

Answer on Question #51652 – Math – Matrix | Tensor Analysis

Question

Given the following:

$$A = 3 \times 3$$

$$B = 2 \times 4$$

$$C = 4 \times 3$$

$$D = 3 \times 2$$

Which of the following are defined:

- 1) $A \times D$;
- 2) $D \times B$;
- 3) $A \times D^T$;
- 4) $C \times D + A \times D^T$;
- 5) $A \times B$;
- 6) $A \times D^T + C$?

Solution

The product **AB** is defined only if the number of columns in **A** and that of **B** are equal.

- 1) $A \times D$. Matrix A has 3 columns, D has 3 rows. Therefore, $A \times D$ is defined.
- 2) $D \times B$. Matrix D has 2 columns, B has 2 rows. Therefore, $D \times B$ is defined.
- 3) $A \times D^T$. Matrix A has 3 columns, D has 3 rows and 2 columns, then D^T has 2 rows. Therefore, $A \times D^T$ is not defined.
- 4) $C \times D + A \times D^T$. Matrix C has 3 columns, D has 3 rows, A has 3 columns, D^T has 2 rows. Therefore, $C \times D + A \times D^T$ is not defined.
- 5) $A \times B$. Matrix A has 3 columns, B has 2 rows. Therefore, $A \times B$ is not defined.
- 6) $A \times D^T + C$. Matrix A has 3 columns, D^T has 2 rows. Therefore, $A \times D^T + C$ is not defined.