DESIGN AND SIMULATION OF POSITION CONTROL SYSTEM OF MAGNETIC LEVITATION BALL USING SLIDING MODE CONTROL (SMC).

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Magnetic Levitation Ball system has a very important role in industrial field, such as a system which is applied on moving train on the railway track with a high velocity (MAGLEV train) and as a model of fly wind tunnel system. The general problem which is mostly faced by the Magnetic Levitation Ball control system is the emergence of uncertain disturbance from inside or outside the system. To repair the system’s performance, it is used a method which is famous to scientists and engineers nowadays, Sliding Mode Control (SMC). In this Final Project, a control system is designed by using SMC dynamic and static method which is a kind of control methods in SMC which is applied in Magnetic Levitation Ball dynamic system to replace conventional control system. SMC is one of control methods which have uncertain model or parameters.

Some experiments show that the SMC dynamic in Magnetic Levitation Ball can be applied to control ball position. Generally, the SMC dynamic control is robust to an external disruption whether it has little or big value and to an internal disruption whether it is the additional or
alleviation of parameters, compare with SMC static. Else, SMC dynamic control doesn’t have an excessive oscillation and it has a fast response time so that it can max the work and position’s system of Magnetic Levitation Ball. However, beside its good, the method also has some bad, that is it can’t be applied in a kind of big impulse disturbance.

Keywords: control system, Magnetic Levitation Ball, Static and dynamic SMC