Sigsys Final Project Proposal

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1 The system

The physical setup is illustrated in Fig. 1 below. Two well-matched speakers will be inserted snugly into either end of a PVC pipe. One speaker will be used to generate a signal, the other will act as a microphone and pick up the signal.

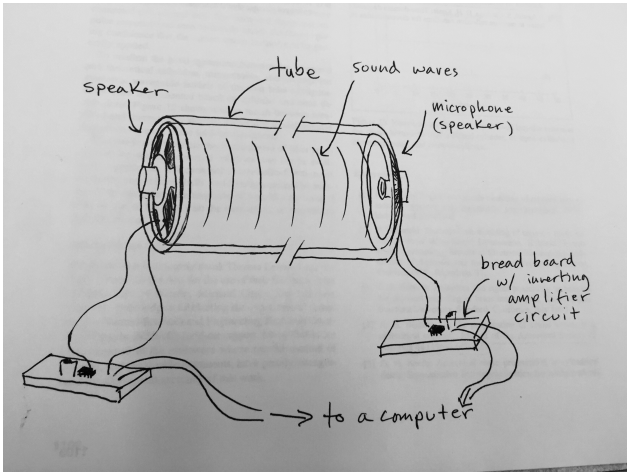

Figure 1: A sketch of the tube-speaker setup.

2 The code

First we will write code to find the frequency response of the tube. This will be done by playing a particular signal through one speaker, recording the output with the other speaker, and doing math on the sent and received signals to find the frequency response of the tube. We will use white noise and a chirp signal to do this. We will compare bode plots from each characterization and discuss how well/not well they match.

The frequency response can be used to filter any sound such that it sounds like it was played through the tube. We will write code that takes a wav file as input and plays the filtered file in real time or simply writes it to a new wav file.

We'd also like to get a theoretical frequency response of the tube, but this may be too difficult. One link we've found that may help us can be found here.

3 The output

People can interact with our project by playing with the filter and comparing the filter-generated sounds with the same sounds played directly into the tube.