MATLAB TUTORIAL FOR BEGINNERS

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The purpose of this workshop is to get you started and to have fun with MATLAB!
Let’s talk a little and decide on what we will be covering today.

- WHY MATLAB?
- WHAT MATLAB IS NOT.
- SETTING THE TOOL:
- MATRIX OPERATIONS:
- XY PLOTS IN MATLAB
- IMPORTING DATA:
- SIMULINK:

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• WHY MATLAB?
  • MATLAB is relatively easy to learn
  • MATLAB code is optimized to be relatively quick when performing matrix operations
  • MATLAB may behave like a calculator or as a programming language
  • MATLAB is interpreted, errors are easier to fix.

• WHAT MATLAB IS NOT.
  Limitations of MATLAB
  • MATLAB is NOT a general purpose programming language.
  • MATLAB is an interpreted language (making it for the most part slower than a compiled language such as C++)
  • MATLAB is designed for scientific computation and is not suitable for some things (such as parsing text).
SETTING THE TOOL:
Open MATLAB:

This is a Classroom license for instructional use. Research and commercial use is prohibited.
Using Toolbox Path Cache. Type "help toolbox_path"

To get started, select "MATLAB Help" from the Help

>> demo

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To get started, select "MATLAB Help" from the Help menu.

>> |
To get started, select "MATLAB Help" from the menu bar.
Use the Arrow to unlock the Command History window from the Desktop.

To get started, select "MATLAB Help" from the Help menu.
the Help menu.
Use the **View** menu to dock the **Command History** window back in the Desktop.
Dock Command History

Dock Command History
Command Window
Command History
Current Directory
Workspace
Launch Pad
Help

the Help menu.
Or simply drag the **Command History** to undock it from the Desktop.
Read line 1 to line 3 of the program, then use the Help menu.
Choose a tab for your desired Desktop tool.
To get started, select "MATLAB Help" from the mask.

Use the Close button to close the selected tool.
Use the View menu to modify the Desktop configuration.

To get started, select "MATLAB Help" from the...
MATLAB IS A MATRIX CALCULATOR!
MATRix + LABoratory = MATLAB

MATRICES
What is a matrix?
A matrix is an arrangement of rows and columns,
Like this
\[
\begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9 \\
\end{bmatrix}
\]
\[A\]
One can see that this has 3 rows and 3 columns i.e. it is a 3 by 3 matrix.
FOR MATLAB EVERYTHING IS A MATRIX,
Question: Is scalar number “5” a matrix for MATLAB?
Answer: Yes number “5” is a 1 by 1 matrix.
Creating a matrix is as easy as making a vector, using semicolons (;) to separate the rows of a matrix.
If we type
\[
A = [1 \ 2 \ 3; \ 4 \ 5 \ 6; \ 7 \ 8 \ 9] ;
\]
Matlab will receive a matrix A in workspace.
If we do A+Enter MATLAB will give what is stored in “A”.
One area in which MATLAB excels is matrix computation.
We can easily find the transpose of the matrix 'A'.
\[
B = A'
\]
Now let's multiply these two matrices together.
Note again that MATLAB doesn't require you to deal with matrices as a collection of numbers. MATLAB knows when you are dealing with matrices and adjusts your calculations accordingly.
\[
C = A * B
\]
Let's find the inverse of a matrix ...

\[ X = \text{inv}(A) \]

and then illustrate the fact that a matrix times its inverse is the identity matrix.

\[ I = \text{inv}(A) * A \]

MATLAB has functions for nearly every type of common matrix calculation.

Some Basic Matrix Operations

First, let's create a simple vector with 9 elements called 'a'.

\[ a = [1 \ 2 \ 3 \ 4 \ 6 \ 4 \ 3 \ 4 \ 5] \]

Now let's add 2 to each element of our vector, 'a', and store the result in a new vector. Notice how MATLAB requires no special handling of vector or matrix math.

\[ b = a + 2 \]
Creating graphs in MATLAB is as easy as one command. Let's plot the result of our vector addition with grid lines.

```matlab
plot(b)
grid on
```

MATLAB can make other graph types as well, with axis labels.

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MATLAB can use symbols in plots as well. Here is an example using *'s to mark the points. MATLAB offers a variety of other symbols and line types.

```matlab
bar(b)
xlabel('Sample #')
ylabel('Pounds')
plot(b,'*')
axis([0 10 0 10])
```

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Figure No. 1

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Importing Data:

How to import data into MATLAB?

1. Select Import data from the file menu and then select the file to import.
The preview pane shows the format of the data within the file.
XY Plots in MATLAB
% Line plot of a chirp
x=0:0.05:5;
y=sin(x.^2);
plot(x,y);
% Stem plot
x = 0:0.1:4;
y = sin(x.^2).*exp(-x);
stem(x,y)
3 D Plots
figure;% Mesh Plot of Peaks
z=peaks(25);
mesh(z);
Simulink

Type `simulink`

`>> simulink`

or click on this simulink block

Simulink Library Browser will open up

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Relational Operator: Applies the selected relational operator to the inputs and outputs the result. The top (or left) input corresponds to the first operand.
Sources
Some Sinks (Output Blocks)

One Simple Simulink Model

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HOW TO EXPLORE IT MORE.

- This tutorial uses standard MATLAB help and demos.
- Simply type ‘help’ and try instructions.
- MATLAB Central file exchange.
- MATLAB downloads are at www.mathworks.com.

http://arri.uta.edu/acs/jyotirmay/gadewadikar.htm
Email : jyotir@arri.uta.edu

THANK YOU AND HAVE A GOOD TIME!

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