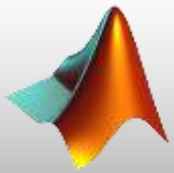


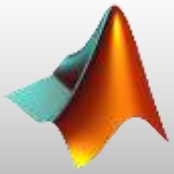
# MATLAB Advantages

- 1) Ease of use
- 2) Platform independent
- 3) Predefined functions
- 4) Device Independent plotting
- 5) Graphics user interface
- 6) MATLAB compiler



# MATLAB Disadvantages

- 1) Slow than compiled languages.
- 2) High cost.



# MATLAB Environment

## The MATLAB Desktop

The command history window

The command window

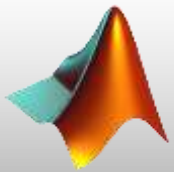
The Current folder browser

The editor window

The figure window

The workspace browser

The help browser



# MATLAB Environment

Menus change, depending on the tool you are currently using.

View or change the current directory.

Click to move Command Window outside of desktop (undock).

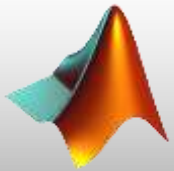
The screenshot displays the MATLAB environment interface. The main window has a menu bar with **File**, **Edit**, **Debug**, **Desktop**, **Window**, and **Help**. Below the menu bar is a toolbar with various icons. The address bar shows the current directory as `d:\mymfiles`. The interface is divided into several panes:

- Current Directory - d:\my...:** A file explorer showing a list of files and folders. The list includes:

All Files	File Type	La
sea_temp	Folder	Ap
bucky.m	M-file	No
caution.mdl	Model	No
- Command Window:** A window for entering MATLAB commands. It contains the text: "To get started, select [MATLAB Help](#) or [Demos](#)" followed by a prompt `>>`.
- Command History:** A window showing the history of commands entered. The visible commands are:

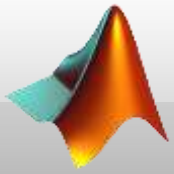
```
-- 4/16/04 10:00 AM --%
| clc
| format long e
| cd d:/mymfiles/sea_tem
```

The Windows taskbar at the bottom shows the **Start** button.



# MATLAB Scratch Pad

MATLAB can be used as a scratch pad to perform mathematical calculations. The calculations to be performed are typed directly into the command window, using the symbols +, -, \*, /, and ^ for addition, subtraction, multiplication, division and exponentiation, respectively. After an expression is typed, the results of the expression will be automatically calculated and displayed.



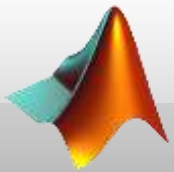
# MATLAB Scratch Pad

For example suppose we would like to calculate the volume of a cylinder of radius  $r$  and length  $l$ . The area of the circle at the base of the cylinder is given by the equation

$$A = \pi r^2$$

And the total volume of cylinder will be

$$V = A l$$



# MATLAB Scratch Pad

If the radius of the cylinder is 0.1m and the length is 0.5m, then the volume of the cylinder can be found using the MATLAB statements

```
>> A=pi*0.1^2
```

```
A=
```

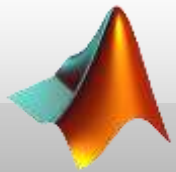
```
0.0314
```

```
>> V=A*0.5
```

```
V=
```

```
0.0157
```

Note that pi is predefined to the value 3.141592...



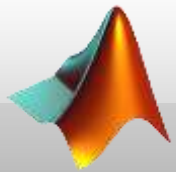
# Variables and Arrays

A MATLAB variable is a region of memory containing an array that is known by a user specified name. The content of the array may be used or modified at any time by including its name in an appropriate MATLAB command.

MATLAB variable name must begin with a letter, followed by any combination of letters, numbers and the underscore character. Only the first 63 characters are significant.

A variable of type double is automatically created whenever the numerical value is assigned.





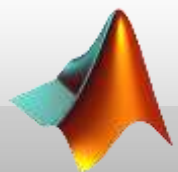
# Variables and Arrays

The fundamental unit of data in any MATLAB is the array.

An array is the collection of data elements organized into rows and columns and known by the single name.

Arrays can be classified as either vectors or matrices. (Vector is usually used to describe an array with only one dimension, while the term matrix is usually used to describe an array with two or more dimensions.)

```
>> A=[1 2 3 4];           % one dim array (vector)
>> B=[1 2; 3 4];
>> C=[1 2 3; 4 5 6; 7 8 9];
```



# Variables and Arrays

## Creating Multi-Dimensional Arrays

Multidimensional arrays in MATLAB are created the same way as two-dimensional arrays. For example, first define the 3 by 3 matrix, and then add a third dimension.

```
A = [5 7 8; 0 1 9; 4 3 6];
```

```
A(:,:,2) = [1 0 4; 3 5 6; 9 8 7]
```

```
A(:,:,1) =
```

```
5 7 8
```

```
0 1 9
```

```
4 3 6
```

```
A(:,:,2) =
```

```
1 0 4
```

```
3 5 6
```

```
9 8 7
```