

Bi-weekly Status Report 4
Senior Design, December 2020, Team 14

Introduction of Real-World Signals and Systems into ECpE DSP Laboratory Curriculum

Brady Anderson, Sam Burnett, Mitchell Hoppe, Max Kiley, Emily LaGrant, Isaac Rex

Progress Summary:

Over the past two weeks we have finished lab drafts, continued hardware development, obtained familiarity with applicable design tools, and worked on the user software side of the project. We also completed our second lightning talk and began discussion on the best way to continue working on the project in the face of the Coronavirus pandemic.

Individual Contributions by Team Member:

- **Brady Anderson (Biweekly: 12; Cumulative: 49)**
 - Completed second lightning talk
 - Started work on porting my PWM core design to the CyDAQ project
 - Created as extra work for CprE488
 - Updated PWM core to have settable period, off time, and clock division
 - Simulated PWM core in Vivado to ensure validity
 - Started brainstorming how to implement parallelism between PWM signal route and primary firmware
 - XADC must be sampled to generate PWM waveform, requires firmware control
- **Sam Burnett (Bi-weekly: 11, Cumulative: 50)**
 - Completed design review for DAD and ADC PMod PCBS
 - Generated Bill of materials for DAC and ADC PMods
 - Validated SPI interface scheme for DAC control and output
 - Placed orders for DAC and ADC PMod PCBS and BoM
- **Mitchell Hoppe (Weekly: 12; Cumulative: 50.0)**
 - Attended workshop for GUI building in Matlab
 - Worked on the UI for error checking of parameters
 - The CLI will check if the given parameters are valid options, and spell check if anything is spelled wrong.
 - Worked on the Bi-Weekly Status Report 4
- **Max Kiley (Biweekly: 12; Cumulative: 46)**
 - Completed second lightning talk.
 - Reviewed Matlab material relevant to EE 224 labs.
 - Reviewed Fourier Series and other EE 224 concepts.
 - Worked on Bi-Weekly Status Report 4
 - Worked on Noise Reduction Lab
- **Emily Lagrant (Biweekly: 12; Cumulative: 51)**

- Completed second lightning talk
- Reviewed 224 concepts and started incorporating them into Noise Reduction Lab
- Began developing MATLAB code for labs
- Continued writing Noise Reduction Lab
- Learned to work with LaTeX to write the labs
- Met with Max Kiley to develop Noise Reduction Lab and plan the lab
- Began work on 224 lab prototype for Noise Reduction Lab
- **Isaac Rex (Bi-Weekly: $|F\{2\text{sinc}(\pi x) * \frac{21}{4}\delta(t + 6\pi)\}|_{\omega=\pi/8}$; Cumulative: 50.5)**
 - Continued researching DSP labs from UC Berkeley
 - Obtained and tested speakers for CyDAQ revision
 - Began high-level design of speaker circuit
 - Continued researching DSP labs from UC Berkeley
 - Finished draft of CyDAQ introduction lab
 - Gained familiarity with Digilent's WaveForms for labs

Pending Issues:

- There are currently no pending issues

Plans:

- Isaac:
 - Complete final draft of CyDAQ introduction lab
 - Create solution manual for CyDAQ introduction lab
 - Finish board for CyDAQ speaker by 4/1
 - Help with final project lab manual
- Emily:
 - Continue writing Noise Reduction Lab, then proceed to test lab and send final draft to Dr. Bolstad and Dr. Dickerson
 - Begin working on final project lab
- Brady:
 - Investigate FreeRTOS and consider implementation strategies
 - Test Sam's PWM intuition lab with prototype PMOD
 - Continue developing PWM IP core, integrate with XADC firmware
- Sam:
 - Generate audio file bank for lab activities
 - Assemble DAC and ADC PMods
 - Validate and test DAC and ADC PMod functionality
 - Experiment with filtering and sampling audio test bank files
- Max
 - Continue to work on the Noise Reduction labs for EE 224.
 - Continue to demo the Fourier Series lab for EE 224.
 - Familiarize myself with EE 224 concepts and Matlab fundamentals.

- Mitch
 - Continue work on the UI for parameter checking and commands for debugging
 - Work on the GUI to improve user experience
 - Research Matlab GUI tools for when we make the migration from Python to Matlab