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Machine Exercise 5 Echo and Reverb

1. Can you describe the perceptual differences as a function of time delay for the implementation of echo and reverb? Why does reverberation require shorter time delay than echo?

With echo, we can only hear the delay once, since the signal being repeated is the original, clean signal. Meanwhile for the reverb, the delayed signal is also repeated at a later time because the repeated signal is from the output. This means that with just a little time delay, the original will be repeated multiple times.

2. What is the effect of the gain setting on the stability of the reverberation system? How can you make the reverb effect sound more natural?

The higher the gain the longer the reverb is audible in the signal. With a high gain, we can hear a phrase repeated multiple times, and when we set a lower gain, we can hear it a little bit less. To make the reverb more natural, the gain should also decrease as time increases, so that the reverb slowly decays.

3. Suppose you want to recreate the reverberation of a room or hall. Can you propose a practical approach that can easily be implemented in MATLAB?

We can compute for a room's reverberation time similar to what we have done in exercise 2, and create a filter out of this. We can then use this filter to recreate the room's reverb to any signal/