

Find a singular value decomposition for $A = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix}$.

Choose the correct answer

$$\text{A. } P\Sigma_A Q^T = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \cdot \begin{bmatrix} \sqrt{3} & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \cdot \frac{1}{\sqrt{6}} \begin{bmatrix} 2 & -1 & -\sqrt{2} \\ 0 & \sqrt{3} & -\sqrt{2} \\ 1 & \sqrt{3} & \sqrt{2} \end{bmatrix}$$

$$\text{B. } P\Sigma_A Q^T = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & -1 \\ 1 & -1 \end{bmatrix} \cdot \begin{bmatrix} \sqrt{3} & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \frac{1}{\sqrt{6}} \begin{bmatrix} 2 & 0 & \sqrt{2} \\ -1 & -\sqrt{3} & -\sqrt{2} \\ 1 & \sqrt{3} & \sqrt{2} \end{bmatrix}$$

$$\text{C. } P\Sigma_A Q^T = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \cdot \frac{1}{\sqrt{6}} \begin{bmatrix} 2 & 0 & -1 \\ -\sqrt{2} & \sqrt{3} & -\sqrt{2} \\ 1 & \sqrt{3} & -\sqrt{2} \end{bmatrix}$$

$$\text{D. } P\Sigma_A Q^T = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \cdot \begin{bmatrix} \sqrt{3} & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} 2 & 0 & -\sqrt{2} \\ -1 & \sqrt{3} & -\sqrt{2} \\ 1 & \sqrt{3} & \sqrt{2} \end{bmatrix}$$