

Th 50/1

$$\left( \begin{array}{ccc|ccc} 1 & 0 & -1 & 1 & 0 & 0 \\ 3 & 1 & 2 & 0 & 1 & 0 \\ -1 & 1 & 0 & 0 & 0 & 1 \end{array} \right) \xrightarrow{(1)-(3)(1)} \left( \begin{array}{ccc|ccc} 1 & 0 & -1 & 1 & 0 & 0 \\ 0 & 1 & 5 & -3 & 1 & 0 \\ 0 & 1 & -1 & 1 & 0 & 1 \end{array} \right) \xrightarrow{(1)-(3)(1)} \left( \begin{array}{ccc|ccc} 1 & 0 & -1 & 1 & 0 & 0 \\ 0 & 1 & 5 & -3 & 1 & 0 \\ 0 & 0 & -6 & 4 & -1 & 1 \end{array} \right)$$

$$\xrightarrow{-\frac{1}{6}(1)(1)} \left( \begin{array}{ccc|ccc} 1 & 0 & -1 & 1 & 0 & 0 \\ 0 & 1 & 5 & -3 & 1 & 0 \\ 0 & 0 & 1 & -\frac{2}{3} & \frac{1}{6} & -\frac{1}{6} \end{array} \right) \xrightarrow{(1)+(3)(1)} \left( \begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{1}{3} & \frac{1}{6} & -\frac{1}{6} \\ 0 & 1 & 0 & \frac{1}{3} & \frac{1}{6} & \frac{5}{6} \\ 0 & 0 & 1 & -\frac{2}{3} & \frac{1}{6} & -\frac{1}{6} \end{array} \right)$$

$$D^{-1} = \frac{1}{6} \begin{pmatrix} 2 & 1 & -1 \\ 2 & 1 & 5 \\ -4 & 1 & -1 \end{pmatrix}$$

$$= 10 + 6 + 10 + 5x + 20$$

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$$A = \begin{pmatrix} -2 & 0 & 8 \\ 0 & 2 & 4 \\ -2 & 2 & 5 \end{pmatrix}$$

$$|A| = -10 + 8 + 2 = \underline{\underline{0}}$$

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$$\begin{aligned} & \text{X. } \begin{pmatrix} 1 & -1 & 3 \\ 2 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} = \begin{pmatrix} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} : |A| = 1^3 + 2 + 1 - 2 - 1 - 1 = 2 \neq 0 \\ & \text{X. } A = B / \cdot A^{-1} \\ & \text{X. } A^{-1} = B^{-1} \\ & \text{X. } \begin{pmatrix} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 2 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1 \end{pmatrix} = -3 \\ & \text{X. } A^{-1} = B^{-1} \\ & \text{X. } \begin{pmatrix} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 1 & 1 \\ 1 & -1 & 1 \\ 2 & 1 & 1 \end{pmatrix} = -2 \\ & \text{X. } A^{-1} = B^{-1} \\ & \text{X. } \begin{pmatrix} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 1 \\ 2 & 1 & 1 \end{pmatrix} = -1 \\ & \text{X. } \begin{pmatrix} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 2 & -3 \\ 0 & 2 & -2 \\ 1 & 2 & -1 \end{pmatrix} \xrightarrow{\text{Satz 1}} \begin{pmatrix} 1 & 2 & -3 \\ 0 & 2 & 2 \\ 1 & -2 & -1 \end{pmatrix} \xrightarrow{\text{Thm 1}} \begin{pmatrix} 1 & 0 & 1 \\ -2 & 2 & -2 \\ -3 & 2 & -1 \end{pmatrix} \end{aligned}$$

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$$\begin{aligned} & \text{X. } \left( \begin{array}{ccc} 1 & 1 & -1 \\ 2 & 1 & 0 \\ 1 & -2 & 5 \end{array} \right) = \left( \begin{array}{ccc} 1 & -1 & 3 \\ 4 & 3 & 2 \\ 1 & -2 & 5 \end{array} \right) : \frac{1}{2} \left( \begin{array}{ccc} 1+2-0 & -2+6 & 1+2-3 \\ 4-6-6 & 6+4 & 4-6-2 \\ 1+4-15 & -4+10 & 1+4-5 \end{array} \right) = \\ & \text{X. } A = B / A^{-1} \quad | \quad = \frac{1}{2} \left( \begin{array}{ccc} -6 & 4 & 0 \\ -8 & 10 & -4 \\ -10 & 6 & 0 \end{array} \right) = \left( \begin{array}{ccc} -3 & 2 & 0 \\ -4 & 5 & -2 \\ -5 & 3 & 0 \end{array} \right) \end{aligned}$$

$$\begin{pmatrix} A = 13 \\ 432 \\ 125 \end{pmatrix} \xrightarrow{\text{A}^{-1}} x = B \cdot A^{-1} \Rightarrow$$

$$\begin{pmatrix} 9 & 0 & 1 \\ -4 & 2 & -1 \\ -3 & 1 & 2 \end{pmatrix} \begin{pmatrix} 13 \\ 432 \\ 125 \end{pmatrix} =$$

