$u_1, \dots, u_k$ LN

$\downarrow$

$e_1, \dots, e_k \quad e_i \perp e_j$

$\|e_i\| = 1$

$$e_k = \frac{\sum_{i=1}^{k-1} r_{ik} e_i + u_k}{\|\underbrace{\sum_{i=1}^{k-1} r_{ik} e_i + u_k}_{v_k}\|}$$

$\|e_1\| = 1 \qquad r_{ik} = -\langle e_i, u_k \rangle$

$$\boxed{\underset{\in \mathbb{R}^n}{u_k} = v_k e_k + \sum_{i=1}^{k-1} \langle e_i, u_k \rangle e_i}$$

$$\boxed{\begin{pmatrix} u_1, \dots, u_k \end{pmatrix}}_{n \times k} = \underbrace{\begin{pmatrix} e_1, \dots, e_k \end{pmatrix}}_{n \times k} \underbrace{\begin{pmatrix} v_1 & \langle e_1, u_2 \rangle & & \\ & v_2 & \ddots & \\ 0 & & \ddots & \\ & & & \ddots \end{pmatrix}}_{k \times k}$$

$$\underset{n \times k}{U} = \underset{\substack{OG \\ n \times k}}{E} \cdot \underset{\substack{hs \\ k \times k}}{T}$$

Název: V 16-11:00 (1 z 6)

$$e_1 = \frac{(0,1,2,1)}{\|(0,1,2,1)\|} = \frac{1}{\sqrt{6}}(0,1,2,1)$$

$$\sqrt{1+4+1}$$

$$\overline{e}_2 = -\frac{1}{\sqrt{6}}(e_1 \cdot u_2)e_1 + u_2$$

$$\frac{(-1,1,1,1)(0,1,2,1)\frac{1}{\sqrt{6}}}{}$$

$$= (0+1+2+1)\frac{1}{\sqrt{6}} = \sqrt{6}$$

$$\overline{e}_2 = -e_1 + u_2 =$$

$$= \left(-1, 1-\frac{1}{\sqrt{6}}, 1-\frac{2}{\sqrt{6}}, 1-\frac{1}{\sqrt{6}}\right)$$

$$= \frac{1}{\sqrt{6}}\left(-\sqrt{6}, \sqrt{6}-1, \sqrt{6}-2, \sqrt{6}-1\right)$$

$$6 + 6 - 2\sqrt{6} + 1 + 6 + 4 - 4\sqrt{6}$$

$$+ 6 - 2\sqrt{6} + 1 = 30 - 8\sqrt{6}$$

TAK NE!

$$e_1 = (0, 1, 2, 1)$$

$$e_2 = h_1 e_1 + u_2$$

$$h_1 = -\frac{\langle e_1, u_2 \rangle}{\langle e_1, e_1 \rangle} = -\frac{4}{6}$$

$$(0, 1, 2, 1)(-1, 1, 1, 1) =$$

$$= (0 + 1 + 2 + 1) = 4$$

$$e_2 = -\frac{4}{6}(0, 1, 2, 1) + (-1, 1, 1, 1) =$$

$$= \left(-1, 1 - \frac{4}{6}, 1 - \frac{8}{6}, 1 - \frac{4}{6}\right)$$

$$e_3 = h_1 e_1 + h_2 e_2 + u_3$$

$$h_1 = -\frac{\langle e_1, u_3 \rangle}{\langle e_1, e_1 \rangle} = -\frac{2}{6} = -\frac{1}{3}$$

$$e_2 = \left(-1, \frac{1}{3}, -\frac{1}{3}, \frac{1}{3}\right)$$

$$(0, 1, 2, 1)(1, 0, 1, 0) =$$

$$= (0 + 0 + 2 + 0) = 2$$

$$h_2 = -\frac{\langle e_2, u_3 \rangle}{\langle e_2, e_2 \rangle} = 1$$

$$= -\frac{\left(-1 + 0 - \frac{1}{3} + 0\right)}{1 + \frac{1}{9} + \frac{1}{9} + \frac{1}{9}} = \frac{\frac{4}{3}}{\frac{12}{9}} = 1$$

$$e_3 = -\frac{1}{3}(0, 1, 2, 1) + 1\left(-1, \frac{1}{3}, -\frac{1}{3}, \frac{1}{3}\right) + u_3$$

$$= (-1, 0, -1, 0) + u_3 = 0$$

Název: V 16-11:38 (3 z 6)

$V = W \oplus W^{\perp}$ $\quad W \cap W^{\perp} = \{0\}$

$W \oplus W^{\perp} \subseteq V$

$\dim V = n$

$\dim W = k$

$\dim W^{\perp} = l$

$e_1, \dots, e_k$
$f_1, \dots, f_l$

$e_1, \dots, e_k, f_1, \dots f_l, u_1, \dots, u_p$

báze $W \oplus W^{\perp}$ $\quad$ báze $V$

$e_1, \dots, e_k, f_1, \dots, f_l, h_1, \dots, h_p$

$h_1 \perp e_i$, $h_1 \perp f_j$

$h_1 \in W^{\perp}$

$h_1 \perp h_1 \Rightarrow h_1 = 0$

$$\underbrace{\langle cu - cu_w, cu_w\rangle}_{=0} +$$

$$+ \langle cu - cu_w, du'_w\rangle +$$

$$+ \langle du' - du'_w, cu_w\rangle +$$

$$+ \langle \underbrace{du' - du'_w, d}_{0} u'_w\rangle$$

$$= \langle cu, du'_w\rangle - \langle cu_w, du'_w\rangle$$

$$+ \langle du', cu_w\rangle - \langle du'_w, cu_w\rangle$$

$$\langle w, \underline{u - w}\rangle = \underline{\underline{0}}$$

$$w \in W$$

$$x \in (W + S)^{\perp} \iff$$

$$x \perp W + S \iff$$

$$x \perp W \wedge x \perp S \iff$$

$$x \in W^{\perp} \wedge x \in S^{\perp} \iff$$

$$x \in W^{\perp} \cap S^{\perp}$$