Orthogonal Matrics

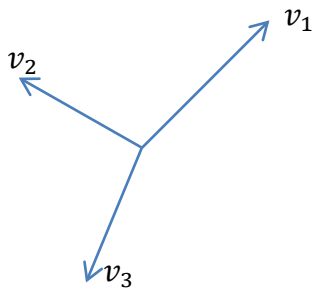
$$A_{ij}^T = A_{ji}$$

$$\big((a_1)\ (a_2) \dots\ (a_n)\big)$$
$$\rightarrow Orthonomal: \begin{cases} a_i . a_j = 0, & i \neq j \\ a_i . a_j = 1, & i = j \end{cases}$$

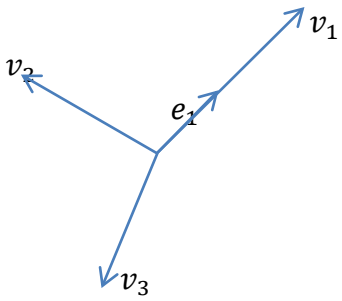
$$A^T A$$
$$\rightarrow \begin{pmatrix} (a_1) \\ (a_2) \\ \dots \\ (a_n) \end{pmatrix} \big((a_1)(a_2) \dots (a_n)\big) = \begin{pmatrix} 1 & 0 & \dots & 0 \\ 0 & 1 & \dots & 0 \\ \dots & \dots & \dots & \dots \\ 0 & 0 & \dots & 1 \end{pmatrix}$$

Gram-Schmidt

$$v = \{v_1, v_2, \dots, v_n\}$$



$$e_1 = \frac{v_1}{|v_1|}$$



$$v_2 = (v_2 . e_1)\frac{e_1}{|e_1|} + u_2$$

$$\rightarrow u_2 = v_2 - (v_2 . e_1)e_1$$

$$\frac{u_2}{|u_2|} = e_2$$