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MATLAB

ide more

Introduction to MATLAB

- Discover the MATLAB desktop and check out the Help system
- Topics
  - MATLAB Desktop/IDE (Integrated Development Environment)
  - HELP
  - ➢Basic elements

The MATLAB Environment

- MATLAB is an interpreted language
  - Commands are typed into the Command Window and executed immediately
  - Variables are allocated in memory as soon as they are first used in an expression
  - Commands must be re-entered to be re-executed
- All variables created in the Command Window are in the Base Workspace
  - Variables can be reassigned new values as needed
  - Variables can be selectively cleared from the workspace

Commands, Statements & Variables

In the Command Window, you can enter expressions:

- Single command:
  - `save` (saves workspace)
  - `whos` (displays list of workspace variables)
- Assignments, mathematical expressions:
  - `A = width * length;`
  - `B = 267;`
  - Assignment statements can have only a single variable on the left side of the assignment operator (=)
  - The RHS is evaluated using current values for all variables and the resulting value is assigned to the variable on the LHS.
  - The variable's TYPE is always updated whenever a new assignment is

Variables and Names

- A variable is a placeholder in memory.
  A variable allows you to assign a label to a piece of information or data. A variable can be used and reused in the command window, script, function, or any other piece of code.
- Variables contain values
- Variable names:
  - Are case sensitive: `Cost, cost, COST` are different
  - May contain up to 63 characters (more are ignored)
  - Must start with a letter,
  - May contain numbers and letters
  - May NOT contain punctuation except "_"
- How do I view the contents of a variable?
  - Just type the variable name without a following ";"
  - Look in the workspace

Reserved Words

- MATLAB has some special (reserved) words that you may not (re)use…
- Use the `iskeyword` to list all reserved words.

```
for
end
if
while
function
return
elsif
case
otherwise
```

```
switch
continue
else
try
catch
global
persistent
break
```

Editing keys

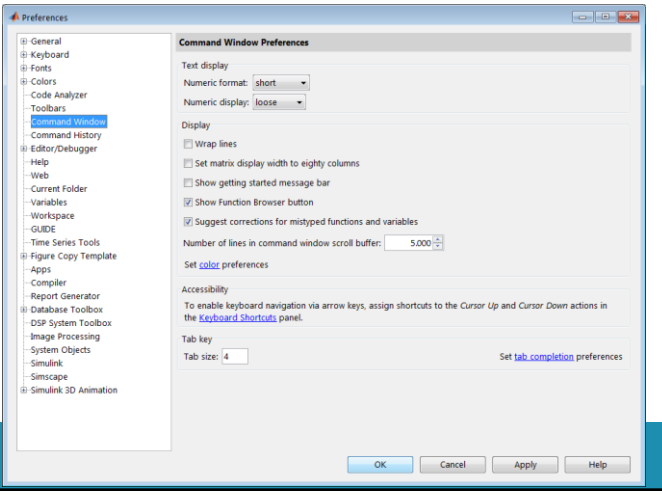
Key	Function
↑	Browse backward through the commands
↓	Browse forward through the commands
←	Scroll backward through a single command
→	Scroll forward through a single command
ctrl ←	Scroll backward through a single command by word
ctrl →	Scroll forward through a single command by word
home	Jump to the beginning of the command line
end	Jump to the end of the command line
esc	Clear line
del	Discard character under cursor
backspace	Discard character in front of the cursor
tab	Complete a command (select from the list) Beginning of command + ↑ scrolls through history

Useful commands / shortcuts

- `clc` : clear command window
- `home` : clear command window / keep history
- `clear` : clear variables and functions from the workspace
- `ctrl + c` : stop the execution of MATLAB
- `whos` : list current variables
- `close` : close the current figure
- `figure` : create a new figure window
- `%` : comment
- Check Preferences > Keyboard > shortcuts
  - F1: help
  - F9: execute selected command
  - …

More: The MATLAB Preferences

- Home > Environment > Preferences



More: Format

- Format controls display of output in the command window
- Check: https://www.mathworks.com/help/matlab/ref/format.html

```
format short
format long
format rat
format hex
```

Built-in functions

- MATLAB offers a wealth of built-in math functions that can be quite helpful for many computational problems
- Elementary MATLAB functions (`help elfun`)
  - Trigonometric functions
  - Exponential functions
  - Complex functions
  - Rounding and remainder functions
- Specialized MATLAB functions (`help specfun`)
  - Specialized math functions
  - Number theoretic functions
  - Coordinate transformations

MATLAB Programs

- Can we execute a “program?”, or is it a simple calculator?
- Programs in MATLAB are:
  - **`Scripts`**: MATLAB statements that are fed from a file into the Command Window and executed immediately
  - **`Functions`**: Program modules that are passed data (arguments) and return a result (i.e., `sin(x)`)
  - These can be created in any text editor (prefer MATLAB built-in editor)

More information?

- https://blogs.mathworks.com/
- Matlab Support https://nl.mathworks.com/support.html

Demo / recap

- Some basic calculations
- Use the editing keys
- Use the information from the different Desktop windows
- Screencast: *matlab_desktop_some_basics*