EXTC - VIII 14/5/19

**Paper / Subject Code: 52902 / Elective 1) Speech Processing**

**Time: 3 Hours** **Marks: 80**

**N.B: (1) Question No. 1 is compulsory.**
**(2) Attempt any Three questions from the remaining Five questions.**
**(3) Figures to the right indicate full marks.**

1. (a) Explain with suitable examples the production of fricatives and stops. [4]
   (b) How is the code book generated for CELP? [4]
   (c) Explain concatenative synthesis. What is the advantage of using sub-word units? [4]
   (d) How can we differentiate between semivowels and nasals on the basis of their formant values? [4]
   (e) Explain the meaning of intonation. What are the different intonations used in general speaking? [4]

2. (a) How is STFT different from Fourier Transform? Explain the difference with respect to the speech signal. [7]
   (b) Compare and contrast the pitch detection methods by using Cepstral coefficients and LPC parameters. [7]
   (c) Explain in detail how the radiation at the lips affect the resonance frequency of the vocal cords. [6]

3. (a) Explain with proper equations how Linear Prediction Filter for speech prediction represents an all pole filter? [10]
   (b) Perform the LPC analysis to determine the predictor coefficients given the autocorrelation sequence as $r_{ss}(0) = 2.1$, $r_{ss}(1) = 1.5$, $r_{ss}(2) = 0.9$. [10]

4. (a) Design a Homomorphic processing system for filtering of a speech signal. [10]
   (b) Draw and explain the schematic representation of the ear. Emphasize on the human hearing mechanism. [10]

5. (a) What is the significance of the Levinson Durbin algorithm. State the necessary equations involved during the execution of the algorithm for calculation of the predictor coefficients. [8]
   (b) Explain the applications of speech processing in detail. [5]
   (c) What are the different speech standards? Explain any one of them in detail [7]

6. (a) Explain Bayes rule for class selection. [6]
   (b) Draw the block schematic for a formant synthesizer. Explain the function of each block. [10]
   (c) In linguistics what is the meaning of prosody? [4]

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