



Matrix invertieren mit Gaußverf.:

$$AX = \begin{pmatrix} 1 & 0 & -1 \\ 3 & 1 & -3 \\ 1 & 2 & -2 \end{pmatrix} \begin{pmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Gesucht Matrix X $\leftarrow AX = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
 \uparrow 9 Variablen

$$\left(\begin{array}{ccc|ccc} 1 & 0 & -1 & 1 & 0 & 0 \\ 3 & 1 & -3 & 0 & 1 & 0 \\ 1 & 2 & -2 & 0 & 0 & 1 \end{array} \right) \quad \text{Nur Zeilenoperationen!}$$

\rightarrow Die Inverse am Schluss

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

$$\begin{array}{l} \rightarrow \text{II} - 3\text{I} \\ \rightarrow \text{III} - 1 \cdot \text{I} \end{array}$$

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

$$\rightarrow \text{III} - 2\text{II}$$

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

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

$$\leftarrow \text{III} \cdot (-1)$$

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

$$\rightarrow \text{I} + \text{III}$$

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

Einheitsmatrix

A^{-1}