Masterarbeit

PID and LQR Speed Control in Simulation and Hardware for a Tele-Robot

Introduction

Chair VII runs the Telelab together with vhb (Virtuelle Hochschule Bayern) with which students can take online courses and work with remote hardware over the internet. An experiment in the Telelab consists of a tutorial describing theoretical background information on a topic and detailing an experimental procedure, which students should follow in order to create and submit a report.

For our freshly updated mobile robot, two new experiments shall be developed: First, a browser-based simulator should be programmed for comparing the performance of PID and LQR speed control of a motor. An accompanying tutorial along with an experiment description should be created as well. Second, a similar experiment shall be realized with the existing mobile robot. Apart from creating the tutorial and experiment description, the existing software needs to be extended. That software comprises of a server application and a relay application (written in C++) and a microcontroller application (written in C) as well as a browser-based application.

Tasks

• Simulator
  o Programming a browser-based motor control simulator for PID and LQR
  o Design and testing of control experiments
  o Writing up a tutorial for an experiment in the Telelab

• Hardware
  o Implementation: extension of browser-based GUI, PID controller and LQ regulator on microcontroller, extension of communication protocol
  o Design and testing of control experiments
  o Writing up a tutorial for an experiment in the Telelab

• Design and testing of control experiments

Prerequisites (Not compulsory but advantageous)

Basics of control engineering, Robotics 2, Microcontroller programming in C, C++ and JavaScript

Kontakt

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