

**Lab Exam BEE-6CD**  
**Speech Compression using the DCT.**  
**A MATLAB based project**  
**Due Date: 6<sup>th</sup> June 2017**

**Approach:**

Segment the given speech data set of M data points into N-point frames using a rectangular window of length N. Then take the DCT of each frame separately. Some of the DCT components would be discarded and some would be retained according to some predefined criterion. These retained coefficients would be coded according to some data compression coding scheme e.g. Huffman coding which would result in further compression and then transmitted. At the receiving end the discarded components are padded with zeros and IDCT is applied on each frame. These frames are then stacked and a speech signal is reconstructed which is a compressed form of the signal transmitted. This would result in substantial data compression but this type of compression results in information loss. Since this project is a simulation of the communication system therefore coding step is not required. To see how good a reconstruction we can achieve from the compressed data different measures can be used. The one you are required to use is the SNR .

$$SNR = 10 \log \left[ \frac{\sum_{n=1}^M x^2[n]}{\sum_{n=1}^M (x[n] - \hat{x}[n])^2} \right]$$

where  $x[n]$  is the uncompressed transmitted speech signal and  $\hat{x}[n]$  is the reconstructed compressed signal.

Compute and plot SNR vs the frame size N for the following values

N=

- i) 64
- ii) 128
- iii) 256
- iv) 512

DCT coefficients

- i) 10%
- ii) 25%
- iii) 50%
- iv) 75%

Choose the coefficients as:

- i) First
- ii) Dominant

Discuss the results in your short report. The report should be in the usual format with all the necessary figures and plots attached.