

Individual Reflection

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At the start of this project, I was not feeling all that confident about my skills. In general, with online QEA and ESA, I felt a little lost with the lack of feedback. We still haven't had the quiz graded yet, so when I started this project I was nervous that the way I was working through these problems is incorrect. In comparison to this, by the end of the project, I was able to reaffirm that I was doing everything correctly, not only because I got feedback back from the homeworks I had done weeks previously, but also because our Rocky actually balanced in the middle of our room, reacting to outside disturbances, and returning to a balanced position.

In class, I learned the theory about Fast-Fourier Transforms (FFTs) and how they collect frequencies. We also learned how natural frequencies apply to pendulums and damped systems, but we hadn't applied it to real life fully. With Rocky, I was able to measure actual values of angles and speeds, with a robot in my room, and use these tools, such as the FFT, to calculate the natural frequency I had learned about in class. I was also able to use this to calculate the effective length of the pendulum we are using to simulate Rocky's control system, which was crucial in the formulas and MATLAB scripts we used to define the control parameters.

One of the interesting things I encountered while measuring the values above, was that they seemed to jump very frantically, so, not only did I have to use these recorded data to get the natural frequency, I also had to understand why these frantic jumps were occurring, and what they mean for the function and values I was calculating.

Another challenge I encountered during this project was related to the Arduino itself, specifically the code used to run it. I had previously worked with Arduinos, but I had no actual background on how to code them and run them. This became a challenge when my partner and I decided to go above and beyond the balancing of the Rocky robot. We wanted to get it to drive in a circle, and then to just move forward for a set amount of time. Even though we weren't able to accomplish these goals, I did learn a lot about how Arduino code works, specifically what parts of the code run what parts of the logic and motors behind the robot. Although we were not able to get our Rocky to move in a circle, we were able to get him to "boogie" a bit, we were able to learn a lot about how the Balboa's motors and sensors worked.

Overall, I am really proud of the work me and my partner were able to complete. We had a lot of fun creating fun ideas for our video, making our Rocky balance, fall on command, shimmying to music, and dressing him up.