Subject: Computer Applications

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Lecture 1

Overview of the User Interface:

MATLAB is a multi-paradigm numerical computing environment and proprietary programming language developed by Math Works. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, C#, Java, Fortran and Python.

It is assumed that the software is installed on the computer, and that the user can start the program. Once the program starts, the MATLAB desktop window opens with the default layout, Figure 1-1. The layout has a Toolstrip at the top, the Current Folder Toolbar below it, and four windows underneath. At the top of the Toolstrip there are three tabs: HOME, PLOTS, and APPS. Clicking on the tabs changes the icons in the Toolstrip. Commonly, MATLAB is used with the HOME tab selected. The associated icons are used for executing various commands, as explained later. The PLOTS tab can be used to create plots, and the APPS tab can be used for opening additional applications and Toolboxes of MATLAB.

The default layout (Figure 1-1) consists of the following four windows that are displayed under the Toolstrip: The Command Window (larger window at the center), the Current Folder Window (on the left) and the Workspace and Command History windows (on the right). A list of several MATLAB windows and their purposes is given in Table 1-1.

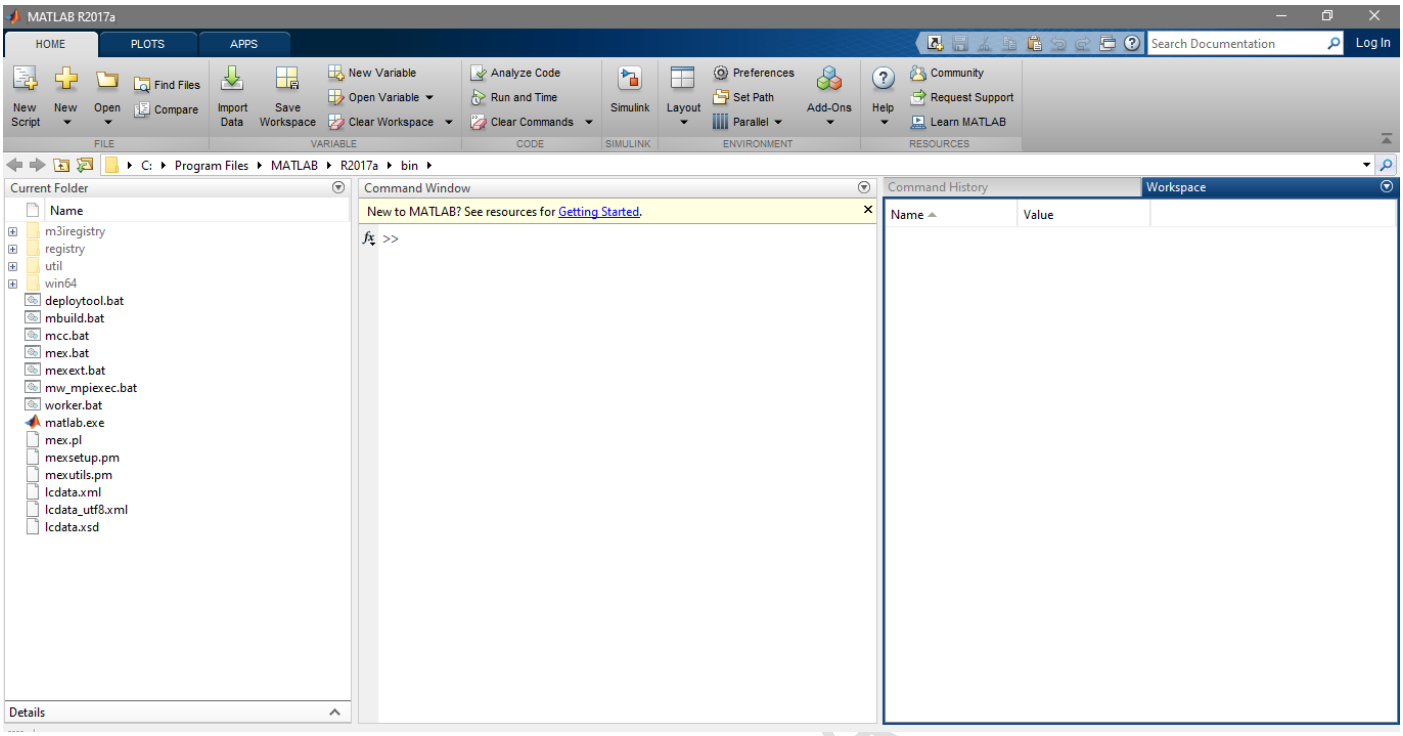

Figure 1-1: The default view of MATLAB desktop.

