

## Lösungen zum 40. Präsenzblatt für Mfi 3

1. Aufgabe :

(a) Gerade:

$$A = \begin{pmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 4 \\ 1 & 6 \\ 1 & 7 \\ 1 & 10 \end{pmatrix}$$

$$\mathbf{b} = \begin{pmatrix} 23 \\ 17 \\ 3 \\ 2 \\ 3 \\ 20 \end{pmatrix}$$

$$A^*A = \begin{pmatrix} 6 & 30 \\ 30 & 206 \end{pmatrix}$$

$$A^*\mathbf{b} = \begin{pmatrix} 68 \\ 302 \end{pmatrix}$$

$$A^*A\mathbf{x} = A^*\mathbf{b}$$

$$\mathbf{x} = \begin{pmatrix} 14.7262 \\ -0.6786 \end{pmatrix}$$

$$g(x) = 14.7262 - 0.6786x$$

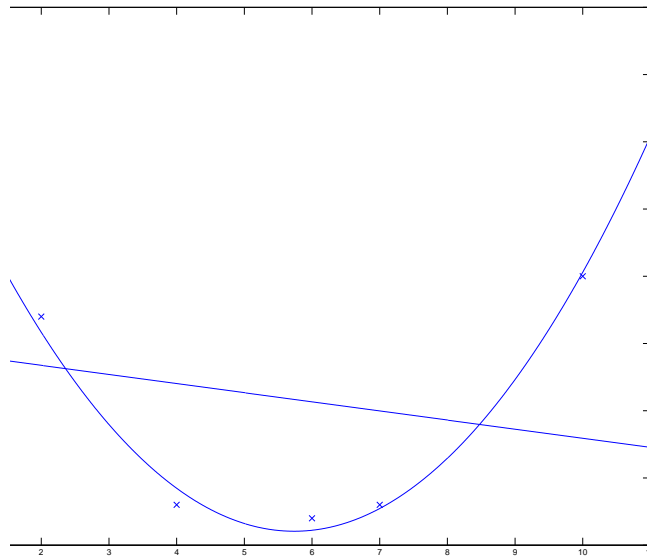
(b) Parabel:

$$A^*A = \begin{pmatrix} 6 & 30 & 206 \\ 30 & 206 & 1632 \\ 206 & 1632 & 13970 \end{pmatrix}$$

$$A^*\mathbf{b} = \begin{pmatrix} 69 \\ 302 \\ 2358 \end{pmatrix}$$

$$\mathbf{x} = \begin{pmatrix} 35.9149 \\ -12.1595 \\ 1.0597 \end{pmatrix}$$

$$p(x) = 35.9149 - 12.1595x + 1.0597x^2$$



2. Aufgabe :

(a) ja

$$COV(X, X^2) = E(X \cdot X^2) - \mu_X \mu_{X^2}$$

$$E(X) = \int_{-1}^1 \frac{1}{2} x \, dx$$

$$= \left. \frac{1}{4} x^2 \right|_{-1}^1$$

$$= 0$$

$$E(X^2) = \int_{-1}^1 \frac{1}{4} x^2 \, dx$$

$$= \left. \frac{1}{12} x^3 \right|_{-1}^1$$

$$= \frac{1}{6}$$

$$\mu_X = 0$$

(b) nein