CN4004: Maths for Computing

Matrices: Tutorial

1. Consider the following matrices:

$$A = \begin{pmatrix} -2 & 3 & 5 \\ 1 & -2 & 9 \end{pmatrix} \qquad B = \begin{pmatrix} 1 & 2 & 7 \\ 3 & 8 & 4 \end{pmatrix}$$

Find the value of:

a) $A + B$ b) $A - B$ c) $2A + 3B$ d) A^T

2. Consider the following matrices:

$$A = \begin{pmatrix} -2 & 3 \end{pmatrix} \qquad B = \begin{pmatrix} 4 & 1 \\ 2 & 3 \end{pmatrix}$$

Calculate A x B.

3. Consider the following matrices:

$$A = \begin{pmatrix} 2 & 7 \\ 1 & 3 \end{pmatrix} \qquad B = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$$

Calculate A x B

4. Find the determinant of the following matrix, A:

$$A = \begin{pmatrix} 1 & 3 \\ 4 & -2 \end{pmatrix}$$

5. Where possible, find the inverse of the following matrices:

a) $A = \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$ b) $B = \begin{pmatrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{pmatrix}$ c) $C = \begin{pmatrix} 3 & 6 \\ 2 & 4 \end{pmatrix}$

Harder Question

6. Consider the matrix A from the previous question:

$$A = \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$$

Now consider the following matrix D.

$$D = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

If A x X = D, find the value of X.

Advanced question

7. Use matrices to solve the following equations (you can use an online matrix calculator to find the inverse and perform the matrix multiplication):

$$\begin{aligned} 2x + y + 4z &= 7 \\ 5y + z &= 3 \\ -x + 4y + 2z &= -2 \end{aligned}$$