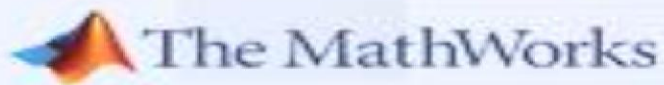


INTRODUCTION TO MATLAB

MATLAB[®] R2006a
The Language of Technical Computing

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The name MATLAB stands for MATrix LABoratory. MATLAB was written originally to provide easy access to matrix software developed by the LINPACK (linear system package) and EISPACK (Eigen system package) projects.

MATLAB [1] is a high-performance language for technical computing. It integrates *computation, visualization, and programming environment*. Furthermore, MATLAB is a modern programming language environment: it has sophisticated *data structures, contains* built-in editing and *debugging tools, and supports object-oriented programming*. These factors make MATLAB an excellent tool for teaching and research.

MATLAB has many advantages compared to conventional computer languages (e.g., C, FORTRAN) for solving technical problems. MATLAB is an interactive system whose basic data element is an *array that does not require dimensioning*. The software package has been commercially available since 1984 and is now considered as a standard tool at most universities and industries worldwide.

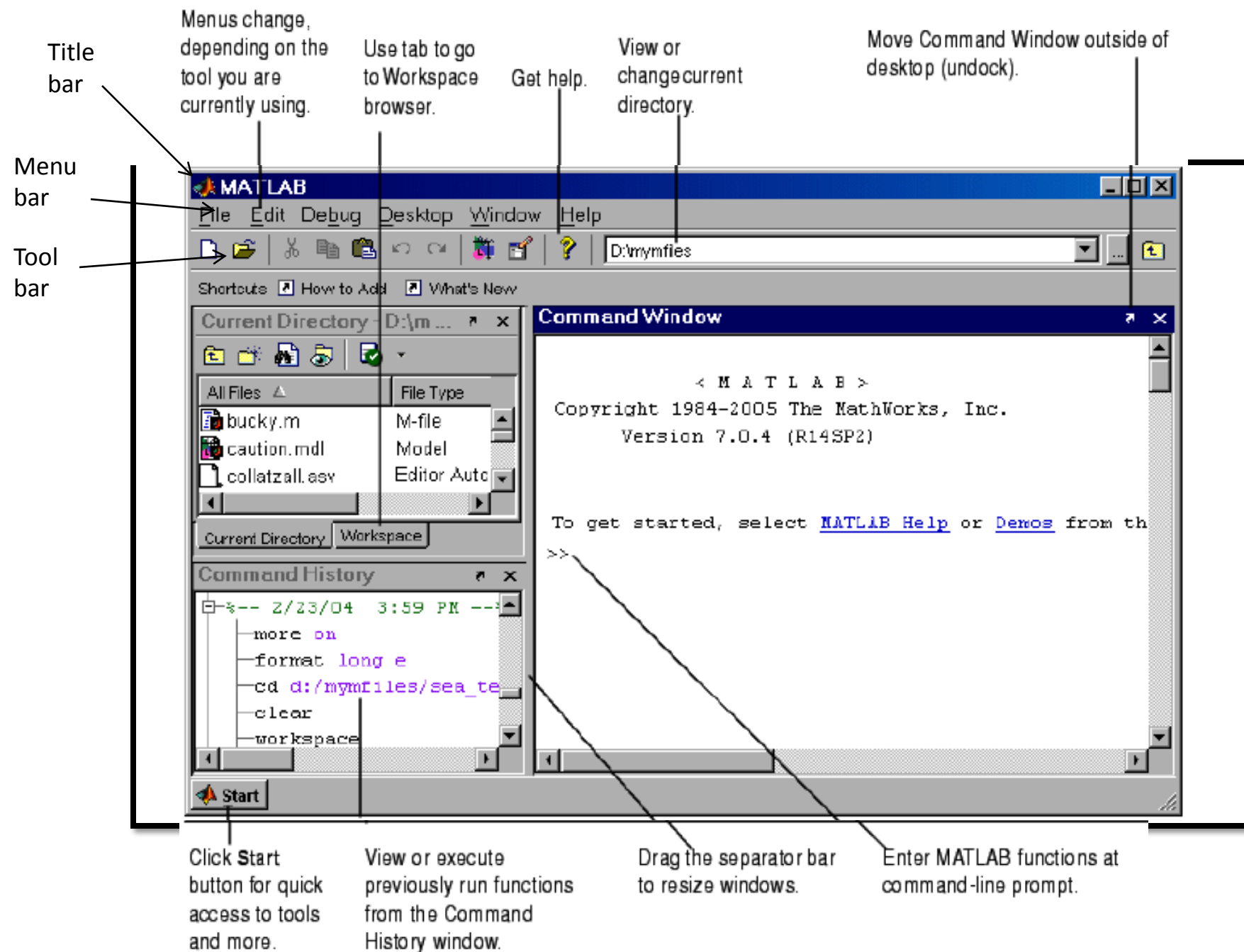
It has powerful *built-in routines that enable a very wide variety of computations*. It also has easy to use graphics commands that make the visualization of results immediately available. Specific applications are collected in packages referred to as *toolbox*. There are toolboxes for signal processing, symbolic computation, control theory, simulation, optimization, and several other fields of applied science and engineering.

