Logical Levitation: Achieving Magnetic Levitation via Computational Feedback Loop

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The purpose of my project was to attempt to create a device which would make invasive surgery less intrusive by removing the need for much of the physical dissection. I planned to accomplish this by creating a device which could control the position and motion of a magnetic object without being physically attached to it in any way. My engineering goals were as follows: to construct a system with the ability to sense and create magnetic fields and to program said system with the logic necessary to keep a magnetic object suspended in mid-air. The following were my engineering procedures: 1) Obtain equipment necessary for experimentation. 2) Construct a physical circuit that meets my design criteria. 3) Experimentally evaluate various hardware qualities. 4) Based on knowledge of hardware and experimental data analysis, create/revise the current algorithm to improve performance. 5) Repeat all aforementioned procedures as I see fit throughout experimentation. The results of my project indicated that it is possible to create a device capable of suspending a magnetic object in mid-air, however due to various issues this levitation can't be stable unless motion is restricted to one dimension. As a result, I've concluded that my device is probably not a good fit for a field such as invasive surgery where precision and stability are indispensable. However, my device may prove useful in various other fields such as valve systems, piston control, and pneumatic/hydraulic alternatives.

Awards Won:

Fourth Award of $500