Table 1-1: MATLAB windows

Window	Purpose
Command Window	Main window, enters variables, runs programs.
Figure Window	Contains output from graphic commands.
Editor Window	Creates and debugs script and function files.
Help Window	Provides help information.
Command History Window	Logs commands entered in the Command Window.

Table 1-1: MATLAB windows

Window	Purpose
Workspace Window	Provides information about the variables that are stored.
Current Folder Window	Shows the files in the current folder.

1-1 Figure Window:

The Figure Window opens automatically when graphics commands are executed, and contains graphs created by these commands more detailed description of this window is given in later.

1-2 Editor Window:

The Editor Window is used for writing and editing programs. This window is opened by clicking on the New Script icon in the Toolstrip, or by clicking on the New icon and then selecting Script from the menu that opens. An example of an Editor Window is shown in Figure1-2 where it is used for writing script files, and it is used to write function files.

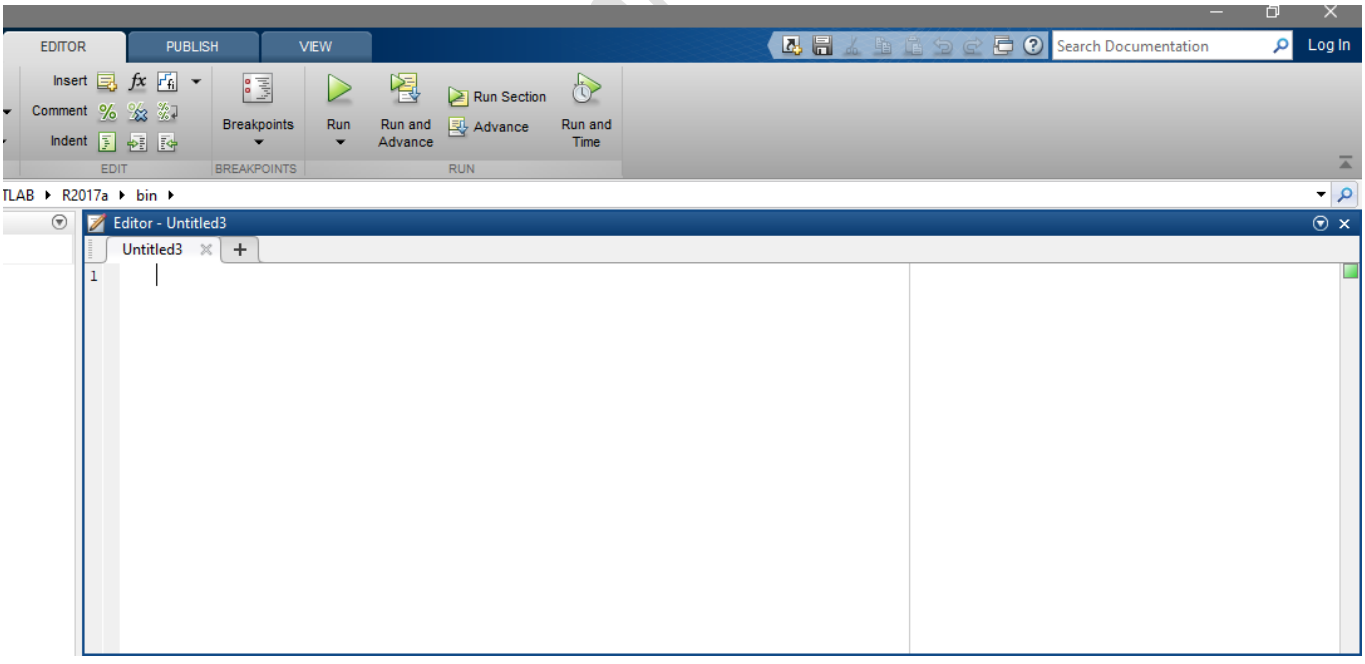

Figure 1-2: Example of an Editor Window

1.3 Help Window:

The Help Window contains help information. This window can be opened from the Help icon in the Toolstrip of the Command Window or the toolbar of any MATLAB window. The Help Window is interactive and can be used to obtain information on any feature of MATLAB. Figure 1-3 shows an open Help Window.

When MATLAB is started for the first time, the screen looks like that shown in Figure 1-1. For most beginners it is probably more convenient to close all the windows except the Command Window. The closed windows can be reopened by selecting them from the layout icon in the Toolstrip. The windows shown in Figure 1-1 can be displayed by clicking on the layout icon and selecting **Default** in the menu that opens. The various windows in Figure 1-1 are docked to the desktop.

