

University of Bristol
Faculty of Engineering



Sensors, Signals and Control

Part 3: PID Implementation, Validation and Retuning in Quanser

Supervisors:
Andres Marcos

Email:
Andres.Marcos@bristol.ac.uk

Authors:
Alex Charles
Akash Ramineni

Candidate Number:
(ac13625)
(ar14120)

26th April 2017

1 Introduction

This report analyses the effectiveness of a using a PID controller derived in Phase 2. Before implementing the controller on the Quanser rig, the controller was first tested by placing nonlinearities into the simulation in the form of a rate limiter and saturation. Through applying the design process the new control objectives were met which could them be implemented on the Quanser rig and further refined to create a controller which met requirements. The following report discusses both the design process, results and any observations made through creating an effective controller for the Quanser rig.

The following transfer function was used taken from phase 1:

$$2^{nd} \text{ Order: } k \cdot \frac{1.109 \cdot \frac{180}{\pi}}{s^2 + 0.1313s + 1.109} \qquad 1^{st} \text{ Order: } k \cdot \frac{1}{15.24s + 1}$$

Where $k = 0.26$.

2 Theory Transfer Function Control Refinement

2.1 Design Process

2.2 Results

3 Nonlinearity Simulation Control Refinement

3.1 Design Process

3.2 Results

4 Quanser Controller

4.1 Design Process

4.2 Results

5 Conclusions