CAS 741: Problem Statement - PID Controller

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Table 1: Revision History

Date	Developer(s)	Change
21-Sep-2020	Naveen Ganesh Muralidharan	First revision of the PID problem statement
24-Sep-2020	Naveen Ganesh Muralidharan	Updates as per the latest problem statement checklist, viz, • Included the Comments.tex file. • Wrapped text in the .tex file to 80 chars. • Corrected few grammatical mistakes. • Added reference to Drasil.

Problem Statement

A closed loop control system can be defined as the system where the input to the Power Plant is continuously adjusted by monitoring the feedback from the Power Plant until the expected Set-Point is reached. The closed loop control is used in a variety of applications such as cruise control of an automobile, temperature control in a thermostat, and many more. The heart of the control loop is a

Proportional, Integral, Derivative (PID) controller that drives the input to the Power Plant in the loop. However, the PID controller in a loop must be tuned before it is deemed ready for use. This involves setting optimal values for the respective Proportional, Integral, and Derivative gain constants. Therefore, a model is necessary to simulate a control loop, using which the PID gains can be tuned.

The inputs to the Model are the Set-Point (numeric), Proportional Gain (numeric), Integral Gain (numeric), Derivative Gain (numeric), Total Simulation Time (numeric) and Step-Time (numeric). The outputs from the Model are the Measured Values from the Power Plant (numeric list) for each iteration, and their respective Time-Points (numeric list).

This Model shall be implemented using the Drasil project. Following is the homepage of the Drasil project,

`https://jacquescarette.github.io/Drasil/`

Stakeholders

Primary stakeholders of this Project are,

- Naveen Ganesh Muralidharan
- Dr. Spencer Smith
- Students of the class CAS 741
- Dr. Jacques Carette
- All contributors of the Drasil Project

Software Environment

The software application in this project is designed to execute on Ubuntu 18.04 and Derivatives, Windows 10 and, macOS 10.13 and greater.