}{11} v = \frac{372}{11}$

$v = 6$

$$\left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & -1 & -1 & -7 & -6 & -78 \\ 0 & -4 & 1 & -18 & -71 & -769 \\ 0 & -15 & -70 & -51 & -32 & -537 \\ 0 & -20 & -75 & -70 & -40 & -715 \end{array} \right) \xrightarrow{\cdot(-4)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 4 & -1 & 18 & 71 & 769 \\ 0 & 15 & 70 & 51 & 32 & 537 \\ 0 & 20 & 75 & 70 & 40 & 715 \end{array} \right) \xrightarrow{\cdot(-15)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & -5 & -10 & -13 & -793 \\ 0 & 0 & 5 & 54 & 58 & 633 \\ 0 & 0 & 5 & 70 & 80 & 845 \end{array} \right) \xrightarrow{\cdot(-20)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & 10 & 20 & 26 & 1565 \\ 0 & 0 & 0 & 108 & 116 & 1292 \\ 0 & 0 & 0 & 140 & 160 & 1690 \end{array} \right)$$

$44u + 45v = 490$

$u = 5$

$5z + 10u + 13v = 143$

$z = 3$

$$\left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & 5 & 10 & 13 & 743 \\ 0 & 0 & 5 & 54 & 58 & 633 \\ 0 & 0 & 5 & 70 & 80 & 845 \end{array} \right) \xrightarrow{\cdot(-1)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & -5 & -10 & -13 & -743 \\ 0 & 0 & 5 & 54 & 58 & 633 \\ 0 & 0 & 5 & 70 & 80 & 845 \end{array} \right) \xrightarrow{\cdot(-1)} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & 5 & 10 & 13 & 743 \\ 0 & 0 & 0 & 44 & 45 & 490 \\ 0 & 0 & 0 & 70 & 80 & 845 \end{array} \right) \xrightarrow{\cdot(-\frac{15}{11})} \left( \begin{array}{cccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 1 & 1 & 7 & 6 & 78 \\ 0 & 0 & 5 & 10 & 13 & 743 \\ 0 & 0 & 0 & 44 & 45 & 490 \\ 0 & 0 & 0 & 60 & 67 & 702 \end{array} \right)$$

$-y - z - 7u - 6v = -78$

$y = 4$

$x + 3y + 2z + 8u + 5v = 95$

$x = 7$

$$L = \begin{pmatrix} 7 \\ 4 \\ 3 \\ 5 \\ 6 \end{pmatrix}$$

$$\left( \begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & -1 & -1 & -7 & -6 & -78 \\ 0 & 0 & 5 & 10 & 13 & 743 \\ 0 & 0 & 0 & 44 & 45 & 490 \\ 0 & 0 & 0 & 60 & 67 & 702 \end{array} \right) \xrightarrow{\cdot(-\frac{15}{11})} \left( \begin{array}{ccccc|c} 1 & 3 & 2 & 8 & 5 & 95 \\ 0 & 0 & 0 & 0 & 0 & -62 \\ 0 & 0 & 0 & 0 & 0 & 11 \\ 0 & 0 & 0 & 0 & 0 & 372 \\ 0 & 0 & 0 & 0 & 0 & 11 \end{array} \right)$$

Jederzeit ein Partner.