

CMPE 49A INTRODUCTION TO ROBOTICS

LAB #6 “Can you control it?”

In this lab we will be experimenting with the control of an unstable system. We will specifically try to design a PID controller. The robot we will be developing will be similar to an “inverted pendulum” which is a very difficult control problem.

Things to do:

1. Construct the Sejway robot as shown in the handouts.
2. PART 1. Simple control.
 - 2.1. Write the SejwayBad code, compile and download it to the robot.
 - 2.2. Observe the behavior and comment on it.
3. PART II. PID Control.
 - 3.1. Write the Sejway code, note that KP, KI, and KD values are missing.
 - 3.2. Tune the PID parameters to find the values of KP, KI, KD.
 - 3.3. Observe how the behavior of the robot is affected as you change the parameters, and comment on it.
 - 3.4. COMPETITION: Try to balance your Sejway as long as possible.
4. PART III. Moving on.
 - 4.1. Change the code so that Sejway becomes a robot that can move forward, backward, and turn left and right as desired.
 - 4.2. Write a code which will make the new robot to follow the sides of a square and come to its starting point.