ECE Senior Design Weekly Report

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Team Name: The Globetrotters Lab Section: 4

Week’s Task: Design the hall effect sensor circuit. Focus on levitating anything. Control the position of the magnet by using string and changing the current through the electromagnets with the H-bridge.

Results: This past week I worked on creating the hall effect sensor circuit we will be using in our design. We plan to have 8 hall effect sensors total. There will be two hall effect sensors on each of the electromagnetic coils. The hall effects will go into a differential amplifier. We will use the INA122P since we already are familiar with it. Once the differential voltage is determined, it will go into the microcontroller and be converted into a digital value which corresponds to a lookup table. Mark has created the lookup table for this information. For testing purposes I hooked up the hall effect sensor SS49 to a simple LED circuit. When the magnet is close enough the voltage will increase and turn the LED on. Since the hall effect sensors are bi-polar, the voltage will increase or decrease based on which pole is introduced to the sensor. Similarly we can keep the LED on and turn it off as the magnet gets closer.

Chris and I hooked up the H-bridge and measured the distance displaced as the current goes from one rail to the other. The magnet is marginally stable with string attached to a base at the top. As the current is increased in the coils, the magnet would move and closer or further away from the center of the base.