ECE Senior Design Weekly Report

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Team Name: Globetrotters Lab Section: TH

Week’s Task: Get magnet to levitate above our globe’s base by characterizing the system and creating an algorithm to control the coils. Finalize website before May 1st.

Results:

Levitation

* Noise from coils will affect the hall effect sensor readings
* Experimented with turning off the coils before doing ADC
* At 24V, we get around 4 amps at 100% duty cycle, hall effect sensor returns to regular reading 38ms after the coil is turned off
* Tested system with PCB and identified connection issues with microcontroller pins
* Directional code for the H-bridges are working when coils are not powered, but noise introduced to the readings cause issues when the coils are powered

Website

* Took team pictures for website and started adding images and videos to the Media section
* Added feature to gallery that allows users to enlarge photos when clicked
* Changed a few css stylings to improve readability of content

Summary

This week I focused mainly on levitating the permanent magnet. After the PCB was finished and soldered, I started testing the sensors immediately on that. The hall effect voltages respond the way they should when shown on a scope, meaning the voltages that are supposed to increase and decrease depending on the position of the magnet are doing so accordingly. I also began writing code in to adjust the PWM based on where the magnet it. The main issue is timing when we should sample the hall effect sensors in order to get valid readings to find the position of the magnet. This is because of the noise added to the system when the coils are on. We found that at 100% duty cycle, the hall effect voltage takes 38 ms to become stable after being turned off, so the PWM should be off for at least that long before we do the conversion so we can get good values. For the final days, I’ll be working on getting correct values and power the coils based on the position of the magnet.