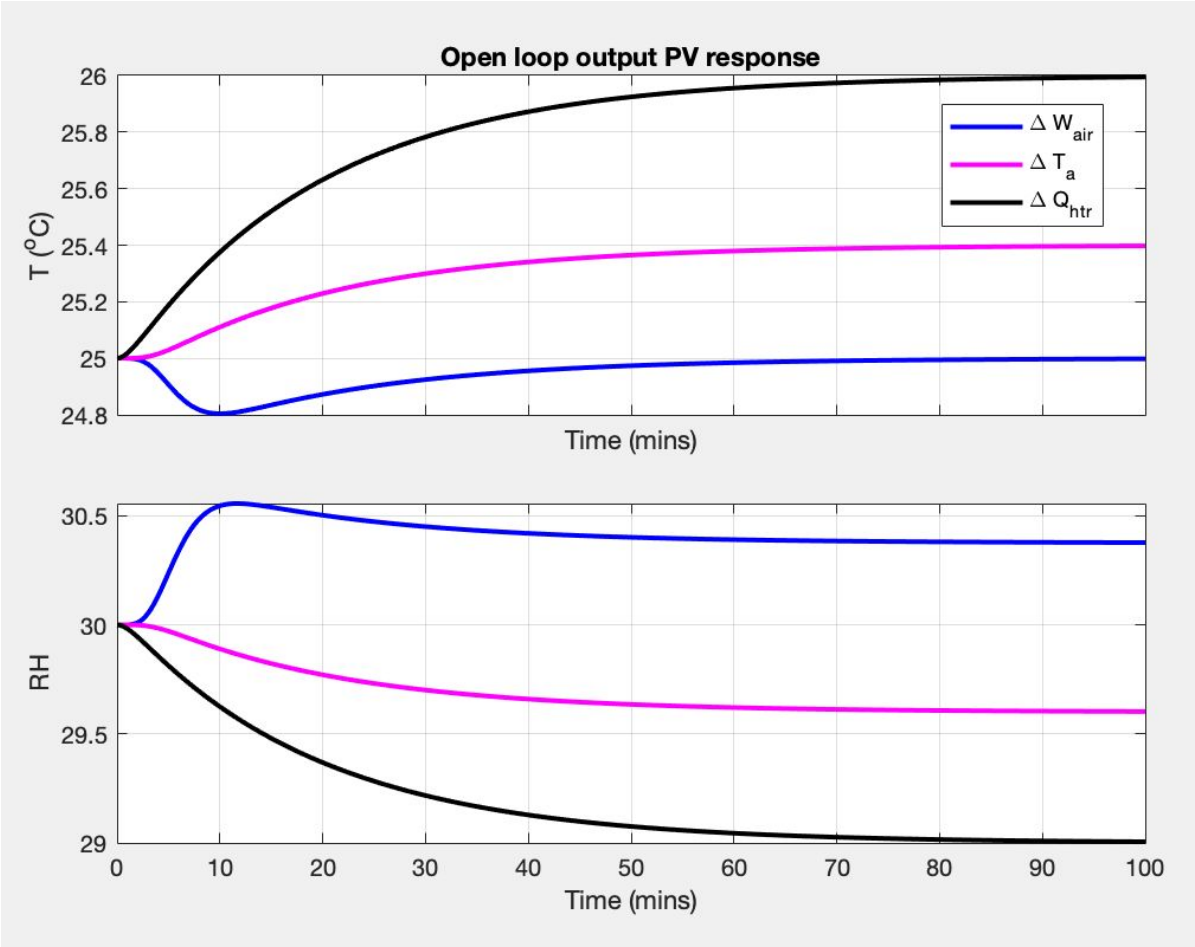
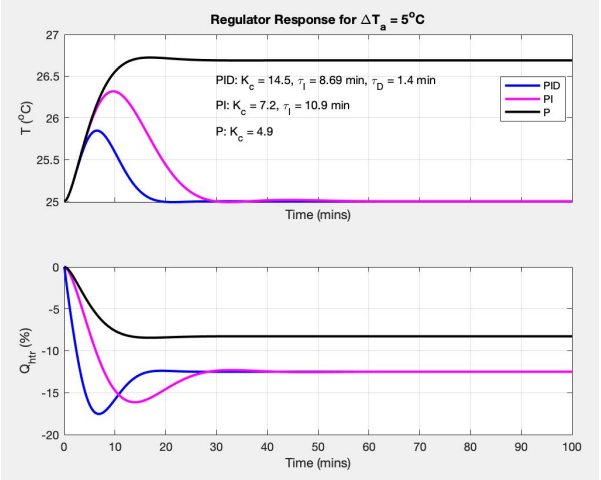
Shubham Gupta **CHE381 Lab:1**
180749

