

CprE 492

**Date:** 01/09/18 – 02/23/18

**Team:** 39

**Title:** Sound Effect Devices for Musicians

**Advisers:** Dr.Chen & Dr.Geiger

**Team:**

Tom Kimler – Team Lead

Virginia Boy – Power Lead

Ben Reichert – Test Lead

Dan Kroese – Embedded Lead

Garrett Mayer – Software Lead

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**Weekly Summary:**

We collected  $V_{in}$  and  $V_{out}$  of the data to start to look at the transfer function. We have found extreme non-linearity in the data and have decided on way to pursue the data. We are going to model a known non-linear circuit that we build and work our way to modelling a tube amplifier going forward. We are running out of time, so we are starting to focus all our efforts on building modeling software for the tube amplifier.

**Past Two Weeks Accomplishments:**

Data Collection – Ben, Tom, Virginia

- Collected  $V_{in}$  and  $V_{out}$  data to start analyzing the non-linear transfer function of the tube amplifier
- Interfaced with Audacity to get uncompressed data

Data Analysis – Ben, Garrett, Virginia, Tom

- Data Analysis of transfer function of new uncompressed data.
- Tube amplifier is clearly non-linear and now we need to figure how to model the wave

FFTW Implementation – Dan

- Researched fftw(fastest Fourier transform in the west) and implementation speeds. Then used that data to extrapolate if it is even feasible to get data at a speed fast enough to be useful for our application.
- Started writing short code to calculate fftw of local stored array. The goal of the code is to calculate total time taken doing one transform of a 1 sec sample at 44.1kHz or 44100 sample transforms. Hit immediate hiccups in trying to use the fftw library especially if it were to eventually go onto a micro controller.

- Results from that research are that it doesn't seem that would be fast enough, and even if it would be in order to create code that would do the same thing our matlab code does would take too much time and is now outside of the scope of our project.

**MATLAB Scripts & Functions – Garrett**

- Adapted more functions to analyze data in the transfer domain sense.
- Created sandbox script to analyze transfer function
- Continued to work on MATLAB scripts that will benefit our data processing capability

**Pending Issues:**

N/A

**Individual Contributions:**

Team Member	Contribution	Weekly Hours	Total Hours
Ben Reichert	Data Collection & Analysis	7	27
Tom Kimler	Data Collection & Analysis	7	30
Garrett Mayer	Data Analysis & MATLAB	8	28
Dan Kroese	FTW Implementation	8	20
Virginia Boy	Data Collection & Analysis	7	21

**Comments:**

N/A

**Plan for Next Two Weeks:**

Create and Data Collect Non-Linear Circuit – Tom

- Create non-linear circuit and extract data from the circuit
- The circuit's purpose is to have practice data to model and to verify the software is working because the non-linearity is known

Model Circuit – Everyone

- Create programmable model to match  $V_{in}$  to  $V_{out}$  effectively for the non-linear circuit
- Extend code to model the data extracted from the tube amplifier

**Summary with Advisors:**

We talked about the non-linearity found in the tube amplifier. We have decided to learn how to model nonlinear data starting with a known circuit and working our way towards the tube amplifier. They are helping with the data acquisition circuit to make sure the circuit does not have any flaws

