National University of Computer & Emerging Sciences

Homework # 19

Section : Higher Order Singular Value Decomposition

Question 1: For the Given Tensor: $\mathcal{A} \in \mathbb{R}^{1 \times 2 \times 3}$

$$\mathcal{A}(:,:,1) = \begin{bmatrix} 1 & 0 \end{bmatrix}, \quad \mathcal{A}(:,:,2) = \begin{bmatrix} 1 & -1 \end{bmatrix}, \quad \mathcal{A}(:,:,3) = \begin{bmatrix} 0 & 1 \end{bmatrix}$$

Compute the HOSVD and find:

- Core tensor $\mathcal{S}$,

- Factor matrices $U^{(1)}$, $U^{(2)}$, and $U^{(3)}$.