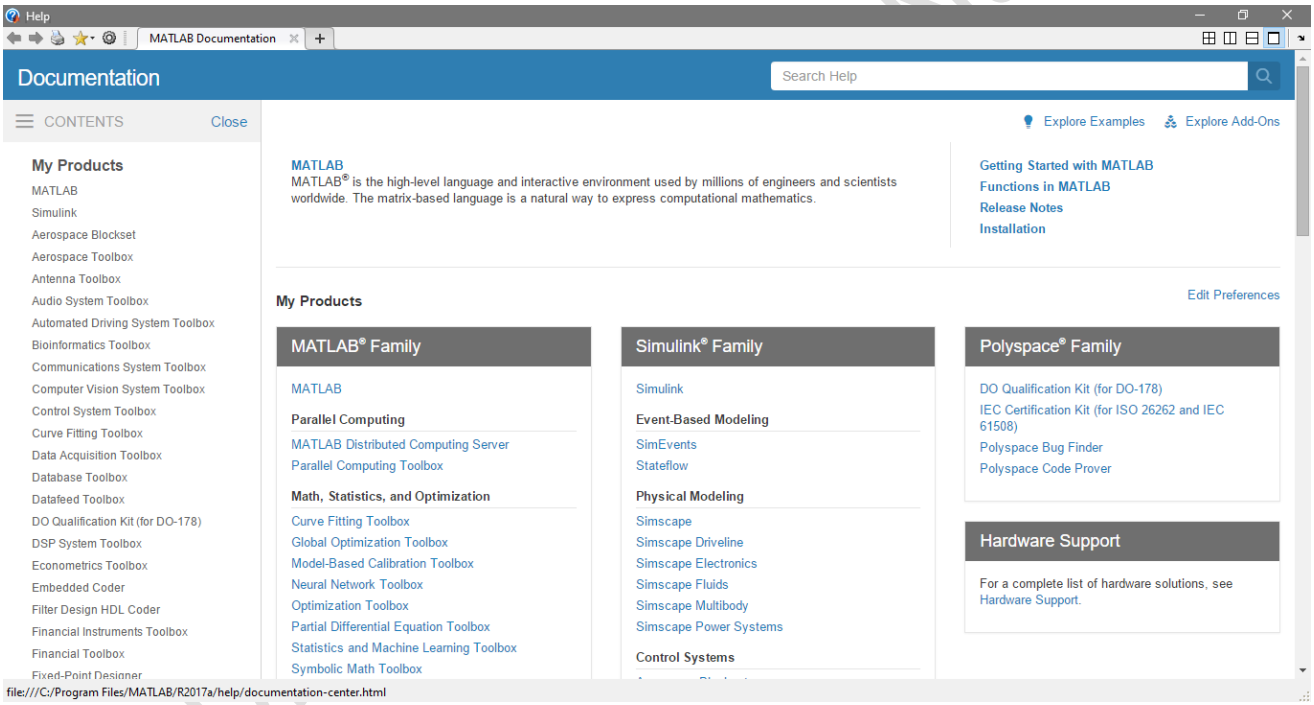

Figure 1-3: The Help Window.

1.4 The Command History Window:

The Command History Window lists the commands that have been entered in the Command Window. This includes commands from previous sessions. A command in the Command History Window can be used again in the Command Window. By double-clicking on the command, the command is reentered in the Command Window and

executed. It is also possible to drag the command to the Command Window, make changes if needed, and then execute it. The list in the Command History Window can be cleared by selecting the lines to be deleted and then right-clicking the mouse and selecting **Delete** Selection. The whole history can be deleted by right-clicking the mouse and selecting choose Clear Command History in the menu that opens.

1.5 Command Window:

The standard mix of menus appears on the top of the MATLAB desktop that allows you to do things like file management and debugging of files you create. You will also notice a drop-down list on the upper right side of the desktop that allows you to select a directory to work in. The most important item of business right now is the **Command Window**.

The Command Window is found on the right-hand side of the MATLAB desktop. Commands are entered at the prompt with looks like two successive "greater than" signs >>. The Command Window is MATLAB's main window and can be used for executing commands, opening other windows, running programs written by the user, and managing the software (see Figure 1-4).

