

Part - C

20181CSE0621

Q.1] We know,  $\phi_{\text{new}} w_{ML} = [\phi^T \phi]^{-1} \phi^T \cdot t$ 

$$\text{Given } \phi(x) = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$$

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

$$\text{Step 1 :- } \phi^T t = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}^T \cdot \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & -1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \end{bmatrix}$$

$$\phi \cdot \phi^T = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & -1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} \phantom{0} & \phantom{0} & \phantom{0} & \phantom{0} \\ \phantom{0} & \phantom{0} & \phantom{0} & \phantom{0} \\ \phantom{0} & \phantom{0} & \phantom{0} & \phantom{0} \\ \phantom{0} & \phantom{0} & \phantom{0} & \phantom{0} \end{bmatrix}$$