Homework 2
Description
CmpE 362 Spring 2017

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Due: 19 March, 23:59, sharp

March 8, 2016

1 Introduction

In this homework, you will implement some simple time domain exercises with matlab.

1.1 Clap Counter

In the first part, you are asked to write a program in MATLAB that counts the number of claps from the recorded sound. Detail: You can use the sent .wav files (one.wav and two.wav) to train your program. Note that your program should be generic. In other words, your program should work on different input files too (not just the sent files). When a wav file that contains a one clap or two claps is given as input to your program, it should output 'one clap' or 'two claps' accordingly. Everyone will send two test files with name 1-1.wav and 1-2.wav which includes one clap and two claps respectively.(Different than sent one.wav and two.wav files) Your program will take batch input. That is from the current directory, your program will read all wav files with name 1-1, 1-2, 2-1, 2-2 upto M-1 and M-2. M will be taken as input also. For all files, your program will return output in the new line.

Use time domain in your application. Your script should be named ClapCounter.m. Basically you are going to model the clap on time domain and you will set a reasonable threshold.

1.2 Frequency(Pitch) of a Sound

In this part, you will do what you are asked in waveexample.m on laughter.wav and explain what you understand. You will explain which exercises play the same sound and why? Briefly explain on the report.

1.3 Spline Interpolation

In this part, you will implement Quadratic Spline Interpolation on a given data.(On Figure 1) Ignore w_i. You would not need them. You will work on x,y pairs. You will have Ax=B where you are trying to find x. You can use linsolve method of MATLAB to find a solution to this equation. It uses LU factorization.
Res = linsolve(A,B);

You will plot your interpolated functions on the data. Plot would be like Figure 2. Actual function is like Figure 3. Briefly comment on your figure

TABLE 2.3 Stress, y_i (psi), versus Microstrain, x_i

i	y_i	x_i	w_i
1	1025	265	3.86
2	1400	400	3.50
3	1710	500	3.42
4	2080	700	2.97
5	2425	950	2.55
6	2760	1360	2.03
7	3005	2080	1.44
8	2850	2450	1.16
9	2675	2940	0.91

Figure 1: Stress vs. MicroStrain

and actual data figure. What do you infer from your figure? Are they similar?

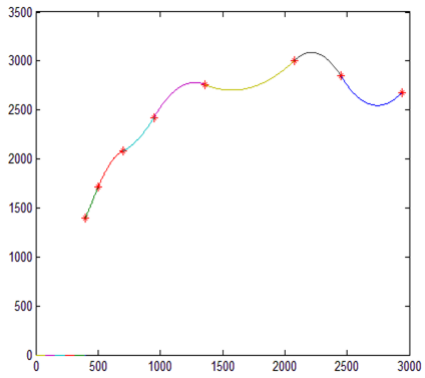

Figure 2: Quadratic Spline Interpolation Result

2 Report

Prepare a report explains your code briefly(not more than one page) Add the answer to the comment questions on HW to your report.
Compress the report and the code files. Name it as "YourNumber_CmpE362_HW2.zip"(or rar, or 7z etc.). Send the file to yektasaid.can@gmail.com before the deadline. Subject of the mail would be CmpE362 HW2.

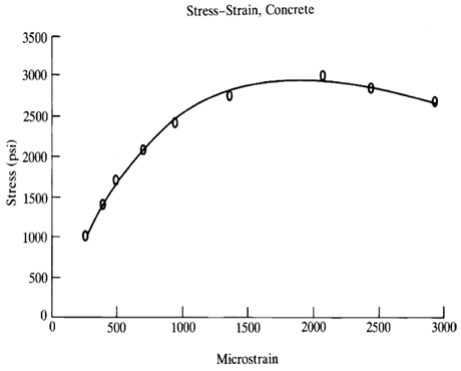

FIGURE 2.8 Stress-strain characteristic for a concrete block.

Figure 3: Actual Data Function

3 Notes

Deadline is strict. Do not send after deadline. When copying is detected, both parties will get zero. Disciplinary action will be taken.