

Computing for Math and Stats

Lecture 2

Using Variables

- The simplest use for Matlab is to play with formulas
- We can use it as a very advanced calculator
- No input, no (formatted) output, just a simple program
- We mainly need variables, assignments, built-in function calls, and simple thinking

Volume and Area of Sphere

$$V = \frac{4}{3} \pi r^3$$

$$S = 4 \pi r^2$$

Predefined Variables and Keywords

- Matlab has 20 keywords.
 - These are words that have specific meaning in the language and cannot be used as variables
 - In the course we will cover at least these
 - Break, end, case, switch, otherwise, if, else, elseif, for, function, global, return, while
- And a ton of built in variables
 - Ans, pi, eps, inf, i, (or j), NaN

Current Working Directory

- Matlab, like most other software has a current working directory, aka current folder
- Most operations on files (read, write) assume that the file is in the working directory
- Can be changed easily using the interface above the editor or the command window
 - It can be changed with the `cd` command
- The `pwd` command prints the working directory

Getting Help

- Most interactive software has on line help
- Matlab is large and has many-many commands
- Many commands are cryptic
- On line help can be obtained by clicking the Help button (black question mark in a white button inside a blue backdrop)
- This button is equally useful to novices and seasoned users

Reading-Debugging Code

- When we write code we give instructions to the computer what to do, step by step
- Far more often we read code
 - Code we just wrote but which does not work exactly as intended
 - Code that we wrote long time ago and hope to re-use/extend
 - Code someone else wrote
- We need to develop skills to read and understand code

Reading-Debugging Code

- The most important reason to read code is debugging
- Debugging is the process of removing bugs (programming mistakes) from the code
- Programmers spend most of their time debugging
- Programming is the process of putting bugs in the code ;-)

Mystery Code

- What do the two pieces of code do
- We need to trace them
- We could run them and see
 - This would work here but not for BIG, COMPLEX programs
- This is an art we need to develop

Mystery Code

- Both pieces swap two variables
- One of them needs a temporary variable
 - Not very good if the variables are huge arrays and we do not have enough memory
- The other has to do math operations
 - Not good if the math operations are expensive or meaningless (e.g. names)
- Both are useful for sorting and many other things