MATLAB :

MATLAB (matrix laboratory) is a fourth-generation high-level programming language and interactive environment for numerical computation, visualization and programming. MATLAB is developed by MathWorks.

It allows matrix manipulations; plotting of functions and data; implementation of algorithms; creation of user interfaces; interfacing with programs written in other languages, including C, C++, Java, and FORTRAN; analyze data; develop algorithms ;and create models and applications.

It has numerous built-in commands and math functions that help you in mathematical calculations, generating plots, and performing numerical methods.

MATLAB's Power of Computational Mathematics:

MATLAB is used in every facet of computational mathematics. Following are some commonly used mathematical calculations where it is used most commonly:

1. Dealing with Matrices and Arrays
2. 2-D and 3-D Plotting and graphics
3. Linear Algebra
4. Algebraic Equations
5. Non-linear Functions
6. Statistics
7. Data Analysis
8. Calculus and Differential Equations
9. Numerical Calculations
10. Integration
11. Transforms

12.Curve Fitting

13.Various other special functions

Features of MATLAB:

Following are the basic features of MATLAB:

1. It is a high-level language for numerical computation, visualization and application development.

2. It also provides an interactive environment for iterative exploration, design and problem solving.

3. It provides vast library of mathematical functions for linear algebra, statistics ,Fourier analysis, filtering, optimization, numerical integration and solving ordinary differential equations.

4. It provides built-in graphics for visualizing data and tools for creating custom plots.

5. MATLAB's programming interface gives development tools for improving code quality, maintainability, and maximizing performance.

6. It provides tools for building applications with custom graphical interfaces.

7. It provides functions for integrating MATLAB based algorithms with external applications and languages such as C, Java, .NET and Microsoft Excel.

Uses of MATLAB:

MATLAB is widely used as a computational tool in science and engineering encompassing the fields of physics, chemistry, math and all engineering streams. It is used in a range of applications including:

1. signal processing and Communications
2. image and video Processing
3. control systems
4. test and measurement
5. computational finance
6. computational biolog

MATLAB IDE:

MATLAB development IDE can be launched from the icon created on the desktop. The main working window in MATLAB is called the desktop. When MATLAB is started, the desktop appears in its default layout:

The MATLAB desktop consists of the following parts:

1. Current Directory: To view, open, search for, and make changes to MATLAB related directories and files.
2. Command Window: This is the main area where commands can be entered at the command line. It is indicated by the command prompt ($>>$).
3. Workspace: Shows the name of each variable, its value, and the Min and Max entry if the variable is a matrix.
4. Command History: This panel shows or rerun commands that are entered at the command line.
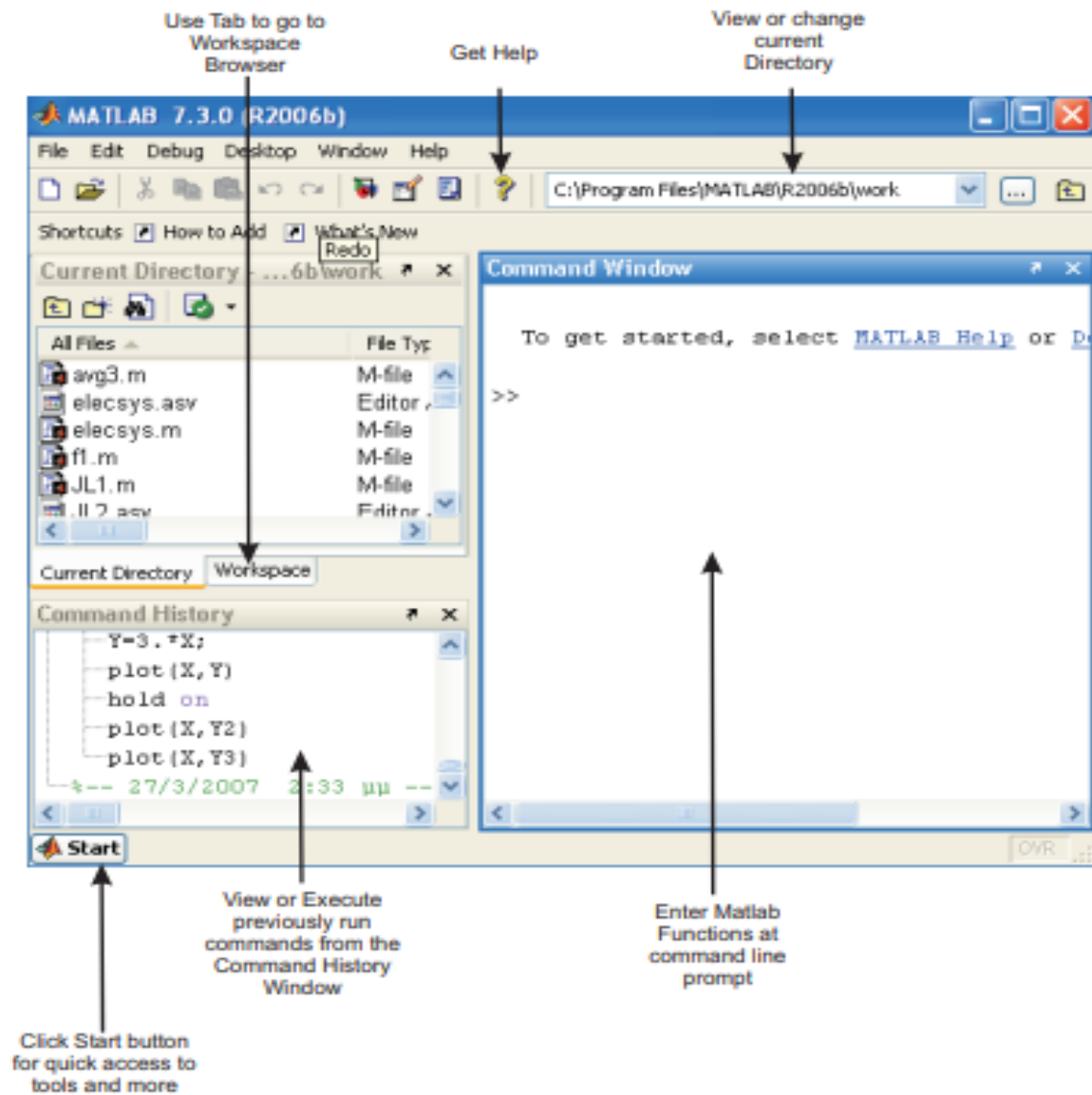
Figure 1: MATLAB Desktop (default layout)

Using MATLAB as a calculator:

As an example of a simple interactive calculation, just type the expression you want to evaluate. For example, let's suppose you want to calculate

the expression, $1 + 2 \times 3$. You type it at the prompt command (>>) as follows,

3*2+1 <<

ans=

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You will have noticed that if you do not specify an output variable, MATLAB uses a default variable ans, short for answer, to store the results of the current calculation. Note that the variable ans is created (or overwritten, if it is already existed). To avoid this, you may assign a value to a variable or output argument name. For example,

 <<x = 1+2*3

x=

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will result in x being given the value $1 + 2 \times 3 = 7$. This variable name can always

be used to refer to the results of the previous computations. Therefore, computing 4x will result in

*4 <<x

ans=

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