

ABSTRACT

Technological developments transport industry today is towards the application of technology of magnetic levitation system, namely control of a metal object (ferromagnetic) floated by magnetic force.

Magnetic levitation ball is the application of a magnetic suspension that discusses controlling position on three steel balls that have different weight and then floated by the magnetic force of a coil.

Variation weight of steel balls cause *magnetic levitation ball* system error occurs calculations and magnetic force. Steel balls used mass 15gr, 22gr and 30 gr. Errors due to variations in load of steel balls can be reduced by PID control methods the value of Kp, Ki and Kd respectively for 9000,0.0001 and 1000. By Implementing value of Kp, Ki and Kd on the system voltage obtained for levitating a steel ball on a mass of 15 grams, 22 grams and 30 grams respectively is 3.38 volt ,3.83 volts and 4.31 volts. To strengthen the system of magnetic levitation ball robust control analysis was used to obtain a good performance of the system is less than 0 dB, the steel balls mass of 15 grams, and 30 grams 22gram system performance values obtained consecutively -3.7dB, -10.2 dB and -3.7dB. The working principle of magnetic levitation ball using version Arduino Uno as a microcontroller and a reading position using hall effect sensor.

Keywords: *Magnetic Levitation Ball*, Arduino, Steel Ball, Hall Effect Sensor, PID Controller, and Robust Control.