Ministry of Higher Education and Scientific Research

Al-Mustaqbal University

College of Engineering

Medical Instrumentation Techniques Engineering Department

Computer programming

One Class

Weeks 1

Introduction of MATLAB

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1.1 Introduction: MATLAB is a powerful computing system for handling the calculations involved in scientific and engineering problems. The name MATLAB stands for MATrix LABoratory, because the system was designed to make matrix computations particularly easy. One of the many things you will like about MATLAB (and which distinguishes it from many other computer programming systems, such as C++ and Java) is that you can use it interactively. This means you type some commands at the special MATLAB prompt, and get the answers immediately. The problems solved in this way can be very simple, like finding a square root, or they can be much more complicated, like finding the solution to a system of differential equations. For many technical problems you have to enter only one or two commands, and you get the answers at once. MATLAB does most of the work for you.

1.2 MATLAB Environments: The MATLAB Desktop is what results when you invoke MATLAB on your computer and provides a convenient and easily configurable interface to the various tools that make up the development environment. Depending on how you have set preferences for your specific installation of MATLAB, it should look something like that shown in Figure1.1. In order to begin, we must assume that you have already gained some familiarity with the MATLAB development environment. Of course the portion of the MATLAB desktop with which you should be most familiar is the Command Window as this is where you will issue commands directly to MATLAB. Specifically, you type the MATLAB statements at the Command Window prompt which is denoted by >> . Generally we will refer to this

as the "command prompt." A few other items with which you will want to become familiar are: the Command History where all the commands entered in the Command Window are recorded, the MATLAB Search Path and how you can add and remove folders from this search path, and the three MATLAB file types that we will be mainly working with M-files, FIG-files, and MAT-files. These file types derive their names from the file extensions. We will avoid other MATLAB file types.

such as MEX-Files and P-Files. You will also want to become familiar

with the MATLAB Figure Window as this is where you display graphics

and GUIs and the MATLAB Editor/Debugger where you will create
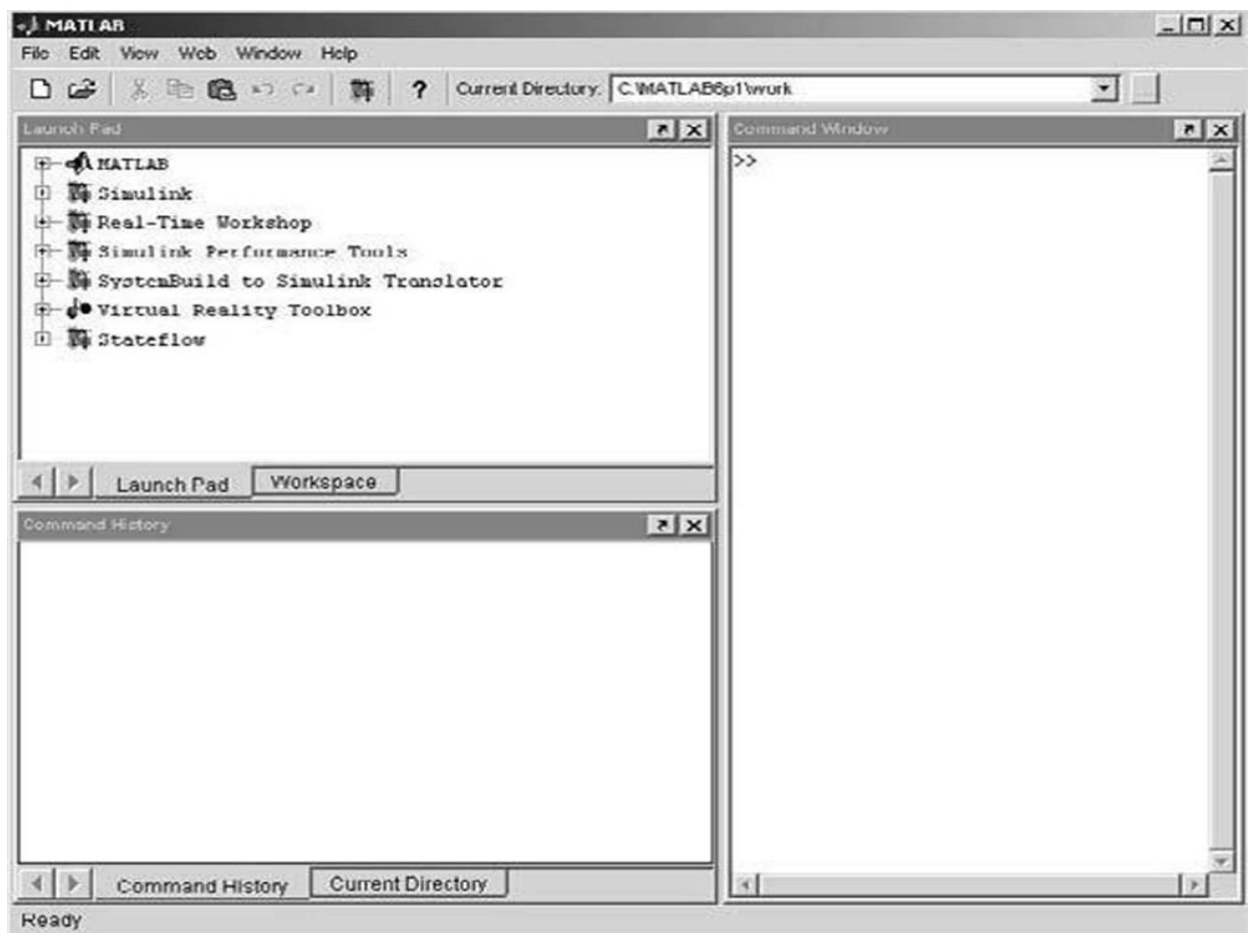
scripts and functions.

Figure1.1 The MATLAB desktop.

1.3 MATLAB Windows:

1. Command Window: is the main window where you type commands directly to the MATLAB interpreter. MATLAB expressions and statements are evaluated as you type them in the Command window, and results of the computation are displayed there too. Expressions and statements are also used in M-files. They are usually of the form: (Variable = Expression) Or (simply: Expression) Expressions are usually composed from operators, functions, and variable names. Evaluation of the expression produces a matrix (or other data type), which is then displayed on the screen or assigned to a variable for future use. If the variable name and =sign are omitted, a variable ans (for answer) is automatically created to which the result is assigned.

 2. Workspace Window: This lists variables that you have either entered or computed in your MATLAB session. There are many fundamental data types (or classes) in MATLAB, each one a multidimensional array. The classes that we will concern ourselves with most are rectangular numerical arrays with possibly complex entries, and possibly sparse. An array of this type is called a matrix. A matrix with only one row or one column is called a vector (row vectors and column vectors behave differently; they are more than mere one dimensional arrays). A 1–by–1 matrix is called a scalar.

 3. Help Window: gives you access to a great deal of useful information about the MATLAB language and MATLAB computing environment. It also has a number of example programs and tutorials. You can also use the help eig command, typed in the Command window. For example,

the command eig will give information about the eigenvalue function eig.

4. Command History window: This window lists the commands typed in so far. You can re-execute a command from this window by double clicking or dragging the command into the Command window. Try double-clicking on the command: A=A+1

Shown in your Command History window. For more options, right-click on a line of the Command window.

5. Editor Window: is a simple text editor where you can load, edit and save complete MATLAB programs. The Editor window also has a menu command (Debug/Run) which allows you to submit the program to the command window.