Introduction to MATLAB\textsuperscript{1} General Information

Once you initiate the MATLAB software, you will see the MATLAB logo appear and then the MATLAB prompt \texttt{>>}. The prompt \texttt{>>} indicates that MATLAB is awaiting a command.

\[ \text{MATLAB is } \textit{case sensitive}; \text{ all built-in MATLAB commands are LOWER CASE.} \]

There are certain MATLAB features you should be aware of before you begin working with MATLAB.

- \textit{Variables, Expressions and Statements}.
  MATLAB statements typically take one of two forms: \texttt{variable = expression} or an \texttt{expression}

\[
\begin{array}{c}
\text{Examples} \\
\text{val = cos(pi/7)} \\
\text{exp(2.13)}
\end{array}
\]

All variable (and function) names consist of a letter followed by any number of numbers, letters and underscores. MATLAB is case sensitive and only the first 19 characters of any name are significant.

The equal sign = is called the \textit{assignment operator}.

Expressions are composed from operators, function calls and variable names. Pressing ENTER normally signifies the end of a statement, causing MATLAB to interpret the command and print its result. \textbf{If the last character of a statement is a; (semicolon), however, display of the result is suppressed.} This feature may be especially useful when the result of a computation is a large matrix. Finally, several statements separated by commas may be placed on a single line.

\[
\text{When an expression is not explicitly assigned to a variable with the assignment operator (=), MATLAB automatically stores the result in the special variable } \texttt{ans}. \]

During a MATLAB session you may forget the names of variables stored in your \textit{workspace}. The command \texttt{who} lists the names of all your variables. If you want to know their size as well, use the command \texttt{whos}. By default MATLAB stores all variables until the session is terminated. To remove a variable from the workspace use the command \texttt{clear var_name}. \textbf{WARNING: clear with no arguments removes all variables from the workspace.}

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• **Numbers.**
  MATLAB uses conventional decimal notation with an optional decimal point and minus sign for negative values. Scientific notation uses the letter e to specify a power of ten scale factor. Some valid numbers are: 34, -7, 0.0017, 6.3457, 2.718281828459046, 3.060196847852814e+002.

  All numbers are stored internally using the "long" format specified by the IEEE floating point standard. Floating point numbers have about 16 significant decimal digits and a finite range of about $10^{-308}$ to $10^{308}$.

• **Starting execution of a command.**
  After you have typed a command name and any arguments or data required, you must press ENTER before it will begin to execute.

• **Search Path.**
  To determine how to execute commands MATLAB uses a search path to find m-files and other data sets. Any file you want to execute must reside in the current directory or in a folder that is on the search path. By default, the files supplied with MATLAB and MathWorks toolboxes are included in the search path.

  To see which directories/folders are on the search path type the command path. To change the search path select Set Path from the File menu in the desktop, and use the Set Path dialog box. The command addpath can be used to add directories to the path, and command rmpath can be used to remove directories from the path,

• **Getting help.**
  If you know the name of command typing help followed by the name displays information about the command.

  ```
  >> help sin
  SIN    Sine of argument in radians.
  SIN(X) is the sine of the elements of X.
  ```

  ```
  >> help sqrt
  SQRT   Square root.
  1. SQRT(X) is the square root of the elements of X. Complex results are produced if X is not positive.
  ```

• **The command stack.**
  As you enter commands, MATLAB saves a number of the most recent commands in a stack. Previous commands saved on the stack can be recalled using the up arrow key. The number of commands saved on the stack varies depending on the length of the commands and other factors.

• **Editing commands.**
  If you make an error or mistype something in a command, you can use the left arrow and right arrow keys to position the cursor for corrections. The home key moves the cursor to the beginning of a command, and the end key moves the cursor to the end. The backspace and delete keys can be used to remove characters from
a command line. The **insert** key is used to initiate the insertion of characters. Pressing the insert key a second time exits the insert mode. If MATLAB recognizes an **error** after you have pressed ENTER, then MATLAB responds with a beep and a message that helps define the error. You can **recall the command line** using the up arrow key in order to edit the line. To **delete an entire command line** press ESC, escape.

- **Continuing commands.** MATLAB commands that do not fit on a single line can be continued to the next line using an ellipsis, which is three consecutive periods, followed by ENTER.

- **Stopping a command.** To stop execution of a MATLAB command, press **Ctrl** and **C** simultaneously, then press ENTER. Sometimes this sequence must be repeated.

- **Quitting.** To quit MATLAB, type **exit** or **quit** followed by pressing ENTER.
You can change the way the desktop looks. Click on the Desktop drop down menu.