

Laboratory Projects

The laboratory projects for the course of Optimal Control consists to propose solutions for realistic problems closely related to the topics covered in the course. Each group is composed by two/three elements and must choose one project. In order to solve successfully the challenges embraced in this course, four phases must be accomplished: i) to formulate the problem at hand and to model the systems and sub-systems involved, ii) to formulate and solve a control and/or estimation problem, based on previously studied techniques, iii) to reformulate and solve an optimal control and estimation problem, with the new techniques to be introduced in the present course, and iv) to provide a real-time laboratorial solution or exceptionally a realistic simulation environment, that allow the demonstration of the solutions proposed.

Phase I

The following tasks should be accomplished in the first phase of this project:

- i) To study the systems and sub-systems available.
- ii) To model, based on first physical principles, the dynamical systems.
- iii) To formulate a control problem that will be able to tackle the problem at hand.
- iv) To analyze the characteristics of the systems, in terms of linearity, stability, controllability and observability and discuss on the disturbances present
- v) To implement realistic Simulink models for the dynamical systems and for the sensors and actuators to be used.
- vi) To verify the frequency and time responses, both in open loop and in closed-loop.

A written report, three slides in Powerpoint, and Matlab/Simulink scripts should be delivered upon conclusion of this phase.

Laboratory Projects

T1) tbd

...