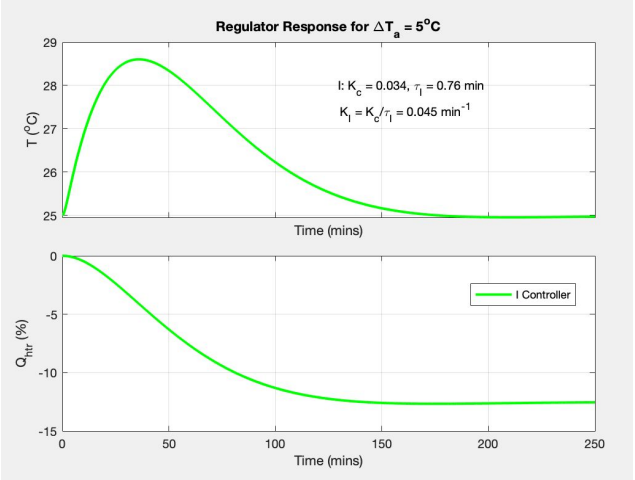
Open Loop Output PV Response



Manual PID Controller

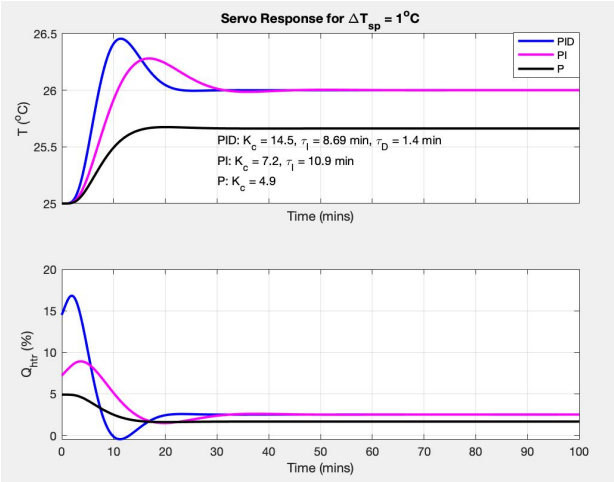
- **Regulator Response:**

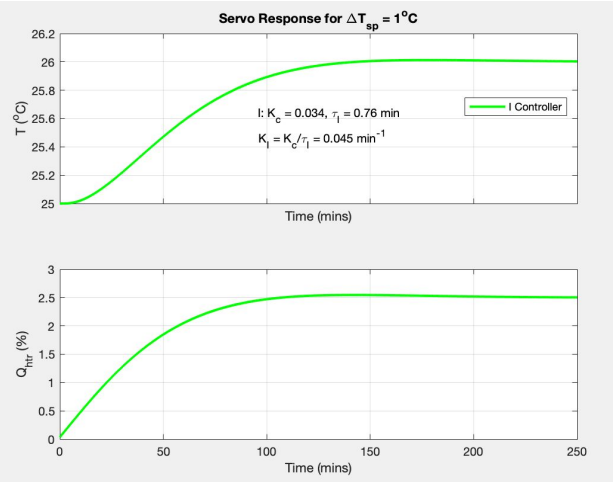




1. We can observe the tradeoff between “highest variability in the temperature” vs “time-taken to reach equilibrium”.
2. If one of the above parameters increases the other decreases and vice versa.
3. To achieve the results mentioned above, I took the initial values, as shown in the lab-1 video. I then focused on reaching the equilibrium faster, therefore, getting some extra variability in the highest temperature.

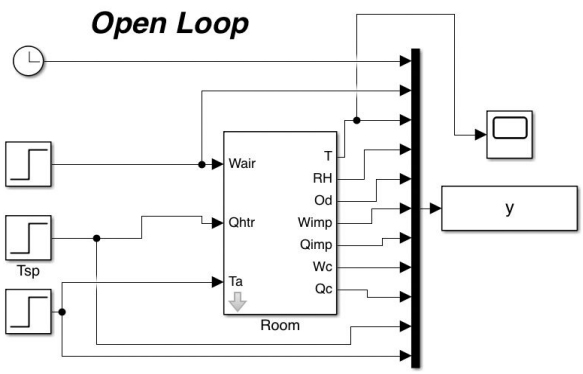
- **Servo Response:**

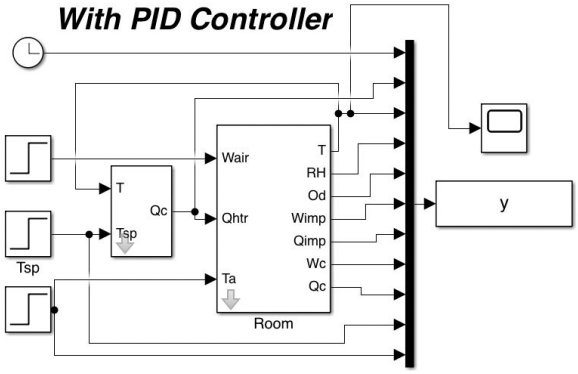




1. I used the same values for Servo Response as in Regulator Response and have found optimal results to reach equilibrium faster.

Circuits Used





Tuning Parameters

- K_c: Manipulation helps us to attain equilibrium faster.
- τ_I: Manipulation helps us to converge without any offset
- τ_D: Manipulation allows us to reduce and eventually nullify any oscillations.

Conclusion

- For I controller, we can take any values of K_c and τ_I until the ratio between these two entities lies between 0.002-0.007(the boundaries are soft).
- For optimum tuning parameters, we can construct a system that minimises temperature oscillations and attains equilibrium faster.