Gram-Schmidt

$S = \{a_1, \ldots, a_k\}$ lin. unabh.

$v_1 = a_1$

$v_2 = a_2 - \frac{a_2 \cdot v_1}{\|v_1\|^2} v_1$

$v_3 = a_3 - \frac{a_3 \cdot v_1}{\|v_1\|^2} v_1 - \frac{a_3 \cdot v_2}{\|v_2\|^2} v_2$

$u_i = \frac{v_i}{\|v_i\|}$

$a_1 \quad a_2 \quad a_3$

$S = \left\{ \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 1 \\ 1 \\ 5 \end{bmatrix} \right\}$

$v_1 = \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix}$, $v_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 3 \end{bmatrix} - \frac{6}{6} \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 2 \\ 1 \\ 1 \end{bmatrix}$

$v_3 = \begin{bmatrix} 3 \\ 1 \\ 1 \\ 5 \end{bmatrix} - \frac{12}{6} \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix} - \frac{8}{6} \begin{bmatrix} 0 \\ 2 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ \frac{1}{3} \\ -\frac{1}{3} \\ -\frac{1}{3} \end{bmatrix}$

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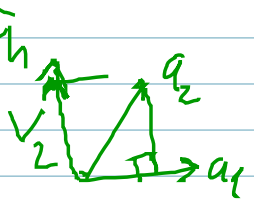
12/6/12, 2:19 AM, 7m 41s

Gram-Schmidt

$S = \{a_1, \dots, a_k\}$ lin. nezh.



$V_1 = a_1$

$V_2 = a_2 - \frac{a_2 \cdot V_1}{\|V_1\|^2} V_1$

$V_3 = a_3 - \frac{a_3 \cdot V_1}{\|V_1\|^2} V_1 - \frac{a_3 \cdot V_2}{\|V_2\|^2} V_2$

$u_i = \frac{V_i}{\|V_i\|}$

a_1, a_2, a_3

$$S = \left\{ \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 1 \\ 1 \\ 5 \end{bmatrix} \right\}$$

$$V_1 = \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix}, \quad V_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 3 \end{bmatrix} - \frac{6}{6} \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 2 \\ 1 \\ 1 \end{bmatrix}$$

$$V_3 = \begin{bmatrix} 3 \\ 1 \\ 1 \\ 5 \end{bmatrix} - \frac{12}{6} \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix} - \frac{8}{6} \begin{bmatrix} 0 \\ 2 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ \frac{1}{3} \\ -\frac{1}{3} \\ -\frac{1}{3} \end{bmatrix}$$

$$\frac{v_1}{\|v_1\|} = \frac{1}{\sqrt{6}} v_1$$

$$\frac{v_2}{\|v_2\|} = \frac{1}{\sqrt{6}} v_2$$

$$\frac{v_3}{\|v_3\|} = \frac{1}{\sqrt{\frac{4}{3}}} v_3 = \frac{\sqrt{3}}{2} v_3$$