Indian Institute of Science

Mathematical Methods and Techniques in Signal Processing

Instructor: Shayan Srinivasa Garani
Home Work #3, Spring 2021

Late submission policy: Points scored = Correct points scored $\times e^{-d}$, d = # days late

Assigned date: May 21$^{\text{st}}$, 2021　　　　　　　　　　　　　　**Due date:** May 31$^{\text{st}}$, 2021, 11:59 pm.

Record your voice with the speech 'It is fun doing speech compression using wavelets'. This needs to be in raw speech format. You can use a sampling rate of 8K samples/second, each sample coded at 8 bits. Perform subband coding of speech using Daubechies wavelet. You can choose a filter order of 10 for the low pass filter. Derive all the filters using QMF construction. Perform uniform and non-uniform quantization and obtain the compression ratios. Experiment on the number of stages of the decomposition. Plot the compression ratio vs. quantization precision. What are your observations? Do you see energy compaction at lowest wavelet scales? You need to attach your software in an Appendix and have the demonstrations done for this homework. (100 pts.)