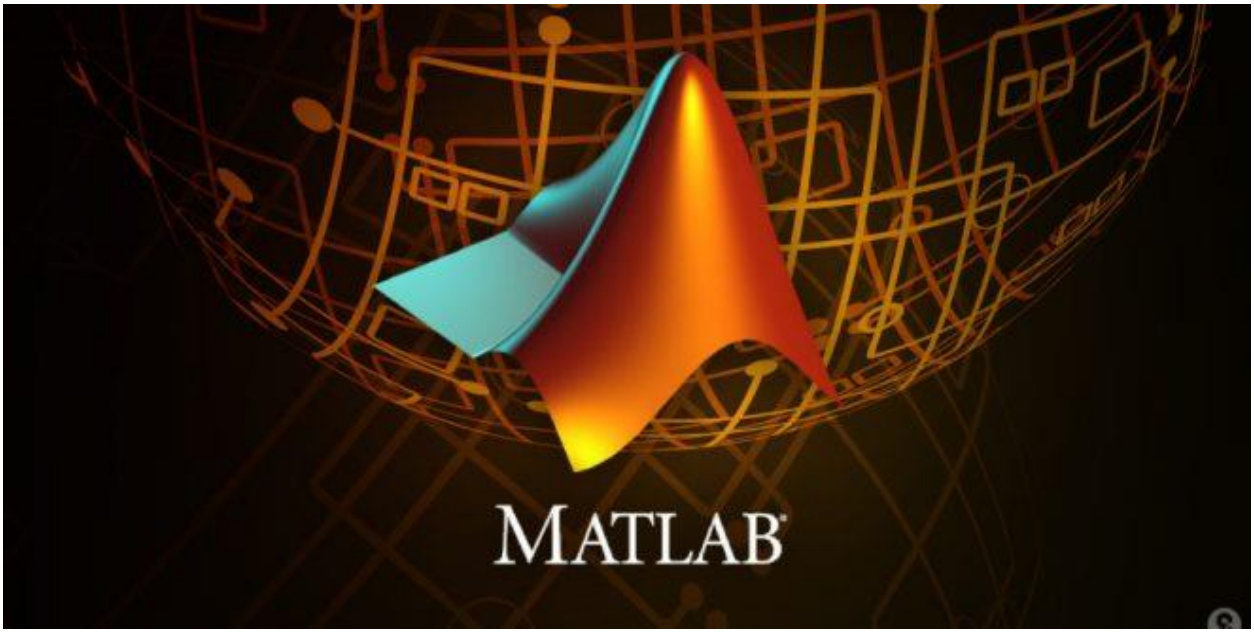
Mohamed Khider University of Biskra, Algeria
Faculty of Sciences and Technology
Department of Civil Engineering and Hydraulics
2nd Year Civil Engineering / Hydraulics / Public Works

Course N°03

Matrix in

MATLAB



Dr. Salah Djerouni

1.Definition a matrix

A matrix is a surrounded by brackets and may have an arbitrary number of rows and columns; for example, the matrix

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \quad (1)$$

To create a such matrix in MATLAB, the following basic conventions must be followed:

- ✓ Separate the elements of a row with spaces or commas ","
- ✓ Use a semicolon ";" to indicate the end of each line or row
- ✓ Surround the entire list of items with square brackets [ ].

