

Abstract Submitted
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Arduino based Implementation of a Closed-Feedback Control Loop in a Magnetic Levitation Device ROEL OLVERA II, TONI SAUNCY, Texas Lutheran University — Magnetic levitation (MagLev) systems provide a fun and engaging way to explore upper-level digital electronics, learn more about control systems, and apply fundamental principles from electrodynamic courses. The MagLev system suspends a neodymium magnet (which can be attached to any object) using a linear hall effect sensor that is set to control the strength of an electromagnet, orchestrated using a low-cost Arduino uno. Construction of the MagLev system has provided an opportunity for strengthening essential skills including coding, electronics design and circuit construction, and basic carpentry skills. The materials and construction of similar devices often prove to be expensive. In this project, a MagLev digital system was designed and built using low-cost materials and scrap wood. A manual for use by future students will allow the device to be used in undergraduate labs and courses to challenge students to find ways to improve on the basic feedback loop system and build their own apparatus. Possible improvements may arise in the form of a digital to analog system, a stronger, cheaper structure, or the addition of different sensors to improve the quality of the feedback loop for more precise positioning of the levitated object.

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