

Lineare Algebra II für Informatiker, 2. Semester

Lösungshinweise Übungsaufgaben, Serie 6, Wiederholung

1. $a = 1/\sqrt{5}$, $b = 1/\sqrt{2}$, $c = 1$, $V = \frac{2\sqrt{2}\pi}{3\sqrt{5}}$,

$$x_1 = \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}, \quad x_2 = \frac{1}{\sqrt{3}} \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix}, \quad x_3 = \frac{1}{\sqrt{2}} \begin{pmatrix} -1 \\ 1 \\ 0 \end{pmatrix}.$$

2.

$$\Lambda = \begin{pmatrix} 5 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad x_1 = \frac{1}{\sqrt{3}} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \quad x_2 = \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ -2 \\ 1 \end{pmatrix}, \quad x_3 = \frac{1}{\sqrt{2}} \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}.$$

3.

$$x = \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}.$$

4.

$$A^{-1} = \begin{pmatrix} 13 & 5 & 3 & -4 \\ 9 & 4 & 2 & -3 \\ 2 & 1 & 0 & -1 \\ 4 & -3 & 1 & -1 \end{pmatrix}, \quad \det A = -1.$$

5.

$$x = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}.$$

6.

$$x = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \quad |Ax - b| = \sqrt{6}.$$

7.

$$x = \begin{pmatrix} 1 \\ \frac{1}{6} \\ \frac{1}{2} \end{pmatrix}, \quad |Ax - b| = 2\sqrt{\frac{7}{3}}.$$

8.

$$x_1 = \frac{20}{3}, \quad x_2 = \frac{22}{3}, \quad z = \frac{46}{3}.$$

9. Koordination = 2, 4.

10. $A^5 = 0$.