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EEE-351 TERM PROJECT PROPOSAL: MAGNETIC SLIDER

Project Description

In this project, we will use the accelerating effect of the interaction between the magnetic field passing through the center of the solenoid with the moving object. This will be the result of the current passing through solenoid. Our object will also levitate through air with the usage of magnetic tapes, levitation enables the object to move in a less frictional environment. This will allow our object to resemble the maglev train concept. From mathematical description magnetic field at the center of solenoid can be calculated from the equation below:

$$\oint_C \vec{B}\,\overrightarrow{dl} = \mu_0 nIL \ (Eq.\,1)$$

$$B = \mu_0 nI \ (T) \ (Eq.\,2)$$

This equation holds because a real solenoid has very small $(\vec{B} \cong 0)$ magnetic field outside compared to inside. The force applied on moving object by solenoid is given below:

$$\vec{F} = \nabla\big(\vec{\mu}\cdot\overrightarrow{B}\big) \ (N) \ (Eq.\,3)$$

In conclusion we will implement a moving object with the similar concept of Maglev Train and use solenoids to accelerate the object. In case if it won't levitate stably we are planning to abandon Maglev Train concept, only the solenoid accelerator will be presented.

Components

- ❖ Magnetic tape
- ❖ Copper wire
- ❖ Round shaped track
- ❖ Breadboard
- ❖ Circuit components (transistors,resistors,etc.)
- ❖ Power supply