

① $\mathcal{U} = \text{Lag}\{(1,1,1), (3,1,-1)\}$ \mathbb{R}^3 so skalarym sučinom karoliu Valloua
 ~~\mathcal{U}~~ u je podprostori \mathbb{R}^3

na baze $\mathbb{R}^3 \rightarrow \{(0,0,0), (0,0,1), (0,1,0), (0,1,1), (1,0,0), (1,0,1), (1,1,0), (1,1,1)\}$ na \mathbb{R}^3

$$\begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix}$$

$$((0,0,1), (1,0,0))$$

* baza $\mathcal{U}^\perp = \{(y_1, y_2)\}$ $\mathcal{U} = \text{Lag}\{(1,1,1), (3,1,-1)\}$

$$\text{baze } \mathbb{R}^3 \text{ so } \mathcal{U} = \{(x_1, 0, 0, 1, 0, 0), (0, 1, 0, 0, 1, 0)\}$$

$$\begin{pmatrix} 1 & 1 & 0 \\ 3 & 1 & -1 \end{pmatrix}$$

$$\begin{pmatrix} y_1 & 0 & 0 & 1 & 0 & 0 \\ y_2 & 0 & 1 & 0 & 0 & 1 \end{pmatrix}$$

$$\vec{y}_1 \quad \vec{y}_2$$

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$$\text{baze } \mathbb{R}^6 = \{(0,0,0,0)\}$$

$$\text{baza } \mathcal{Z} = (\vec{x}_1, \vec{x}_2)$$

ortogonalne baze

$$\vec{x}_1 = \vec{y}_1 = (1, 1, 1)$$

$$\vec{x}_2 = \vec{y}_2 - \text{proj}_{\vec{x}_1}(\vec{y}_2) = \vec{y}_2 - \frac{\langle \vec{y}_2, \vec{x}_1 \rangle}{\langle \vec{x}_1, \vec{x}_1 \rangle} \vec{x}_1 = \vec{y}_2 - \frac{3}{3} \vec{x}_1 = \vec{y}_2 - \vec{x}_1$$

$$\langle \vec{x}_1, \vec{x}_1 \rangle = 3$$

$$\equiv (2, 0, -2) = x_2$$

$$\langle \vec{y}_2, \vec{x}_1 \rangle = 3 + 1 - 1 = 3$$

$$\langle x_2, x_2 \rangle = 4 + 4 = 8$$

$$\mathcal{Z} = \{((1, 1, 1), (2, 0, -2))\}$$

$$X = \left(\frac{\vec{x}_1}{\|\vec{x}_1\|}, \frac{\vec{x}_2}{\|\vec{x}_2\|} \right) = \left(\frac{\vec{x}_1}{\sqrt{3}}, \frac{\vec{x}_2}{\sqrt{8}} \right) = \left(\frac{1}{\sqrt{3}}(1, 1, 1), \frac{1}{\sqrt{8}}(2, 0, -2) \right)$$

ortonormálne baze X

$$\mathcal{U}^\perp = \{\vec{w} \in \mathbb{R}^3 : \vec{w} \perp \mathcal{U}\}$$

1+1+1

$$\langle \vec{w}_1, \vec{y}_1 \rangle = 0 \quad \vec{w}_1 = (-1, 1, 1) \quad -1+1+3$$

$$\langle \vec{w}_2, \vec{y}_2 \rangle = 0 \quad \vec{w}_2 = (1, 1, 3)$$

$$\vec{x}_1' = \vec{w}_1$$

$$X' = \left(\frac{\vec{x}_1'}{\sqrt{3}}, \frac{\vec{x}_2'}{\sqrt{8}} \right) = \left(\frac{1}{\sqrt{3}}(-1, 1, 1), \frac{1}{\sqrt{8}}(2, 0, -2) \right)$$

$$\vec{x}_2' = \vec{w}_2 - \text{proj}_{\vec{x}_1'}(\vec{w}_2) = \vec{w}_2 - \frac{\langle \vec{w}_2, \vec{x}_1' \rangle}{\langle \vec{x}_1', \vec{x}_1' \rangle} \vec{x}_1' = \vec{w}_2 - \frac{3}{3} \vec{x}_1' = \vec{w}_2 - \vec{x}_1' = (2, 0, 2) = \vec{x}_2'$$

$$\mathcal{Z}' = \{(-1, 1, 1), (2, 0, 2)\} \quad X' = \left(\frac{\vec{x}_1'}{\sqrt{3}}, \frac{\vec{x}_2'}{\sqrt{8}} \right)$$