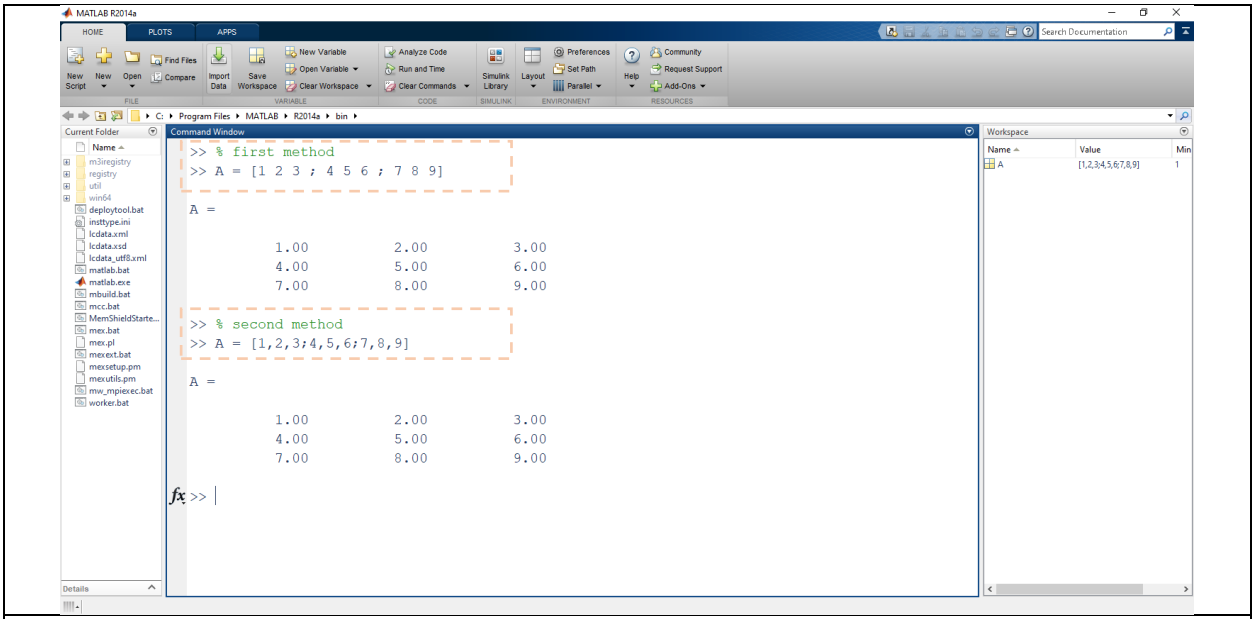


Fig 1. Different methods to create or define a matrix

2.Other useful MATLAB functions

For matrices, to find or extract the highest and/or lowest value or number in the whole matrix, we use the command/function max(.) and/or min(.) two times because these are matrix with two dimensions not one dimension. Otherwise, will indicate the highest values or the lowest values for each column in the matrix.

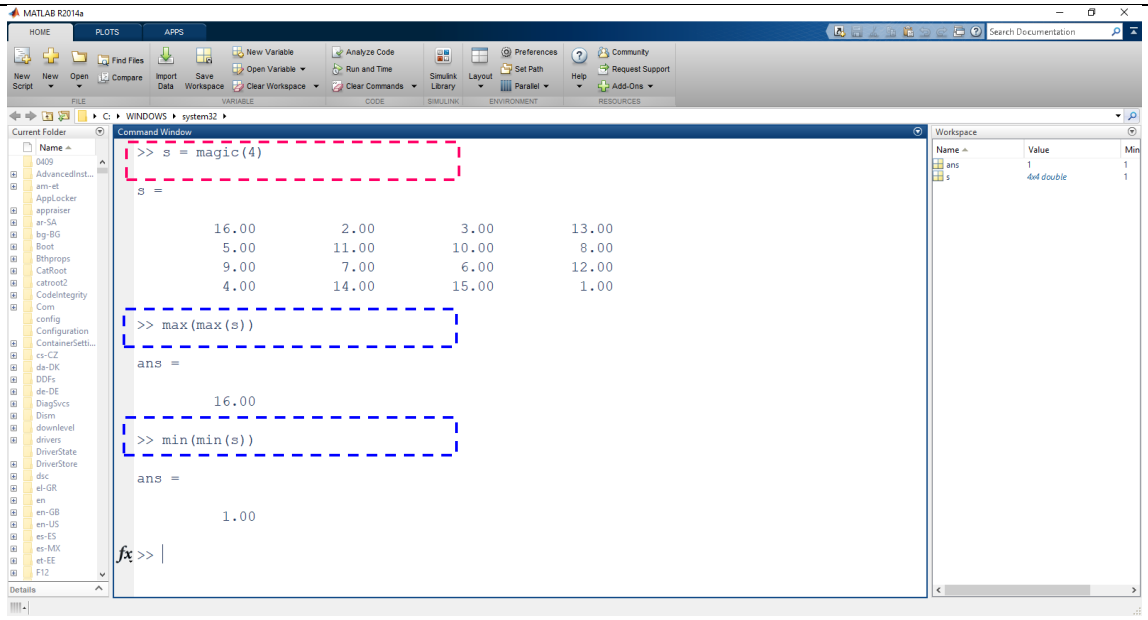


Fig 2. Find the highest and lowest value in the matrix

Again, in order to find or evaluate the summation and/or production of such element in the matrix, we use the command/function sum(.) and prod(.)

