

Control System Laboratory

Number of 12 classes

Objectives

1. Familiarisation with MATLAB and modelling with Simulink
2. Familiarisation with Arduino and interfacing with Simulink
3. Basic control using analog circuits
4. Understanding the basic control of line follower robot
5. Understanding the basic hysteresis control using Arduino and sensing the analog signals
6. Understanding the DC motor parameters and understanding about open loop control
7. Learning about digitization from s-domain to z-domain

List of Experiments

1. Introduction to Matlab and Simulink (one class)
2. Introduction to Arduino and interfacing with Simulink (one class)
3. Voltage regulator control using OPAMP (one class)
4. Line follower robot experiment (one class)
5. Temperature control of light bulb using temperature sensor and Arduino (one class)
6. DC motor open loop speed control and estimating machine parameters (one class)
7. Modelling of DC motor in MATLAB and performing closed loop control using P, and PD (three class)
8. Class project i.e., levitation of small object (three class)

Outcome

1. Student should be able to do modelling with Simulink
2. Students should be able to program Arduino using Simulink
3. Students should learn OPAMP based control circuit design
4. Students should be able to control the robot using Arduino
5. Students should be able to characterize the model of light bulb and control using Arduino
6. Student should learn about open loop control and advantages and disadvantages
7. Knowing about various forms of closed loop control, stability, system performance etc.

Evaluation

1. Lab Experiments (20%)
2. Lab report every week (20%)
3. Project (20%)
3. Final Exam (40%)