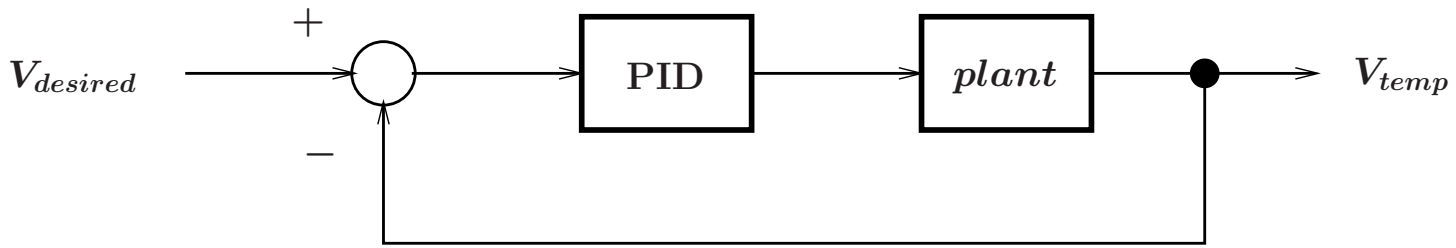
EEE 101 Experiment 3

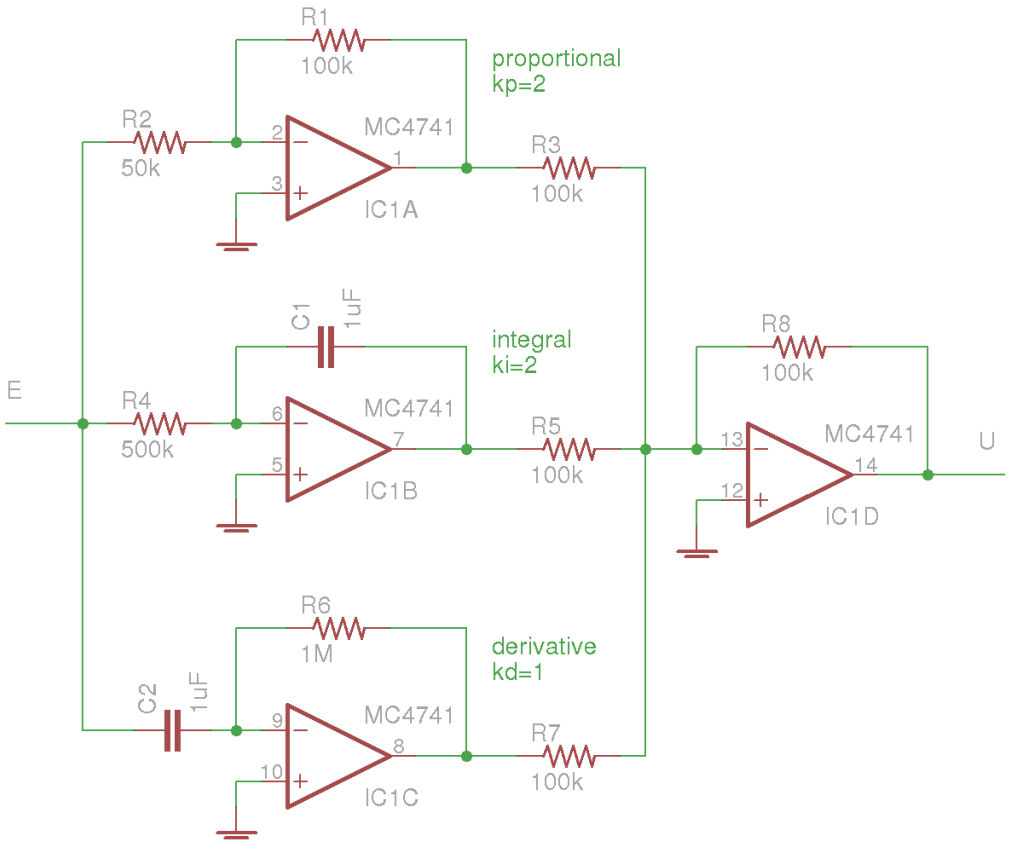
- **Construct the following system.**



  - **The plant is exactly the same plant as in Experiment 2.**
  - **$V_{desired}$ corresponds to the 75% of the maximum temperature recorded in Experiment 1.**
  - **Record V_{temp} every 10 seconds for at least 5 minutes.**
  - **Only start when the bulb temperature is at ambient.**
  - **Do multiple runs using different PID controller configurations.**

EEE 101 Experiment 3

- **Build the following PID controller.**



EEE 101 Experiment 3

- **Use the following different configurations by removing the appropriate resistor(s) among R3, R5, and R7.**
  1. **P: $K_p = 2$.**
  2. **I: $K_i = 2$.**
  3. **PI: $K_p = 2$ and $K_i = 2$.**
  4. **PD: $K_p = 2$ and $K_d = 1$.**
  5. **PID: $K_p = 2$, $K_i = 2$ and $K_d = 1$.**

- **Compile your data for the 5 configurations in one table. Submit at the end of the experiment.**

EEE 101 Experiment 3

- **Lab report preparation.**
  - **Compile all your data for all runs in one table.**
  - **Plot your results in one graph. The results should be easily distinguished from the others.**
  - **Plot temperature vs. time and error vs. time.**
  - **Make a theoretical analysis of the experiment using the model you derived in Experiment 1. Clearly show your analysis.**
  - **What are the step responses? Plot them.**
  - **Compare your analytical results with the data gathered from the experiment.**
  - **For each configuration, plot the actual result and the theoretical step response in one graph.**