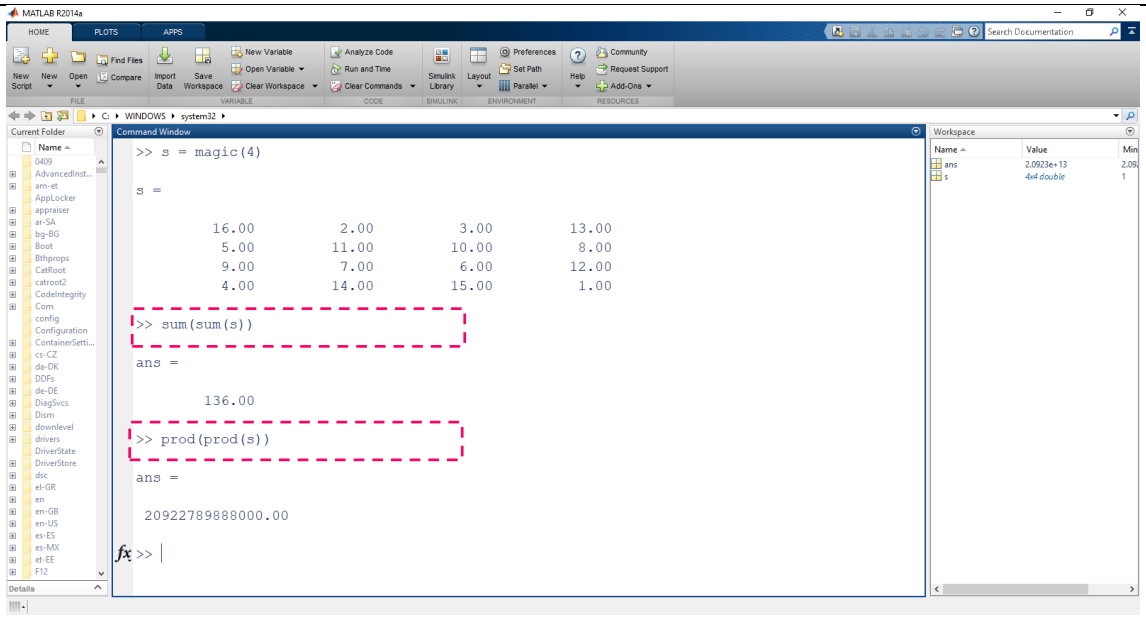


Fig 3. Find summation as well as product of the all of element in the matrix

The mean of a matrix, also known as the average which equal the sum of the numbers in each row in the matrix divided by the number of rows and then the result will sum again and divided on the number of columns, using the command/function mean(.)

