

Practical Work 3

Matrix manipulation

Exercise 01: Basic Commands

<p>Define matrices:</p> $A = \begin{pmatrix} 0 & 8 & 1 & 9 \\ 1 & 3 & 7 & 6 \\ 4 & 0 & 11 & 2 \end{pmatrix} \quad B = \begin{pmatrix} 0 & -1 & 2 & -1 & 8 & 7 \\ 6 & -3 & -2 & 0 & 3 & 2 \\ -4 & -1 & 2 & 7 & 8 & 6 \end{pmatrix}$ $C = \begin{pmatrix} 2 & 2 & 1 & 1 \\ 1 & 3 & 1 & 3 \\ 4 & 0 & 4 & 0 \end{pmatrix}$	» » »
Extract the first 3 rows and the first 2 columns of A	»
Return the size of matrix B	»
Multiply the two matrices A and B	»
Multiply the matrices B and C element-wise	»
How to generate transpose of A?	»
Define a matrix X of size 10×4 containing zeros.	»
Define a matrix Y of size 13×11 containing ones	»
Fill the first and last row of X with randomly generated values	»
Fill the diagonal of Y with randomly generated values	»

Exercise 2: Create a script named *MatrixManipulation* to record the following instructions:

1. Define the X matrix:

$$X = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 & 26 & 27 & 28 & 29 & 30 \end{pmatrix}$$

2. Extract from this matrix the following matrices:

$$Y = \begin{pmatrix} 1 & 2 \\ 11 & 12 \\ 21 & 22 \end{pmatrix} \quad Z = \begin{pmatrix} 8 & 9 & 10 \\ 18 & 19 & 20 \\ 28 & 29 & 30 \end{pmatrix} \quad U = \begin{pmatrix} 3 & 7 \\ 23 & 27 \end{pmatrix}$$

3. Extract from the matrix \mathbf{X} the matrix \mathbf{V} obtained by taking from \mathbf{X} one column out of 2.

4. Construct the following matrices:

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 3 & 2 \\ 0 & 1 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 0 & 0 \end{pmatrix}$$

5. Build the matrix \mathbf{C} defined by blocks as:

$$C = \begin{pmatrix} 3A & B \\ A & -A \end{pmatrix}$$

6. Using the **diag** function, construct the diagonal matrix \mathbf{D} of the same format as the matrix \mathbf{A} and whose diagonal terms are equal to those of \mathbf{A} .

7. Build the row vector \mathbf{V} with 5 components uniformly distributed between -1 and 1.

8. Construct the row column \mathbf{W} of 6 components containing odd numbers greater than or equal to 7.

9. Insert the vector \mathbf{V} in the third row of the matrix \mathbf{C} .

10. Insert vector \mathbf{W} in the last column of \mathbf{C} .

Home Work: *questions from 6 to 10.*

% MATLAB code: Manipulation of matrices