**Adaptive Position Control of a Levitating Ball**

Course Project - Project Description

ELG7113 - Machine Learning for Adaptive and Intelligent Control Systems

By

Derek Boase, Clive Plante, Alfa Budiman and Zeinab Keserwan

Department of Electrical Engineering

Faculty of Engineering

University of Ottawa

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System Description

*“Each group has to submit a short report describing the system selected for the project, and a preliminary description of the type of analysis that is going to be conducted. Feedback will be given.”*

System Schematic

Diagram

Description automatically generated

System Diagram

Diagram

Description automatically generated

Problem Formulation

Dynamic Model

Work Plan

The overall plan is to model the system and implement multiple adaptive control structures, comparing their performance to each other as well as a baseline set of responses from a previous implementation of this project.

1 - Model the dynamics of our system in accordance with the literature and implement control strategies from the linearized model (i.e. empirical tuning and gain scheduling)

2 - Perform parameter estimation on the model to increase the correlation of the constantly updating model and the physical output.

3 - Perform system identification on the physical system with the purpose of control

4 - Implement multiple adaptive control structures (example: model reference control, model-free control, self-tuning regulator).

5 - Compare the performance of the implemented control structures

Performance metrics include overshoot, settling time, ….