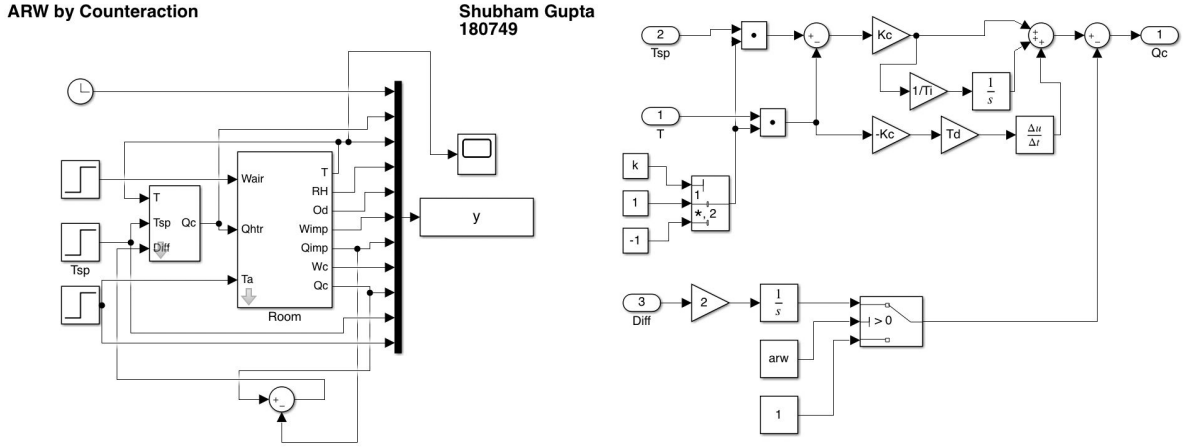
Shubham Gupta 180749 CHE381 Lab:3

When we deal with PID setup along with integral optimization, sometimes we see large values of input changes and the integral optimization continues even after saturation. This leads to a huge deviation in equilibrium. We switch integral optimizer off when equilibrium is reached and vice versa to solve this problem. Such setups are called Anti Reset Windup (ARW) and there are 3 such setups.

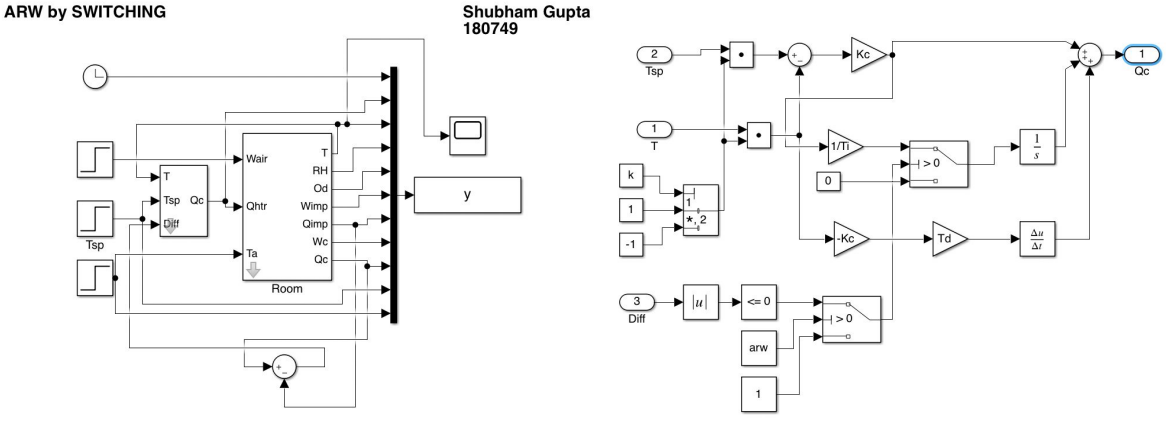
Values used for experiments:

