$$\rightarrow A = S + R \qquad \underline{\underline{F}} = \underline{\underline{A}} \cdot x$$

$$S = S^T \qquad -R = R^T$$

$$A = \underbrace{\frac{1}{2}\left(A + A^T\right)}_{S} + \underbrace{\frac{1}{2}\left(A - A^T\right)}_{R}$$

$$\mathrm{tr}(AB) = 0 \quad \forall \underline{\underline{A}}$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & & \\ \vdots & & \end{bmatrix} \rightsquigarrow \quad a_{11} \cdot b_{11} = 0 \rightsquigarrow b_{11} = 0$$

$$\Uparrow$$

$$= 1$$

$$\sim$$

$$a_2 x^2 + a_1 x + a_0 \cdot A = p(x)$$

$$\langle \underline{\hspace{10em}}, \bigcirc \rangle = \underbrace{\langle p(x), q(x) \rangle}_{=}$$

$$\langle \lambda u, v \rangle \qquad \langle u, v\lambda \rangle$$

$$\bar{\lambda} \langle u, v \rangle \qquad \langle u, v \rangle \lambda$$

$$\lambda \langle u, v \rangle \qquad \langle u, v \rangle \bar{\lambda}$$

$\mathbb{R}$

$$f(v) = \langle w, v \rangle = \dots = \sum \langle w, e_i \rangle \langle e_i, v \rangle$$

$$w = \sum \langle w, e_i \rangle e_i$$

$$v = \sum \langle v, e_i \rangle e_i$$

$$f\left(\sum \langle v, e_i \rangle e_i\right) = \sum f(e_i) \langle v, e_i \rangle$$

$$w = \sum \langle w, e_i \rangle e_i = \sum f(e_i) e_i$$

$$\| f(\cdot \sim) - y_i \|^2 = \| \alpha \vec{v}_1 + \beta \vec{v}_2 + \gamma \vec{v}_3 - \vec{y} \|_2^2$$

$$p = \begin{bmatrix} \alpha \\ \beta \\ \gamma \end{bmatrix}$$

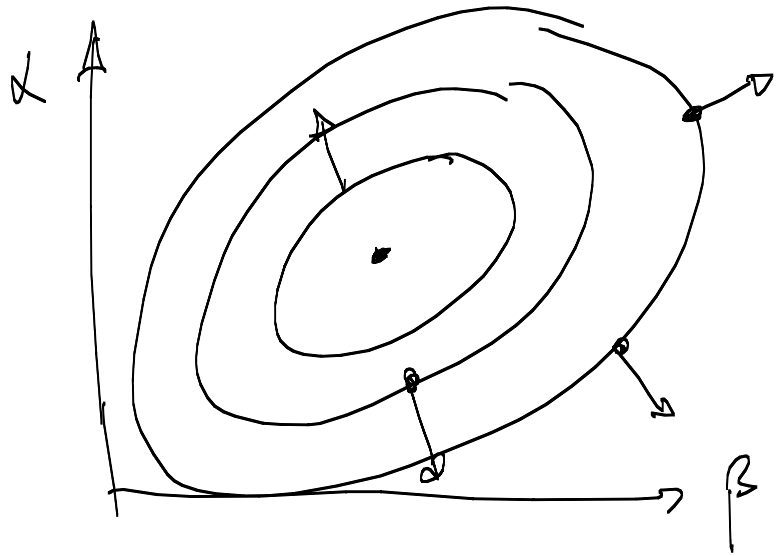
$$S = \begin{bmatrix} | & | & | \\ v_1 & v_2 & v_3 \\ | & | & | \end{bmatrix}$$

$$\min_p \| S \cdot p - y \|_2^2$$

$$Df(p) = 0 \longrightarrow S^T(Sp - y) = 0$$

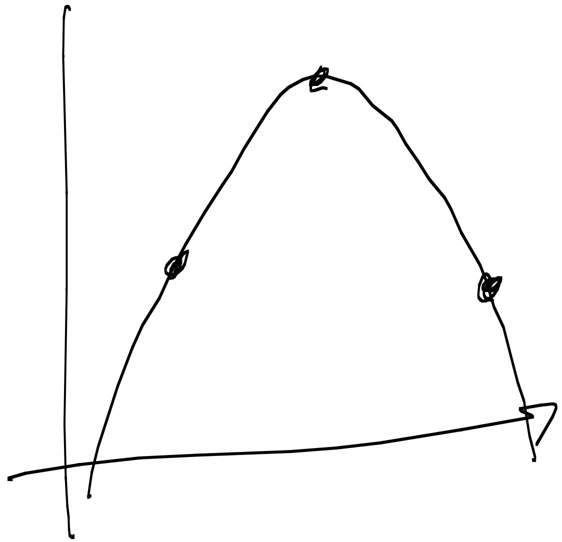
Das muss das optimale p erfüllen

Normalen-Gleichungen



$$S^T\underline{S} = H_f$$

3 Punkte das Polynom was durch diese Punkte geht



$n+1$ Punkte (x_i, y_i)

$p \in \Pi_n \quad : \quad p(x_i) = y_i$

$n+1$ Gleichungen

Bei 3 Punkten

$$a x_1^2 + b x_1 + c = y_1$$

$$a x_2^2 + b x_2 + c = y_2$$

$$a x_3^2 + b x_3 + c = y_3$$

$1, x, x^2$ Basis von Π_2

$$\underbrace{\begin{bmatrix} x_1^2 & x_1 & 1 \\ x_2^2 & x_2 & 1 \\ x_3^2 & x_3 & 1 \end{bmatrix}}_{X} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \vec{y}$$

X invertierbar