

## Magnetic Levitation Control: A Comparative Analysis of Two-Position and Tuned PID Methods Using Arduino Microcontrollers

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**Abstract :** The research examines the effectiveness of Two-Position and Tuned PID controllers in magnetic levitation systems. Magnetic levitation, a crucial technology in diverse industries, depends on meticulous control mechanisms for stability and performance. The study seeks to compare these two control strategies to ascertain their efficacy in practical applications. The paper explores the theoretical foundations of the controllers, presents an experimental methodology emphasizing setup and installation, and examines the results about stability, response time, and susceptibility to disturbances. By interpreting and discussing the findings, the research provides valuable perspectives on the practical ramifications of utilizing Two-Position and Tuned PID controllers in magnetic levitation systems. The conclusion encapsulates significant outcomes and proposes avenues for future research, thereby contributing to the progress of control strategies in magnetic levitation technology.

**Keywords :** arduino, comparative analysis, magnetic levitation, tuned PID controller, two-position controller

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