Project Progress Report #2

Due to the nature of the subject, we opted for simulated data and responses. In order to design a control system we needed some starting parameters and opted to derive them using an FOPDT model. We initially attempted to treat the power output as the controller output, but the gain wasn't the same at the high power setpoint as it was at the low power setpoint. To make the gain constant we swapped our system to make power the input and gate height our controller output. This means that the power output becomes the process variable and the gate height the controller output. Treating the depth of the reservoir as a disturbance variable, we ran open-loop simulations, the data of which is shown below. This data allows us to find parameters that model the relationship between power output and the required gate height. Fitting this data to a FOPDT model yields the following parameters: $\boldsymbol{K_p}$ = 1.0, $\boldsymbol{\tau}_p$ = 1.8 days, $\boldsymbol{\theta_p}$ = 0.0 days.

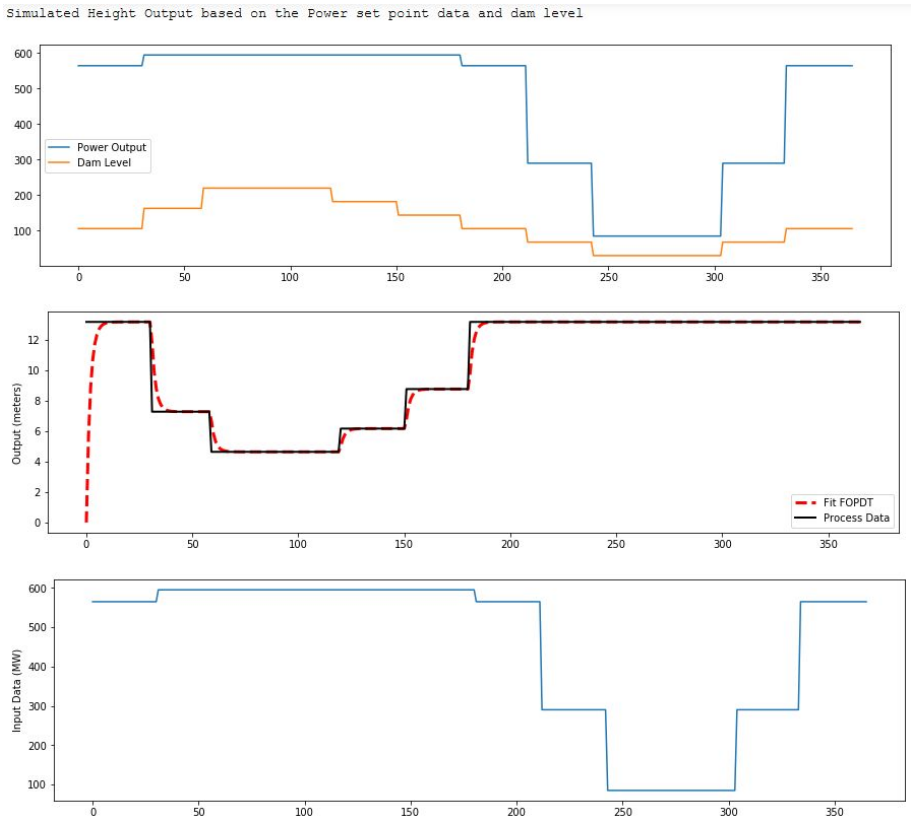

***Figure 1*: The above graphs show our input (power in MW), output (gate height in meters), and the FOPDT model fit to our process data.**

It's worth remembering that our code represents simulated data. In actual measured data additional noise would come from differing pressures and densities throughout the system.

We are still on track to be finished by Dec 9th, 2020