ECE-448: Speech Signal Processing -- Monsoon 2018

Assignment 3
DEADLINE: Before 11.59PM on 27th Aug 2018

INSTRUCTIONS:
1. You need to upload a single ZIP file in the moodle. The ZIP file should contain a pdf with your answers which may include screenshots, text etc.
2. At the top-right of the first page of your submission, include the assignment number, your name and roll number.
3. IMPORTANT: Make sure that the assignment that you submit is your own work. Do not copy any part from any source including your friends, seniors or the internet. Any breach of this rule could result in serious actions including an F grade in the course.
4. Your grade will depend on the correctness of answers. In addition, due consideration will be given to the clarity and details of your answers.

Note: For the 3rd question you can use wavesurfer

Questions:

Epoch Extraction:
1. a) Implement Zero Frequency Filter and Plot
- **i: Speech signal**
- **ii: ZFF signal**
- **iii: Epochs extracted using ZFF signal**
- **iv: dEGG signal**

for any wav file of your choice from the given data set (in the 2nd assignment) .
b) Quote epoch extraction performance of your filter tested on the entire data set.

2. a) What are epochs in speech production? Why are they significant in speech signal processing?

b) What are some methods available for epoch extraction from speech signal? Briefly write a few lines about them.

c) What are the steps involved in constructing zero frequency filter (ZFF)? What is the significance of choosing zeroth frequency for epoch extraction?

3. What are the different nasal and approximants ? Record speech utterances in following context.

a. **a-n-a**
b. **a-m-a**
c. **a-r-a**
d. **a-l-a**
e. **a-y-a**
f. **a-w-a**

How these sounds are different from each other? Note down the formants F1, F2, and F3 for each of the case? Plot the spectrograms using wave surfer for each of the utterance?

How /n/ and /m/ are different in the acoustics ? & write your own observations?