

2019/10/11

Practice

Prove it

$$V\lambda = \underset{\substack{\textcircled{v_1} \textcircled{v_2} \textcircled{v_3}}}{\begin{bmatrix} v_1 & v_2 & v_3 \end{bmatrix}} \begin{bmatrix} \lambda_1 \\ 0 \\ 0 \end{bmatrix} = \lambda_1 \lambda v_1$$

$$\textcircled{2} V = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

$$\textcircled{1} V\lambda = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} \lambda_1 \\ 0 \\ 0 \end{bmatrix} = \cancel{\begin{bmatrix} \lambda_1 & 2\lambda_1 & 3\lambda_1 \\ 4\lambda_1 & 5\lambda_1 & 6\lambda_1 \end{bmatrix}} = \begin{bmatrix} \lambda_1 \\ 4\lambda_1 \end{bmatrix}$$

$2 \times 3 \quad 3 \times 1 \quad \Rightarrow 2 \times 1$

②

$$\cancel{\lambda_1 \begin{bmatrix} 1 \\ 4 \end{bmatrix}} + \cancel{0 \begin{bmatrix} 2 \\ 5 \end{bmatrix}} + \cancel{0 \begin{bmatrix} 3 \\ 6 \end{bmatrix}} =$$

$$\lambda_1 \begin{bmatrix} 1 \\ 4 \end{bmatrix} + 0 \begin{bmatrix} 2 \\ 5 \end{bmatrix} + 0 \begin{bmatrix} 3 \\ 6 \end{bmatrix} = \lambda_1 \begin{bmatrix} 1 \\ 4 \end{bmatrix} = \begin{bmatrix} \lambda_1 \\ 4\lambda_1 \end{bmatrix}$$

$$\begin{aligned} \hat{y} = \begin{bmatrix} \hat{y}_1 \\ \hat{y}_2 \\ \vdots \\ \hat{y}_m \end{bmatrix} &= \begin{bmatrix} w_1 x_{11} + w_2 x_{12} + \dots + w_N x_{1N} \\ w_1 x_{21} + w_2 x_{22} + \dots + w_N x_{2N} \\ \vdots \\ w_1 x_{m1} + w_2 x_{m2} + \dots + w_N x_{mN} \end{bmatrix} \\ &= \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1N} \\ x_{21} & x_{22} & \dots & x_{2N} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mN} \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_N \end{bmatrix} \\ &= \begin{bmatrix} x_1^T \\ x_2^T \\ \vdots \\ x_m^T \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_N \end{bmatrix} \\ &= Xw \end{aligned}$$