

Lösungen zu Übung 2

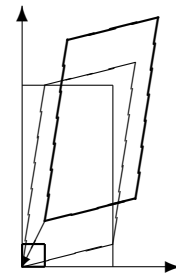
$$1. \quad T = \begin{pmatrix} x_2 - x_1 & y_1 - y_2 & x_1 \\ y_2 - y_1 & x_2 - x_1 & y_1 \\ 0 & 0 & 1 \end{pmatrix}$$

bei 2 Strecken i.a. keine orthogonale Transformationsmatrix:

$$T = \begin{pmatrix} x_2 - x_1 & x_3 - x_1 & x_1 \\ y_2 - y_1 & y_3 - y_1 & y_1 \\ 0 & 0 & 1 \end{pmatrix}$$

$$2. \quad T = \begin{pmatrix} \frac{1}{2} & 0 & 0 & -1 \\ 0 & \frac{1}{5} & 0 & -\frac{1}{5} \\ 0 & 0 & \frac{1}{40} & -\frac{1}{4} \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$3. \quad T = \frac{1}{31} \begin{pmatrix} 8 & -1 & -6 \\ -1 & 4 & -7 \\ 0 & 0 & 31 \end{pmatrix}$$



$$4. \quad T = \begin{pmatrix} 2\sqrt{2} & \sqrt{2} & 0 & -5\sqrt{2} \\ -2\sqrt{2} & \sqrt{2} & 0 & 3\sqrt{2} \\ 0 & 0 & 3 & -6 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$P = \begin{pmatrix} 2 \\ 1 \\ 2 \\ 1 \end{pmatrix} \longrightarrow \begin{pmatrix} 1 \\ 3 \\ 3 \\ 1 \end{pmatrix} \longrightarrow \begin{pmatrix} 4 \\ 6 \\ 9 \\ 1 \end{pmatrix} \longrightarrow \begin{pmatrix} 5\sqrt{2} \\ \sqrt{2} \\ 9 \\ 1 \end{pmatrix}$$

5. Verschiebung, Basistransformation, Skalierung

$$T = \begin{pmatrix} \frac{16}{25} & 0 & \frac{12}{25} & \frac{3}{25} \\ 0 & 1 & 0 & 0 \\ -\frac{3}{5} & 0 & \frac{4}{5} & \frac{1}{5} \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

