对线性映射 $\mathscr{A}$. $\mathscr{A} \xrightarrow{\mathcal{L}\alpha} A$.

若 $\mathscr{A}\alpha = \lambda\alpha \Rightarrow \mathscr{A}(\alpha_1, \alpha_2, \alpha_3) = (\lambda\alpha_1, \cdots \lambda\alpha_3)$.

$$A(\alpha_1, \alpha_2, \alpha_3) = (\alpha_1, \alpha_2, \cdots \alpha_3)\begin{pmatrix} \lambda_1 & & \\ & \lambda_2 & \\ & & \lambda_3 \end{pmatrix}.$$

$$A\begin{pmatrix} \vdots \end{pmatrix} = \lambda\begin{pmatrix} \ \end{pmatrix}.$$

$\Rightarrow$ ~~$A(\lambda_1, \lambda_2 \cdots \lambda_n) = (\lambda_1, \cdots \lambda_n)'$~~.

$$A(\xi_1, \xi_2, \cdots \xi_n) = (\xi_1, \cdots \xi_n)\begin{pmatrix} \lambda_1 & & \\ & \lambda_2 & \\ & & \ddots \lambda_n \end{pmatrix}.$$

$$A = (\xi_1, \cdots \xi_n)\begin{pmatrix} \lambda_1 & & \\ & \lambda_2 & \\ & & \ddots \lambda_n \end{pmatrix}(\xi_1, \cdots \xi_n)^{-1}.$$

由此可得. $(\xi_1, \cdots \xi_n)$ 可逆即可得到 A 可对角化.

$\xi = (\xi_1, \cdots \xi_n)$ 为 $n \times n$.

$\therefore$ 需要满秩. 又 $\because$ ~~dim~~ $\dim V = n$.

故 $\{\xi_1, \cdots \xi_n\}$ 可作为 V 的一组基.