Summary of Introduction to Matlab

• Looked at the basic features of Matlab:
  – Getting help
  – Variable definitions and usage
  – Math operators
  – Control statements: Syntax is available through the online help
  – M-files: Script and function types
    • Variable number of input and output arguments
Today’s Lecture

- Continue examining Matlab operations
- path and addpath commands
- Variables and constants
- IO using fopen, scanf etc.
- Formats
- Dialog boxes

Path controls

- Matlab uses a path structure to tell it where to look for M-files
- In simple cases, all the m-file needed are in the directory from which Matlab runs but in more complex cases this is not possible
- The path command lists the current path
- The addpath command adds a new directory to the path (the current directory is always searched first)
- The pwd command can be used in the addpath command e.g., addpath(pwd)
- M-files can contain multiple functions but additional functions in M-file are available only to the main function of the M-file.
- In complex systems of analysis, where functions are put in M-files should be carefully considered.
Variables and constants

• In Matlab variables are passed into functions by address unless the values are changed, in which case they are copied into the function workspace.
• Although most variables are stored as double precision in Matlab, they can be referred to as different types e.g., complex, logical.
• who shows the type of variable
• all, any, find implement logical expressions in array indexing. (See ops for more details)
• logical can be used to select elements from an array

IO: fopen, scanf, printf

• fopen opens a file and returns a file ID number (FID):
  Syntax is
  [fid, message] = fopen(‘filename’, ‘permissions’)
• If the open is not successful, fid returns as -1
• Lec02_01_file.m gives a simple example of reading and plotting a data file. Data files used here are MIT GPS data processing. Example allows a number of different features in Matlab to be explored.
FORMATS for scan and print

- The format structure in Matlab is very similar to C (and unix programs such as awk)
- Mostly these are used for outputting values
- Basic types (see details in Matlab On-line help)
- `%f, %e, %g` — floating point numbers
- `%d` — integer values
- `%s` — String characters
- `
` — newline (needed often at ends of format)
- `` — carriage return

Dialog boxes

- We can make the File selection even better in the example using a dialog box.
- The Matlab M-file Lec02_02_db.m shows an example of how we might do this.
- This example shows ways to get file names from a directory listing.
- At this point we try these features on the MIT server
- In the next two lectures, you will develop a Matlab program to manipulate data of this type.
Summary of Today’s class

• Continued examining Matlab operations
• path and addpath commands
• Variables and constants
• IO using fopen, scanf etc.
• Formats
• Dialog boxes
• Much of the lecture is spent actually using these features in the M-files that are included with the lecture.