ECE-448: Speech Signal Processing -- Monsoon 2018

Assignment 6
DEADLINE: Before 11.59PM on 7th Oct 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.

Questions:

1. a) Explain the primary mode of excitation of the vocal-tract system during speech production.

b) Explain the characteristics of the glottal volume velocity waveform. How is it different from the EGG signal?

c) Explain the steps to extract glottal volume velocity waveform from the speech signal using LP analysis. Implement the same on a couple of utterances provided in previous assignments.

2. From the glottal waveform extracted in the above question 1.c find the parameters average Normalized Amplitude Quotient and H1-H2 for a couple of utterances provided in previous assignments.

3. Extract the prosody features based on the VOP locations. As part of this question use the following paper "Extraction and representation of prosodic features for language and speaker recognition" for just extracting the VOP based prosody features only.

4. a). What is Zero Time Windowing (ZTW) ? How it is useful in extracting the system information of speech ?

b). Write a matlab code to obtain the Zero Time Windowing based spectrogram for speech wav file and compare it with STFT based spectrogram of that speech utterance ?

c). Write short note on window shape (hamming, hanning, gaussian, and highly decaying windows) on spectral representation of a signal ?