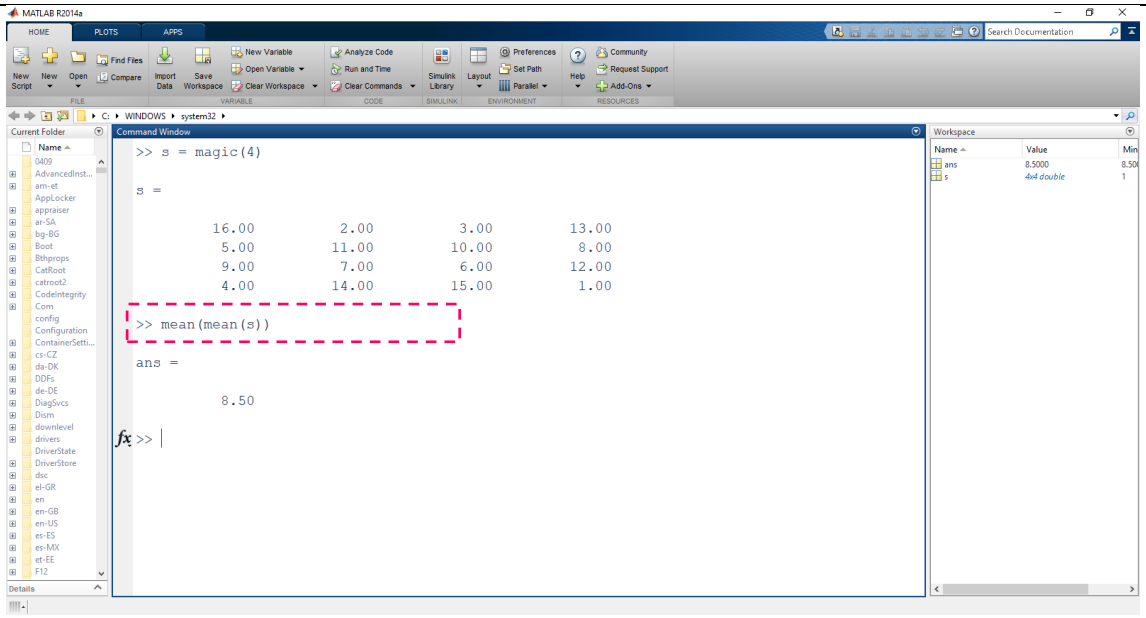


Fig 4. Find the average of the values that contain in the matrix

3.MATLAB output

3.1.The *diag* command

Displaying or to generate a diagonal of a matrix, using the command/function diag(.)

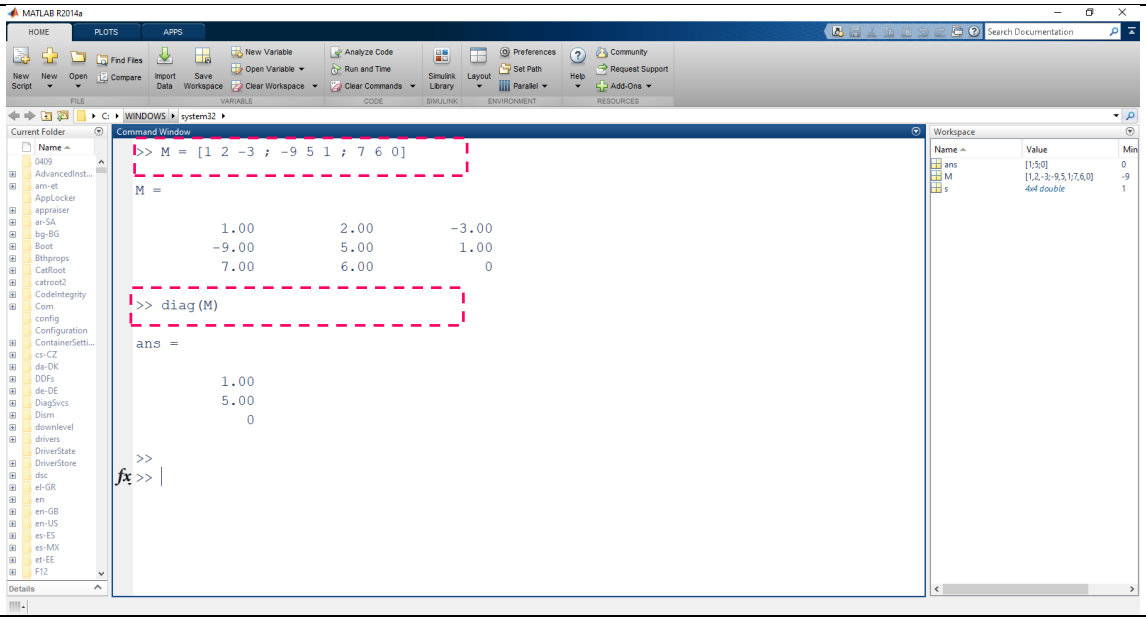


Fig 5. Display the diagonal of the matrix

3.2.The *transpose* and/or ' and/or *transp* command

Transpose a matrix, rows become a columns and columns become rows.