Starting MATLAB :

After logging into your account, you can enter MATLAB by double-clicking on the MATLAB shortcut *icon on your Windows desktop*. When you start MATLAB, a special window called the MATLAB desktop appears. The desktop is a window that contains *other windows*. The major tools within or accessible from the desktop are:



- ² ***The Command Window***
- ² ***The Command History***
- ² ***The Workspace***
- ² ***The Current Directory***
- ² ***The Help Browser***
- ² ***The Start button***



- **The Command Window**

The command window is the active window immediately appears after launching MATLAB. This window allows a user to enter simple commands to perform simple computations. One enters MATLAB commands after the ">>" prompt and presses enter to execute the command. To recall the last commands entered, simply press the up or down arrows; one can edit the commands before executing them

- **Workspace Browser:**

The workspace is an area of memory normally accessible from the MATLAB command line. It maintains a set of variables built up during a MATLAB session. MATLAB variables through this browser may be viewed, manipulated, saved, and cleared.

- Command History Window

The Command History window displays a log of the statements most recently run in the Command Window.

- Current Directory Browser

The Current Directory browser includes tools to help manage your directories and files related to MATLAB (search for, view, open, find, and make changes).

Alternate Windows

The smaller of the two windows is alternate windows that can be accessed by clicking on the tabs (Current directory, workspace).

MATLAB Numbers

There are three kinds of numbers used in MATLAB:

- Integers (**3**, **-1**, **6000**, **-2500**).
- Real (**2.3**, **-4.3**, **35777.1**, **23.564327**). Numbers with decimal point (.)
- Complex (**2-4i**, **-4+4i**, **2i**, **1+3j**).

(The variable **i** or **j** are used for present imaginary part).

In addition to these, MATLAB has three variables representing non-numbers:

- (**Inf**, **-inf**) which are the negative and positive infinity. Infinity is generated by the operation of dividing by zero or by overflow such as **e¹⁰⁰⁰**

- NaN) stands for Not-A-Number and it is obtained as a result of the mathematically undefined operations such as 0/0.

Using MATLAB as a Calculator

For example, let's suppose you want to calculate the expression, $1 + 2 * 3$. You type it at the prompt command (`>>`) as follows:

```
>> 1+2*3  
ans =  
    7
```

MATLAB uses a default variable **ans**, short for answer, to store the results of the current calculation.

To avoid this, you may assign a value to a variable or output argument name. For example,

```
>> x = 1+2*3  
x =  
    7
```