Abstract

The paper proposes to use Particle Swarm Optimization (PSO) to tune parameters of a fuzzy logic controller for regulating a magnetic levitation (maglev) system at a desired position. PSO is a meta-heuristic search method. This method is inspired by bird flocking behavior searching for food. In this study, the rule base of the Fuzzy Logic Controller (FLC) is brought by expert experience, and the parameters of the controller including the membership function parameters and scaling gains will be optimally tuned by the PSO such that a quadratic criterion is minimized. Simulation results show that the designed fuzzy controller is able to stabilize the position of the maglev system. Besides, a state feedback controller is also used to regulate the maglev system. Although, the simulation results show that FLC gives performance better than the state feedback controller but the latter is more robust.

References

1. Vinodh Kumar E, Jovitha Jerome. 2013. LQR based optimal tuning of PID controller for
trajectory tracking of Magnetic Levitation System. IConDM. Elsevier Ltd.

Index Terms

Computer Science Fuzzy Systems

Keywords

Fuzzy Logic Controller, PSO, Maglev.