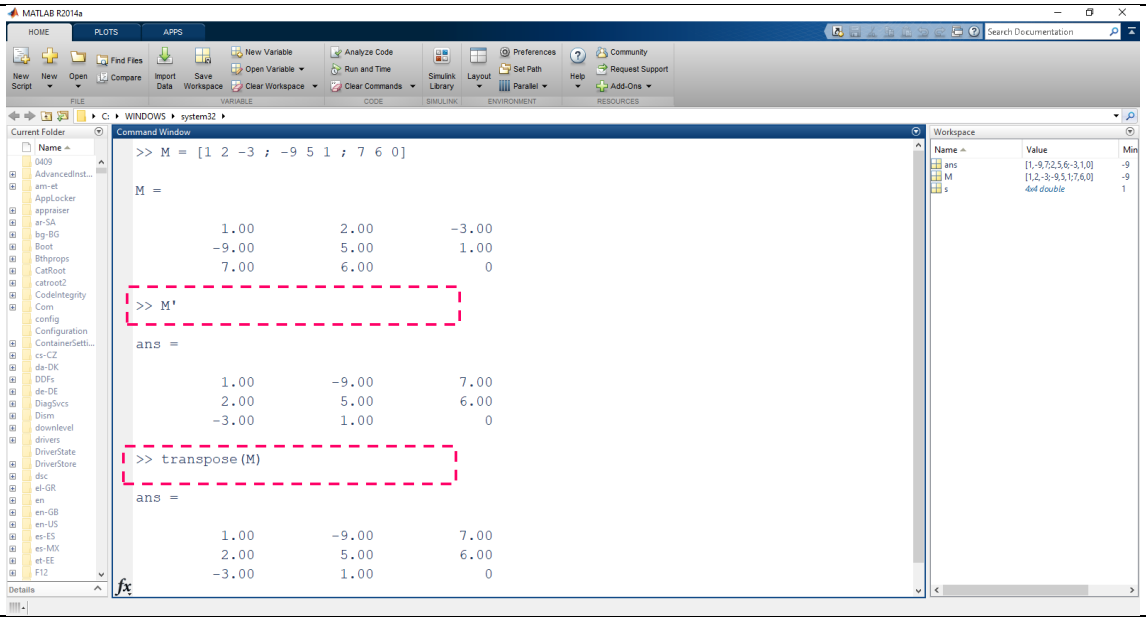


Fig 6. Display the transpose of the matrix

Or

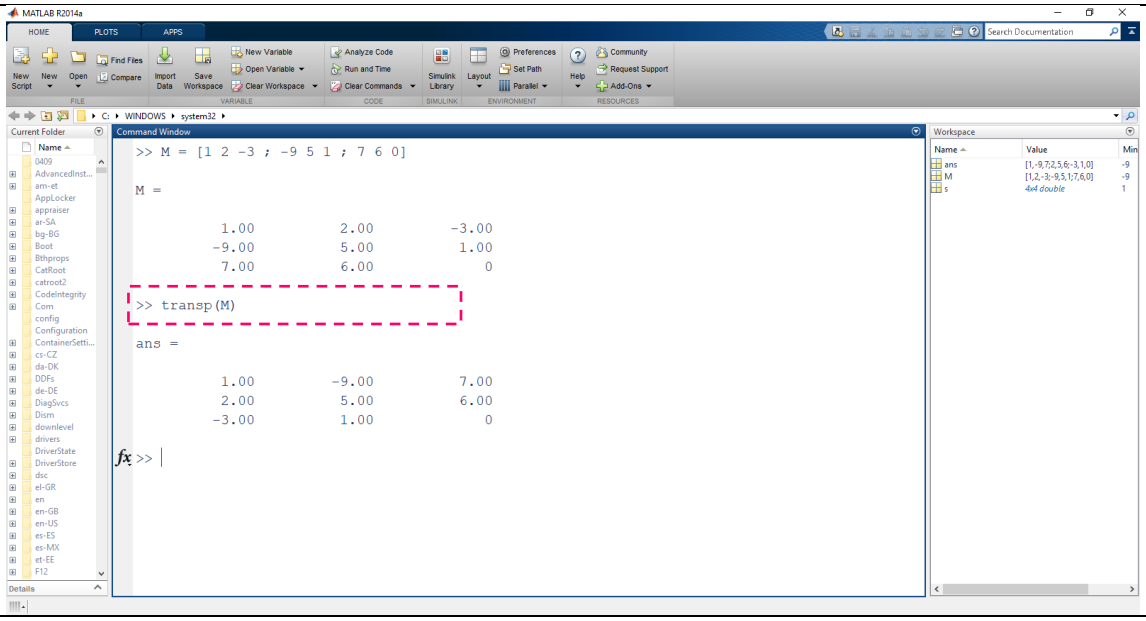


Fig 7. Display the transpose of the matrix another command

3.3.The *inv* command

To display the inverse of such matrix just type the command/function inv(.) and the inverse of the matrix will be printed in the screen