AWR: $K_C = 20$, $\tau_I = 6$, $\tau_D = 1.5$, $Q_{iC} = 50$, $W_{iC} = 0$, $T_{iC} = 25^oC$, $T_{spf} = 30^oC$
On-OFF Control: $K_C = 20$, $\tau_I = 6$, $\tau_D = 1.5$, $Q_{iC} = 0$, $W_{iC} = 0$, $T_{iC} = -10^oC$, $T_{spf} = 25^oC$
Heater duty in ON-OFF Control oscillates between 0-100

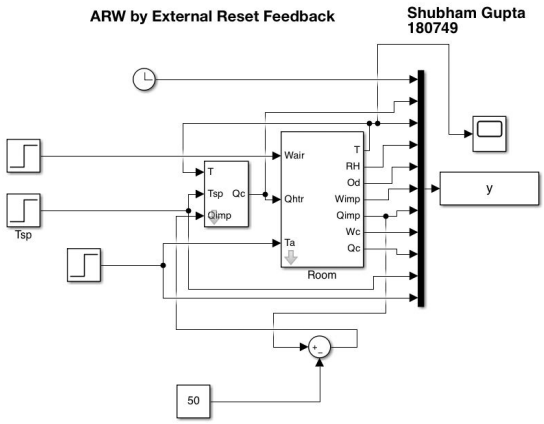
1. ARW by Counter-Action

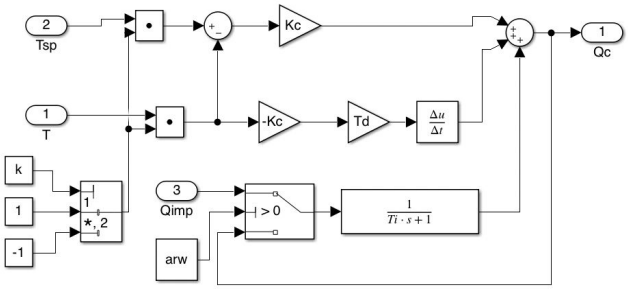


2. AWR by Switching



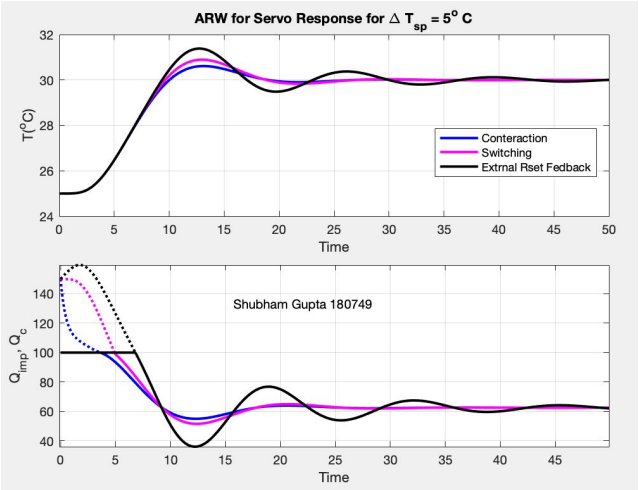
3. AWR by External Reset Feedback



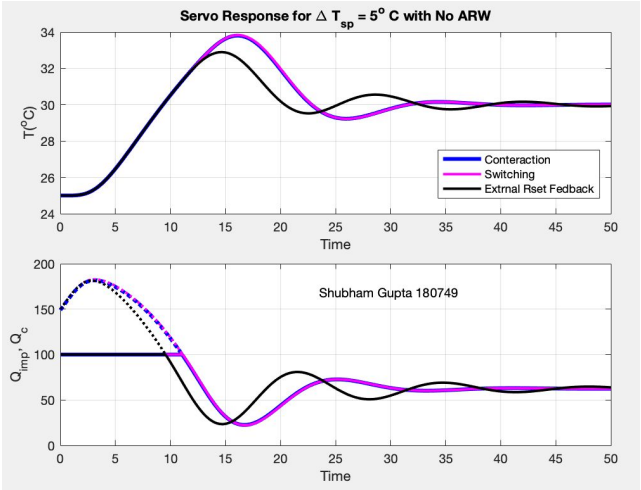


Graphs

AWR on



AWR off



ON-OFF Control