Introduction to MATLAB

Connect with me: Youtube | LinkedIn | WhatsApp Channel | Web | Facebook | Twitter

- Download PDF

Introduction

- MATLAB stands for Matrix Laboratory.
- It's a proprietary (paid) programming platform specifically designed for engineers and scientists.
- It allows users to analyze data, create data visualizations, develop algorithms, and create models.

Command Window

- In MATLAB, the Command Window is your interactive workspace. It's like a command center where you can directly interact with the software.
- The Command Window displys the command prompt `>>` and a cursor where commands are entered and are excutated instantaneously on pressing the `Enter` key of the keyboard.

What is the ans variable?

- Think of ans as a temporary "holding area" that MATLAB automatically creates under specific conditions.
- Whenever you execute a command or function without assigning the output to a named variable, the result gets stored in ans.

```
result = sin(pi/2); % `result` stores the output (1) explicitly
2 + 3 * 4;          % `ans` holds the implicit output (14)
```

In the second line, since we didn't assign the calculation (14) to a specific variable, it goes into the ans variable.

Start with a clean slate:

```
clc
```

the `clc` command clears any previous commands or outputs from the window, giving you a fresh start.

Example 1.1 from book [1].

Example #1: Find the value of z for the expression z = 2x+y, if x=5 and y=7.

```
% Given values
x = 5;
y = 7;
```

```
% Expression for z
z = 2*x + y;
```

Example #2: Find the value of z for the expression z = (3x + 2y) / 4, if x=10 and y=5.

```
% Given values
x = 10;
y = 5;

% Expression: z = (3x + 2y) / 4
z = (3*x + 2*y) / 4;
```

Example #3: Find the value of q for the expression q = x^2 + 2xy + y^2, if x=2 and y=3.

```
% Given values
x = 2;
y = 3;

% Expression: q = x^2 + 2xy + y^2
q = x^2 + 2*x*y + y^2;
```

Command History Window

- The Command History Window consists of a list of all the commands that are entered in the Command Window.

Workspace

- A workspace is a collection of all the variables that have been generated so far in the current MATLAB session and shows their data type and size.
-

Check the current workspace:

```
who
```

The who command shows you a list of all the currently defined variables and their values in the workspace.

Some Useful MATLAB Commands

General Commands

date: ver:

Directory Commands

ls:

Workspace Commands

who whos clear all clc clf

Help commands

help helpwin help topic doc lookfor

Key Terms

True/False (Mark T for True and F for False)

- The clc command clears the command history. **True or False**
- The workspace stores all variables and their values during a session. **True or False**

Multiple Choice (Select the best answer)

> Which of the following statements is TRUE about MATLAB?

1. ☐ It's an open-source programming language.
2. ☐ It's specifically designed for engineers and scientists
3. ☐ It cannot be used for data visualization.

> What does the ans variable represent in MATLAB?

1. ☐ A user-defined variable.
2. ☐ A temporary storage for implicit output.
3. ☐ A specific function for mathematical calculations.
4. ☐ A keyword for accessing the command history.

> What does MATLAB stand for?

1. ☐ Mathematical Analysis Tool Box
2. ☐ Matrix Laboratory
3. ☐ Machine Learning Application Tool
4. ☐ Multi-function Analysis Language

> What is the purpose of the clc command in MATLAB?

1. ☐ Clear the command history
2. ☐ Close the current figure window
3. ☐ Clear all variables in the workspace
4. ☐ Clear the screen and display a new prompt

> What is the difference between the who and whos commands in MATLAB?

1. ☐ who displays all variables, while whos shows detailed information like size and class.
2. ☐ who shows only numeric variables, while whos displays all variable types.

3. [ ] who is used for clearing the workspace, and whos displays the command history.
4. [ ] There is no difference; both commands do the same thing.

> What is the primary function of the help command in MATLAB?

1. [ ] To display the current working directory.
2. [ ] To provide information and documentation about MATLAB functions, commands, and syntax.
3. [ ] To save the current state of the workspace.
4. [ ] To clear the command window and history.

> What does the "doc" command do in MATLAB?

1. [ ] Displays a list of available functions.
2. [ ] Opens the MATLAB documentation browser.
3. [ ] Prints the source code of a function.
4. [ ] Provides examples of MATLAB code.

> How is the helpwin command different from the help command in MATLAB?

1. [ ] helpwin displays help text in a separate window, while help displays help text in the Command Window
2. [ ] helpwin is used for accessing documentation of built-in functions, while help is used for custom functions
3. [ ] There is no difference; both commands provide the same functionality
4. [ ] helpwin is used for accessing toolbox documentation, while help is used for accessing function documentation

> What does the "ver" command in MATLAB do?

1. [ ] Verifies the syntax of a MATLAB script
2. [ ] Verifies the version of MATLAB currently installed
3. [ ] Verifies the integrity of MATLAB's installation files
4. [ ] Verifies the licensing information of MATLAB

> Which command in MATLAB clears only the command window and doesn't affect the workspace?

1. [ ] clc
2. [ ] clear
3. [ ] close all
4. [ ] delete

> What does the "clear all" command do in MATLAB?

1. [ ] Clears the command window
2. [ ] Removes all variables from the workspace
3. [ ] Deletes all files in the current directory
4. [ ] Exits MATLAB session

> What does the "doc" command do in MATLAB?

1. [ ] Displays the content of a variable

2. ☐ Opens the MATLAB documentation browser with the specified topic
3. ☐ Clears the current command window
4. ☐ Executes a predefined MATLAB script

Fill in the Blanks

- The keyword _____ displays all currently defined variables in the workspace. (who)

Exercises

Review Questions

- What is MATLAB and what is its primary area of application?
- List the major components of the MATLAB enivornmnet?
- What is the difference between who and whos commands?
- What is a script file?
- What is the workspace in MATLAB, and what is its purpose?
- What is the primary function of the command window in MATLAB
- What is the purpose of the command history?
- What is the purpose of the semicolon (😉 and the comment symbol (%) in MATLAB code?

Answer:

Semicolon (😉:

- Separates statements: Primarily, the semicolon separates multiple statements on a single line. Each statement after the semicolon is executed independently. For example:

```
a = 5; b = a^2;
```

Suppresses output: When placed at the end of a line, the semicolon suppresses the output of that specific line in the command window. This is useful if you want to perform calculations but don't need to see the intermediate results.

Comment symbol (%):

Marks non-executable text: Anything following the percent sign (%) on the same line is considered a comment and is ignored by MATLAB during execution. This allows you to add notes, explanations, or reminders within your code, improving readability and maintainability.

References and Bibliography

[1] Raj Kumar Bansal, A. K. Goel, and Manoj Kumar Sharma, MATLAB and its applications in engineering : [based iôn MATLAB 7.5 (R2007b)]. Delhi: Pearson, 2012.