

Sample Mean Vector

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PCA

Mean Vector \checkmark

$X = \begin{bmatrix} 4 & 1 \\ -1 & 3 \\ 3 & 5 \end{bmatrix}^{3 \times 2}$ $n=3$ $p=2$ $\Rightarrow \underline{\underline{PCA}}$

$J \in \mathbb{R}^{n \times 1}$

$\bar{X} = \frac{1}{n} X^T \cdot \mathbf{1}$

$X^T = \begin{bmatrix} 4 & -1 & 3 \\ 1 & 3 & 5 \end{bmatrix}$

$\mathbf{1} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

$\bar{X} = \frac{1}{3} \begin{bmatrix} 4 & -1 & 3 \\ 1 & 3 & 5 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \frac{1}{3} \begin{bmatrix} 4 + (-1) + 3 \\ 1 + 3 + 5 \end{bmatrix} = \frac{1}{3} \begin{bmatrix} 6 \\ 9 \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \end{bmatrix} \checkmark$

$\bar{X} = \frac{2}{3}$ \checkmark