

Abstract

This thesis develops a test platform for a control problem.

The inverted pendulum is selected as a well-established control problem. It is representative of an unstable nonlinear system which may remain balanced using any of several methods. Once balancing is achieved, multidimensional maneuvering is added as a supplemental control objective.

To approach the control problem hardware is selected which is then characterized and simulated, and then operated while communicating operational data.

The thesis provides a detailed description of the approaches to:

- Selecting the hardware.
- Characterizing the hardware.
- Developing a functioning controller.
- Simulating the results.

Additionally, a modular test platform is developed such that additional control approaches or characterization models could be implemented and hot-swapped.