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$$\underline{A} \underline{x} = \underline{B} / \underline{\underline{A}}^{-1}$$

$$\underbrace{A^M \cdot A^{-1}}_{\in} \cdot x = \underbrace{A^{-1} \cdot B}_{\in} \quad \text{④}$$

$$|A|=2 \cdot 3 - 5 = 1 \neq 0$$

$$\begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix} \xrightarrow{\text{S.E}} \begin{pmatrix} 3-1 \\ -5+2 \end{pmatrix} \xrightarrow{\text{E}_n} \begin{pmatrix} 3-1 \\ -1+2 \end{pmatrix} = A^{-1}$$

$$\begin{pmatrix} 1 & 2 & 5 \\ 1 & 1 & 3 \end{pmatrix} \begin{pmatrix} 8 & -2 & 3 \\ 6 & 8 & 1 \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$$

$$(7) \begin{pmatrix} 3 & -5 \\ 1 & 2 \end{pmatrix} \cdot \begin{pmatrix} 4 & -9 \\ 2 & 1 \end{pmatrix} = \begin{pmatrix} 12-10 & -18-5 \\ -4+4 & 6+2 \end{pmatrix} = \begin{pmatrix} 2 & -23 \\ 0 & 8 \end{pmatrix} = \begin{pmatrix} 4 & -6 \\ 2 & 1 \end{pmatrix} = \underline{\underline{B}}$$

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$$\begin{pmatrix} 2 & 1 & -1 \\ 4 & -1 & 2 \\ 3 & 0 & 1 \end{pmatrix} X = \begin{pmatrix} 5 & 1 & 6 \\ 7 & -8 & 7 \\ 6 & -4 & 7 \end{pmatrix} ; \begin{vmatrix} -1 & 2 \\ 0 & 1 \end{vmatrix} = -1 \quad \begin{vmatrix} 4 & 2 \\ 3 & 1 \end{vmatrix} = 2 \quad \begin{vmatrix} 4 & -7 \\ 3 & 0 \end{vmatrix} = 3$$
$$\begin{vmatrix} 1 & -1 \\ 0 & 1 \end{vmatrix} = 1 \quad \begin{vmatrix} 2 & -7 \\ 3 & 1 \end{vmatrix} = 5 \quad \begin{vmatrix} 2 & 1 \\ 3 & 0 \end{vmatrix} = -3$$

$$A^{-1} X = B / A^{-1} ; \begin{vmatrix} 1 & -1 \\ -1 & 2 \end{vmatrix} = 1 \quad \begin{vmatrix} 2 & -1 \\ 4 & 2 \end{vmatrix} = 8 \quad \begin{vmatrix} 2 & 1 \\ 4 & -1 \end{vmatrix} = -6$$

$$\underbrace{A^{-1} A}_{\infty} X = \underbrace{A^{-1} B}_{\infty} ; \begin{pmatrix} -1 & -2 & 3 \\ 1 & 5 & -3 \\ 1 & 8 & -5 \end{pmatrix} \xrightarrow{\text{r1} \leftrightarrow \text{r2}} \begin{pmatrix} -1 & 2 & 3 \\ -1 & 5 & 3 \\ 1 & -8 & -6 \end{pmatrix} \xrightarrow{\text{r3} + \text{r2}} \begin{pmatrix} -1 & -1 & 1 \\ 2 & 5 & -8 \\ 3 & 3 & -6 \end{pmatrix}$$

$$|A| = -2 + 6 - 3 - 4 = -3 \neq 0$$

$$A^{-1} = \frac{1}{-3} \begin{pmatrix} 1 & 1 & -1 \\ -2 & -5 & 8 \\ -3 & -3 & 6 \end{pmatrix}$$

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$$\begin{pmatrix} 2 & 1 & -1 \\ 4 & -1 & 2 \\ 3 & 0 & 1 \end{pmatrix} X = \begin{pmatrix} 5 & 1 & 6 \\ 2 & -8 & 7 \\ 6 & -4 & 7 \end{pmatrix}$$
$$\text{① } \frac{1}{3} \begin{pmatrix} 1 & 1 & -1 \\ -2 & -5 & 8 \\ -3 & -3 & 6 \end{pmatrix} \left( \begin{array}{|ccc|} 5 & 1 & 6 \\ 2 & -8 & 7 \\ 6 & -4 & 7 \end{array} \right) = \dots$$
$$A^{-1} X = B / A^{-1}$$
$$\frac{1}{3} \begin{pmatrix} 5+7-6 & 1+8+7 & 6+7-7 \\ -10-35+48 & -2+40-32 & -12-35+56 \\ -15-27+36 & -3+24-24 & -18-27+48 \end{pmatrix} = \frac{1}{3} \begin{pmatrix} 6 & -3 & 6 \\ 3 & +6 & 9 \\ 0 & -3 & 3 \end{pmatrix}$$
$$\boxed{x = A^{-1} \cdot B}$$
$$A^{-1} = \frac{1}{3} \begin{pmatrix} 1 & 1 & -1 \\ -2 & -5 & 8 \\ -3 & -3 & 6 \end{pmatrix}$$
$$|A| = -2+6-3-4 = -3 \neq 0$$