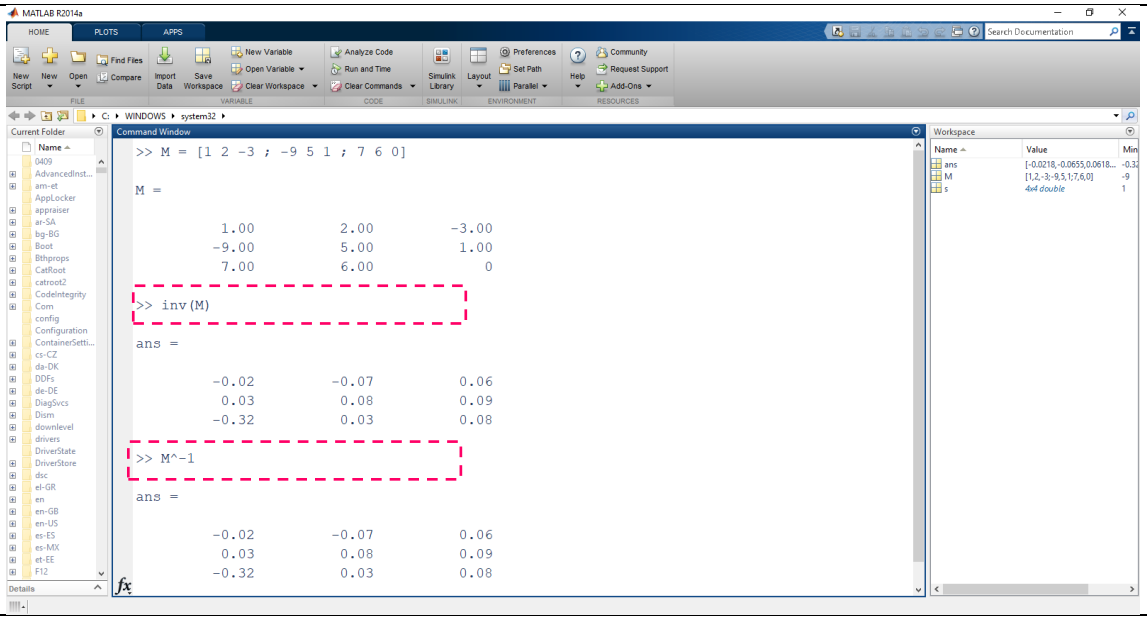


Fig 8. Display the inverse of the matrix

3.4.The *size* command

To display the dimension of a matrix, just type the command/function size(.) and the dimension will be printed in the screen.

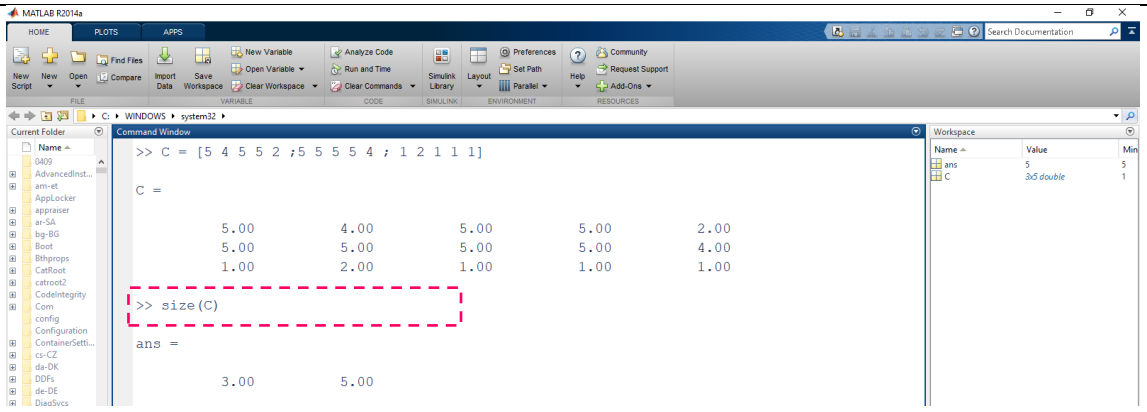


Fig 9. Display the main difference and the relation between two commands size(.)

4.List of References

Kattan, Peter Issa. Matlab for Beginners: A gentle approach. Petra books, 2008.

Etter, Delores M., David C. Kuncicky, and Douglas W. Hull. Introduction to MATLAB. Vol.4. Hoboken, NJ, USA: Prentice Hall, 2002.

Attaway, Stormy. Matlab: a practical introduction to programming and problem solving. Butterworth-Heinemann, 2013.

Driscoll, Tobin A. Learning Matlab. Society for Industrial and Applied Mathematics, 2009.

Butt, Rizwan. Introduction to numerical analysis using MATLAB. Laxmi Publications, Ltd.,2008.

Sigmon, Kermit. Matlab: aide-mémoire. Springer Science & Business Media, 1999.

Chapman, Stephen J. Essentials of MATLAB programming. Cengage Learning, 2016.