MATLAB intro

Bates College

Last updated September 2009
Outline

1. When To Use MATLAB
2. When You First Open MATLAB
3. Going Further In MATLAB
MATLAB is best used for numerical computations.
- Ex. 1: \( 3 + 4 = 7 \).
- Ex. 2: \( \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 5 \\ 11 \end{bmatrix} \).

MATLAB is not appropriate for symbolic computations. For these, try Mathematica or Maple.
- Ex. 1: \( 3x^2 + 2x - 7 = 0 \). Solve for \( x \).
- Ex. 2: Factor \( 3a^3 - 3ab^2 \).

MATLAB is a programming language and works best with numbers in matrix form (or, more generally, array form).
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How To Open MATLAB

- Click on the Start menu (bottom left of screen), then Programs> MATLAB>R2009A> MATLAB R2009A
- Older computers may say, for example, R2006a instead of R2009A.
- There may be a MATLAB icon on the desktop.
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To get started, select MATLAB Help or Demos from the Help menu.

>>
Important Windows

1. Command Window: place the cursor after the `>>`, type commands, and enter.
2. Current Directory: you may save files to MATLAB (as with M-Files - more later). To work with saved files, drag and drop between the desktop and Current Directory. Or, navigate in this window to the set of files and folders you wish to work with.
3. Command History: scroll up to see commands you have used during previous MATLAB sessions. This is very helpful if you cannot recall a command or file name but know you have used it previously.
4. Workspace: we will skip this for now. For more information, consult the MATLAB Help browser.
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Other PDF Files Available

- MATLAB_Basics: how to do basic arithmetic in MATLAB.
- MATLAB_Matrices: how to enter matrices of all sizes, do basic matrix operations, and concatenate matrices.
- MATLAB_Plots: introduction to simple 2-D plots in MATLAB.
M-file: A Sample

function trap(n)
    % trap estimates the area under the curve
    % y=1/x
    % for x ranging from 1 to 101
    % splitting the x-axis into n equal intervals
    % and using the trapezoid rule
    delta=(101-1)/n;
    area=0;
    for i = 1:delta:101-delta
        area=area+((1/i)+(1/(i+delta)))*(delta/2);
    end
    area
Opening and Running an M-File

- To create a new M-File: click on “File” along the top, then New>M-file. Or use Ctrl-N.
- To open an already created M-File, use Ctrl-O, or File>Open, or double-click on the M-File you want in the Current Directory window.
- To run the commands in an M-File, type the name of the M-File at the prompt in the Command Window. One comment: some M-Files require you to type only the name. The example on the previous slide requires additional information. To run that M-File, you need to type \texttt{trap(n)} where \( n \) is replaced by a positive integer.
More About M-Files

- M-Files let you both save a set of commands, and *run many commands* with one entry in the Command Window.

- There are multiple classes of M-File. This presentation showed a *function M-File*. The first line reads `function filename(inputs)`, and we must save the M-File under the name `filename.m`. In this case, there is only one input, `n`. If there are no inputs, the first line reads simply `function filename`.

- The scrollbar on the far right of the M-File window gives MATLAB suggestions. These may or may not be errors. For example, the orange bar in the real version of the shown M-File has the message “Terminate statement with semicolon to suppress output” upon mouseover. This is informational, not a required change.
Once you get the basics, you can consult MATLAB’s help browser or online documentation for further details.

Also consider talking to other Bates folks as you get started.

Thanks for reading!