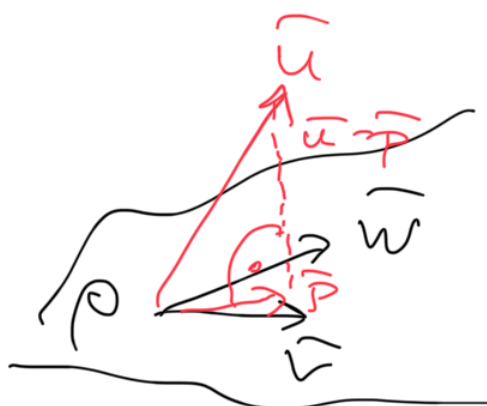


Pr. Vypočítajte ortog. projekci

$$\bar{u} = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix} \text{ do roviny } \bar{v} = \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix}, \bar{w} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

$$\bar{p} = \alpha_1 \bar{v} + \alpha_2 \bar{w}$$

$$\begin{aligned} \bar{u} - \bar{p} &\perp \bar{v} \\ \bar{u} - \bar{p} &\perp \bar{w} \end{aligned}$$



$$A = (\bar{v}, \bar{w}) = \begin{pmatrix} 1 & 1 \\ -1 & 1 \\ 0 & 0 \end{pmatrix}$$

$$A^T A \bar{\alpha} = A^T \bar{u}$$

$\bar{p}$

$$A^T A = \begin{pmatrix} \bar{v} \cdot \bar{v} & \bar{v} \cdot \bar{w} \\ \bar{w} \cdot \bar{v} & \bar{w} \cdot \bar{w} \end{pmatrix} = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

$$A^T \bar{u} = \begin{pmatrix} \bar{v} \cdot \bar{u} \\ \bar{w} \cdot \bar{u} \end{pmatrix} = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$$

$$\left( \begin{array}{cc|c} 2 & 0 & -1 \\ 0 & 2 & 1 \end{array} \right) \quad \begin{aligned} \alpha_1 &= -1/2 \\ \alpha_2 &= 1/2 \end{aligned}$$

$$\bar{p} = \alpha_1 \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix} + \alpha_2 \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

$-1/2 \qquad 1/2$

Pr. Vypočítajte približnú riešenie!

$$2x + y = 1$$

$$x + y = 0$$

$$x - y = 2$$

metódou najmenších čísel

$$A = \begin{pmatrix} 2 & 1 \\ 1 & 1 \\ 0 & -1 \end{pmatrix}, \quad \bar{b} = \begin{pmatrix} 1 \\ 0 \\ 2 \end{pmatrix}$$

$$A^T \cdot A \cdot \bar{x} = A^T \cdot \bar{b}$$

$$A^T \cdot A = \begin{pmatrix} 6 & 2 \\ 2 & 3 \end{pmatrix}$$

$$A^T \vec{b} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$$

$$\left( \begin{array}{cc|c} 6 & 2 & 4 \\ 2 & 3 & -1 \end{array} \right) \xrightarrow{-3 \cdot \text{I}_1} \sim \left( \begin{array}{cc|c} 6 & 2 & 4 \\ 0 & -3 & -13 \end{array} \right)$$

$$\begin{aligned} x_2 &= \frac{13}{3} \\ \underline{\quad} \\ x_1 &= \dots \end{aligned}$$