

UNIVERSITY COLLEGE SEDAYA INTERNATIONAL
SCHOOL OF ENGINEERING
FINAL YEAR PROJECT
FINAL REPORT

DESIGN OF SAFETY MAGLEV TRAIN

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ABSTRACT

The objective of this study is to develop a miniature prototype magnetic suspension and develop a magnetic suspension by using a simple analog PD controller. This study presents a discrete magnetic suspension system using a simple control strategy, which relies on a single decision plane. The proposed system deploys an infrared (IR) emitter detector pair with a beam width of 2mm to detect the suspended iron ball. Whenever the ball intercepts the IR beam the uncompensated proportional derivative PD controller switches on the current flow to the electromagnet (EM) which pulls up the iron ball. After a while the PD controller becomes unstable and pushes the ball above the IR beam, meanwhile the controller switches off the (EM) current flow and consequently drops the ball as the suspension force becomes less than the gravitational force. Again, while intersecting the IR beam, the pulling process will be started. It has been found that the low current consumption is one of the major advantages of the proposed system. From the results, the study has found that the PD controller did not produce such expected result from Matlab simulation. The experimental result in practical world showed that the iron ball or steel ball did not even pull up or suspended in the range of 8mm to 9mm air gap. So to solve the problem, a simple circuitry has created. The improvement shows that the steel ball really oscillates.