

USC GSBME MATLAB CLASS

Fist session

What is MATLAB?

MATLAB is a high-performance language for technical computing
MatLab stands for Matrix Laboratory

A) MATLAB Environment

The MATLAB environment consists of three main parts:

- 1- Command Window
- 2- Work Space
- 3- Current Directory

1. In this part we can write our commands. Moreover, results will be shown in Command Window.
2. In this part, name, type, size and other details about our variables are displayed.
3. It is the default directory for MATLAB. To get access to any file from this directory, we do not need to enter any address and we can just access any file from this directory by simply writing its name.

Notes:

B) Defining variables in MATLAB:

All the variables in MATLAB are defined in the form of matrices. These Matrices can be an integer, a character or a matrix of integers and characters with arbitrarily chosen dimensions.

There are different ways to define a variable in MATLAB and we will discuss two different ways in this session.

1. Direct method:

In this case, we will directly assign numbers to our variables. In other words, we can enter our numbers manually.

Examples:

```
x = [1 2 3;4 5 6;7 8 9]
```

```
y = [ 10 11 12
```

```
13 14 15
```

```
16 17 18];
```

Note 1: putting the “ ; ” sign at the end of a command means that we do not want to see the results on the command window. It will keep the command window clean and save time in some cases (since large data needs time to be shown entirely on the screen). (Try it!)

Note 2: putting a “ ’ ” sign after a variable can change its columns and rows. So you can use it to change column variables to row variables and vice versa. (Try it!)

2. Using MATLAB functions:

Some of these functions are:

`rand();`

`randn();`

`zeros();`

`ones();`

`eye();`

`diag();`

`magic();`

Notes:

C) Extracting from matrices

Again, there are two different ways to locate a part of a matrix.

1. Direct method

```
a = x(2,3)
```

which extracts the element on the second row and the third column.

```
a=x(2,1:4)
```

which extracts the elements on the second row and the first four columns.

Let's find out what `a=x(2,:)` does!

2. Using MATLAB functions

Some of these functions are:

```
triu();
```

```
tril();
```

```
diag();
```

```
max();
```

```
min();
```

Notes: