

$$\underline{A} = \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$$

$$|\underline{A}| = 2^2 - 1^2 = 3 \neq 0$$

$$\underline{A}^{-1} = \frac{1}{3} \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \rightarrow \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \xrightarrow{\text{Satz 11.1.1}} \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix} \xrightarrow{\text{Laplace}} \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$$

$$\underline{A}^{-1} = \frac{1}{3} \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$$

$$\underline{D} = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 1 \\ 3 & 1 & 1 \end{pmatrix}$$

$$\begin{vmatrix} 1 & 2 \\ 1 & 0 \end{vmatrix} = -2 \quad \begin{vmatrix} 3 & 2 \\ -1 & 0 \end{vmatrix} = 2 \quad \begin{vmatrix} 3 & 1 \\ -1 & 1 \end{vmatrix} = 4 \quad \begin{pmatrix} -2 & 2 & 4 \\ 1 & -1 & 1 \\ 1 & 5 & 1 \end{pmatrix} \xrightarrow{\text{Satz 11.1.1}}$$

$$\begin{vmatrix} 1 & 0 \\ 1 & 0 \end{vmatrix} = 0 \quad \begin{vmatrix} 1 & -1 \\ 1 & 0 \end{vmatrix} = 1 \quad \begin{vmatrix} 1 & 0 \\ -1 & 1 \end{vmatrix} = 1 \quad \begin{pmatrix} -2 & -2 & 4 \\ -1 & -1 & -1 \\ 1 & -5 & 1 \end{pmatrix} \xrightarrow{\text{tr.}} \begin{pmatrix} -2 & -1 & 1 \\ -2 & -1 & -5 \\ 4 & -1 & 1 \end{pmatrix}$$

$$|\underline{D}| = -3 - 1 - 2 = -6 \neq 0$$

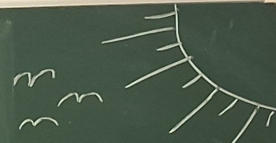
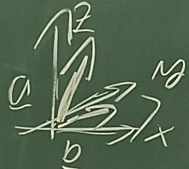
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$$\begin{cases} x_1 - 2x_2 - 3x_3 = 6 \\ 2x_1 - 3x_2 + x_3 = -1 \\ 3x_1 + x_2 + x_3 = 5 \end{cases}$$

$$\begin{cases} 2x_1 - 3x_2 + x_3 = -1 \\ 3x_1 + x_2 + x_3 = 5 \end{cases}$$

$$3x_1 + x_2 + x_3 = 5$$

$$\begin{vmatrix} 1 & -2 & -3 \\ 2 & -3 & 1 \\ 3 & 1 & 1 \end{vmatrix} = -3 - 6 - 6 - 27 + 4 - 1 = -39$$



$$x_1 - 2x_2 - 3x_3 = 6$$

$$x_2 + 7x_3 = -13$$

$$7x_2 + 10x_3 = -13$$

$$(II) - 2(I) \quad \begin{vmatrix} 1 & -2 & -3 \\ -1 & -3 & 1 \\ 3 & 1 & 1 \end{vmatrix} = -18 - 10 + 3 - 45 - 2 - 6 = -78$$

$$(III) - 3(I) \quad \begin{vmatrix} 1 & -2 & -3 \\ 2 & -3 & 1 \\ 5 & 1 & 1 \end{vmatrix} = -1 + 18 - 30 - 9 - 12 - 5 = -39$$

$$(III) - (II) \quad \begin{vmatrix} 1 & -2 & -3 \\ -1 & -3 & 1 \\ 6 & 4 & 4 \end{vmatrix} = -1 + 18 - 30 - 9 - 12 - 5 = -39$$

$$x_1 - 2x_2 - 3x_3 = 6$$

$$x_2 + 7x_3 = -13$$

$$-39x_3 = 78 \rightarrow x_3 = -2$$

$$x_2 = 1$$

$$x_1 = 2$$

$$\begin{vmatrix} 1 & -2 & -3 \\ 2 & -3 & 1 \\ 3 & 1 & 1 \end{vmatrix} = -15 + 6 + 12 + 5 + 20 = 14$$

$$x_3 = -2$$

$$x_1 = 2$$