Notes from January 19 – Tuesday

- Matlab’s name came from Matrix Laboratory, it is very efficient in dealing with arrays and matrices.
- Matlab has a number of file maintenance commands so you would not need to leave the software to process files. It has a self contained operating system, a cross between MSDOS and UNIX.
  - `pwd` – this command will indicate your present working directory.
  - `cd (newdirectory)` – this command changes the directory.
  - `mkdir` – make directory.
  - `dir` – provides a listing of the directory.
  - `rmdir` – removes a directory.
  - `path` – indicate the search path, i.e., where matlab will look for m files.
  - `copyfile file1 file2` – copies from file1 to file2.
  - `delete filename` – deletes a file from the directory.
  - `movefile file1 file2` – renames file1 to file2.
  - `help subject` – displays information about given subject.
  - `lookfor keyword` – displays all articles containing the keyword.
- The results displayed in matlab have 4 significant digits and it is default as “format short”. To display 14 digits of accuracy, use “format long”.
- Use control-C to abort an ongoing command.
- Established a recommended list of variable names for project 2.
  Names: r, rd, rdd, t (theta in radians), td, tdd, ar, at, Fs, beta, N, Q, theta (theta in degrees).
- The matlab functions to be used in program are `sqrt(...)` for square roots, `sin(...)` for sine, `cos(...)` for cosine and `atan(...)` for arc tangent.
- Intermediate results to help with debugging program of project 2
  - Case One
    - Enter mass: 0.5
    - Enter theta in degrees: 30
    - Enter theta dot in rad/sec: 15
    - Enter theta dot dot in rad/sec^2: 0
    - r = 0.1070
    - rd = 0.4146
    - rdd = 13.0951
    - ar = -10.9903
    - at = 12.4377
    - Fs = 35.2331
    - beta = 0.2709
    - N = 30.7132
• Q = 13.8972
• theta = 30 degrees
• F_s = 35.23
• N = 30.71
• Q = 13.90

Case Two
• Enter mass: 1.25
• Enter theta in degrees: 70
• Enter theta dot in rad/sec: 12
• Enter theta dot dot in rad/sec^2: 5
• r = 0.1423
• rd = 0.9092
• rdd = 11.2817
• at = 22.5321
• Fs = 211.7382
• beta = 0.7326
• N = 226.8119
• Q = 134.7318
• theta = 70 degrees
• F_s = 211.74
• N = 226.81
• Q = 134.73

• The strength of the matlab software is its ability to handle arrays, i.e., matrices. That allows matlab to enter the world of parallel processing very easily and effectively.
• Most general purpose programming languages do not have arithmetic operators which deal with matrices, large arrays are dealt with using loops and indices. The early matrix languages, APL or PL1, popular in the 1970s, are no longer upgraded. Matlab has cornered the market for this area.
• The following is the demonstration or a warning that learning Matlab before C, C++ or Fortran can be hazardous because the concept of integer division is not important in Matlab. For example, 3/2 is 1.5000 in matlab, but 3/2 is an integer division in most renowned compiled programming language is the result is 1. To write a floating point division, 3.0/2.0 (or simply 3./2.), is required. See the examples below using 3 different world recognized languages:

```
a=1/2
b=4/3
c=680/625
d=680./625.
write (*,*) 'a=',a
write (*,*) 'b=',b
write (*,*) 'c=',c
write (*,*) 'd=',d
```

It is recommended that ce108 students should work on part (a) of Project 2 carefully to obtain the correct results. Using matlab, it would not be difficult to change the program to yield results in the form of a matrix.