

# ASSIGNMENT 2

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Download all python codes from

[https://github.com/vishwahurakadli/EE3900/blob/main/Assignment\\_2/EE3900\\_Assignment\\_2.ipynb](https://github.com/vishwahurakadli/EE3900/blob/main/Assignment_2/EE3900_Assignment_2.ipynb)

and latex-tikz codes from

[https://github.com/vishwahurakadli/EE3900/blob/main/Assignment\\_2/EE3900\\_Assignment\\_2.tex](https://github.com/vishwahurakadli/EE3900/blob/main/Assignment_2/EE3900_Assignment_2.tex)

Now

$$\mathbf{B}^T \mathbf{A}^T = (1 \times -2 + 3 \times 4 + (-6) \times 5) \quad (2.0.6)$$

$$\mathbf{B}^T \mathbf{A}^T = (-20) \quad (2.0.7)$$

$$\Rightarrow (\mathbf{AB})^T \quad (2.0.8)$$

Therefore  $(\mathbf{AB})^T = \mathbf{B}^T \mathbf{A}^T$

## 1 PROBLEM

(Matrix-2.52)

If  $\mathbf{A} = \begin{pmatrix} -2 \\ 4 \\ 5 \end{pmatrix}$ ,  $\mathbf{B} = (1, 3, -6)$ , verify that  
 $(\mathbf{AB})^T = \mathbf{B}^T \mathbf{A}^T$

## 2 SOLUTION

Calculating transpose of matrix multiplication on LHS

Matrix multiplication of AB is given by

$$\mathbf{AB} = \begin{pmatrix} -2 \\ 4 \\ 5 \end{pmatrix} (1, 3, -6) \quad (2.0.1)$$

$$\Rightarrow \mathbf{AB} = (-2 \times 1 + 4 \times 3 + 5 \times (-6)) = (-20) \quad (2.0.2)$$

As there is only one element in matrix AB and it is square matrix, therefore transpose of matrix AB is AB itself

$$(\mathbf{AB})^T = (-20) \quad (2.0.3)$$

Calculating multiplication of transpose of matrices  
 Transpose of matrices

$$\mathbf{A}^T = (-2, 4, 5) \quad (2.0.4)$$

$$\mathbf{B}^T = \begin{pmatrix} 1 \\ 3 \\ -6 \end{pmatrix} \quad (2.0.5)$$