

$$u = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \in \mathbb{R}_{3 \times 1} \quad v = \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} \in \mathbb{R}_{3 \times 1}$$

$U^T U = [1 \ 2 \ 3] \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = 14$   
 inner-product  
 dot-product  
 $U^T V$

$U U^T = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [1 \ 2 \ 3] = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{bmatrix}$   
 outer-product  
 $U U^T$