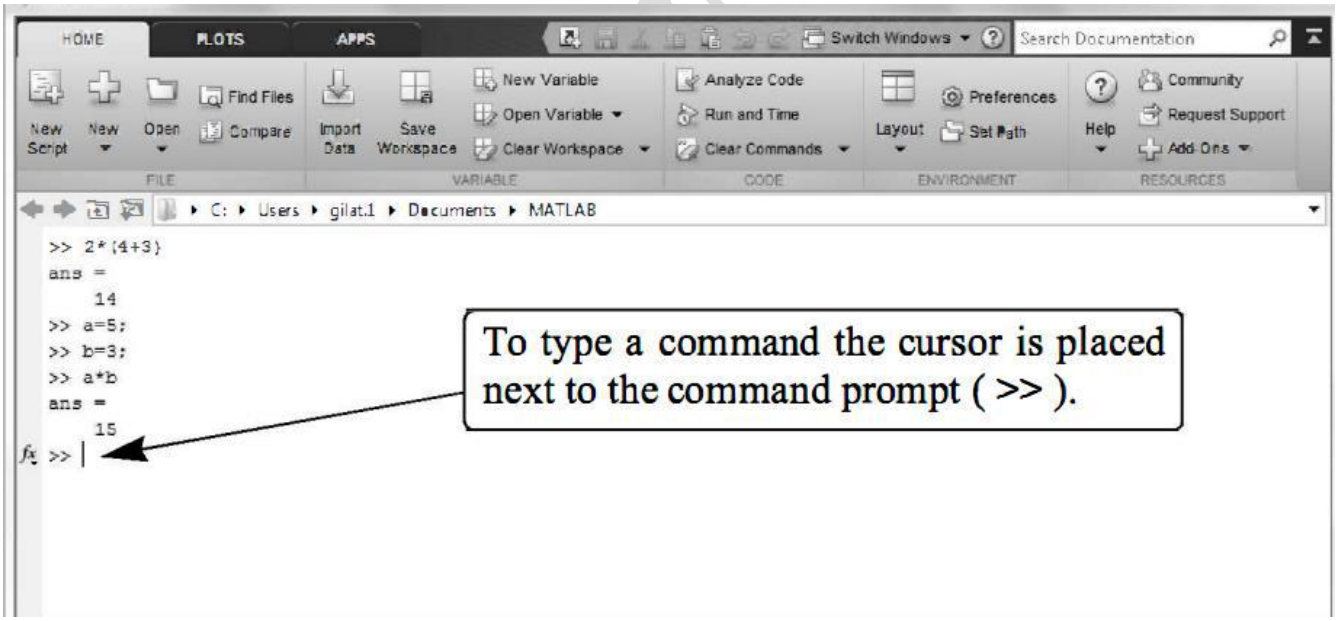

Figure 1-4: The Command Window

Notes for working in the Command Window :

• To type a command, the cursor must be placed next to the command prompt (>>) .

• Once a command is typed and the Enter key is pressed, the command is executed. However, only the last command is executed. Everything executed previously (that might be still displayed) is unchanged .

• Several commands can be typed in the same line. This is done by typing a comma between the commands. When the Enter key is pressed, the commands are executed in order from left to right .

• It is not possible to go back to a previous line that is displayed in the Command Window, make a correction, and then re-execute the command.

• A previously typed command can be recalled to the command prompt with the up-arrow key (↑). When the command is displayed at the command prompt, it can be modified if needed and then executed. The down-arrow key (↓) can be used to move down the list of previously typed commands.

• If a command is too long to fit in one line, it can be continued to the next line by typing three periods (...) (called an ellipsis) and pressing the Enter key. The con attenuation of the command is then typed in the new line. The command can continue line after line up to a total of 4,096 characters.

semicolon (;):

In many instances, it is not desirable to have MATLAB spit out the result of an assignment. To suppress MATLAB output for an expression, simply add a semicolon (;) after the expression. In the following command sequence, first we just type in the assignment x = 3. MATLAB duly reports this back to us. On the next line, we enter x = 3; so that MATLAB does not waste space by telling us something we already know. Instead it comes back with the command prompt waiting for our next input:

```
>> x = 3
x =
   3
>> x = 3;
>>
```

We can include multiple assignments on the same line. For example, the following expressions are valid

```
>> x = 2; y = 4; z = x*y
z =
  8
```

Notice the two semicolons, they tell MATLAB we don't want to see the values of x and y.

symbol %:

When the symbol % (percent) is typed at the beginning of a line, the line is designated as a comment. This means that when the Enter key is pressed the line is not executed. The % character followed by text (comment) can also be typed after a command (in the same line). This has no effect on the execution of the command. Usually there is no need for comments in the Command Window. Comments, however, are frequently used in a program to add descriptions or to explain the program

```
>> ro=5.6; %the electronic density of state
```

The clc command:

The clc command (type clc and press Enter) clears the Command Window. After typing in the Command Window for a while, the displaymay become very long. Once the clc command is executed, a clear window is displayed. The command does not change anything that was done before. For example, if some variables were defined previously, they still exist and can be used. The up-arrow key can also be used to recall commands that were typed before.