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MAS.632 Conversational Computer Systems
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Problem Set 4

For the following problems, consider speech recorded with the following compression algorithms:

8 bit mu-law PCM sampled at 8 kHz
Delta Modulation (1 bit) at 32,000 Hz
Linear Predictive Coding, one set of LPC parameters each 20 ms
Each set of parameters is 20 bytes long

1. I have 10 seconds of recorded speech. I wish to remove the sound from 3015 ms into the sound through 3085 ms into the sound. For each of the coding methods, how should I proceed? What are the issues in obtaining an edit which sounds "clean"? Can you remove precisely the time interval required? Does it matter whether speech or silence is being removed?

Note: one possible answer is to convert the signal back to PCM, edit that, and then re-code. But your answer should process the signal in its encoded form, please.

2. The sound file was recorded on disk, but someone accidentally overwrote 64 bytes of random values into the middle of my sound file. When I listen to the sound, at the point where the random values are sent to the decoder I hear some noise. How long will the noise last? In other words, how long will it be until the sound plays normally again? What do you think the corrupted speech will sound like?