American University Of The Middle East

EECE382: Feedback System Analysis and Design

(Project Title)

Project Deliverable II: Final Report

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Contents

1. Introduction (100 – 250 Words):

The transfer of heat from one part to another (load) is accomplished using fuel (fuel). A controlled combustion releases heat as energy. During combustion, flue gases are released. The fluid continuously flows through the tube, which causes it to be continuously heated. Before distillation can begin, refineries should be directly involved in overseeing oil regulation before distillation begins. Simulates and controls industrial furnaces that typically burn oil using balances and thermodynamic relationships. A PID controller was designed for temperature simulation and open and closed circuits were implemented as a result of the researchers' work in Laos.

1.1. Problem Definition

The heating furnace raises the temperature of the fluid during the refining process. The flame transfers energy to the material, causing temperature rise and phase change (vaporization). The temperature in the atmosphere increases as the temperature rises. Radiant heat absorbs the gas released by the heat, so the greater the heat in the convection zone, the greater the energy loss. The refractory wall prevents heat from escaping into the atmosphere. Nevertheless, it still occurs in 2% to 3% of isolates. The diagram shows that the oven needs several different parts to function properly. Some of these components are air and fuel, which are responsible for transferring heat from the tube to the air, as well as the coil and convection area of the tube that radiates. In addition to the outlet pipe to the atmosphere, there is an additional control door to control the outlet of the furnace. An unbalanced heat transfer path (heat transfer from the heating zone) will affect the normal operation of the oven. In these steps, the equipment will only operate for a short time due to the rapid formation of coke (the carbon layer in the wall) and the possibility of high temperatures.

1.2. Criteria and Constraints

To generate the necessary heat in each room, two types of burners are installed under the stove. The temperature is 3600 °C, the flow is 530 K, the inlet pressure is 16.32 bar. Table 1 lists all oven specifications. Crude oil is first heated with exhaust gas, then for thermal efficiency, and then subjected to cavitation. Combustion in a furnace allows you to simulate thermodynamic equations and apply current equilibrium laws. A parameter or reference unit for models with oil heating. Process liquid flow rate (kg/s), process liquid inlet temperature (), process liquid outlet temperature (OC), process liquid inlet pressure (bar), process liquid inlet pressure (bar), combustion air pressure (nominal fuel (gas), flow rate (kg/s), potential airflow (kg/s), low hot air flow (mJ/kg), energy efficiency LHV, metal temperature ^{0}C, liquid compression process (kg/m^{3}). Assume that Cp = 3h/3Tp and dh/dt-(3h/3T)(dT/dt) are equal. This is because the pressure inside the oven changes when the load changes. 3. At rest, the metal temperature is close to the process temperature and is negligible in the equation. three

1.3. Objectives

- Design a Feedback system model with a PID controller for use in a Crude Oil Pre-heating furnace using the technical parameters; crude oil flowrate, fuel ratio control system, fuel flowrate.
- Step-response plot of an Open-Loop system with the transfer functions, flowrate to the open-loop system with the time versus Amplitude.
- Detailed error and stability numerical computations wit the PID controller parameters for auto-tuning.

2. Discussion / Simulations/ code

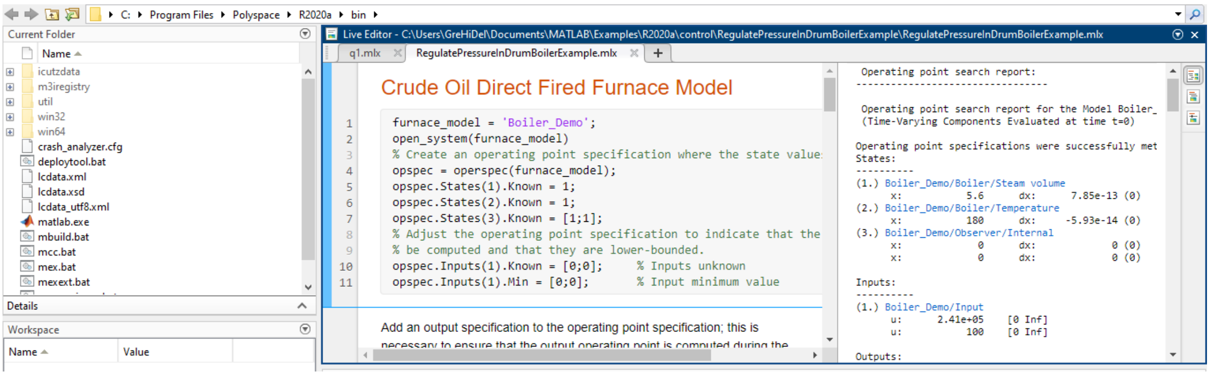

Figure showing the Crude-Oil Direct Fired Furnace Model.

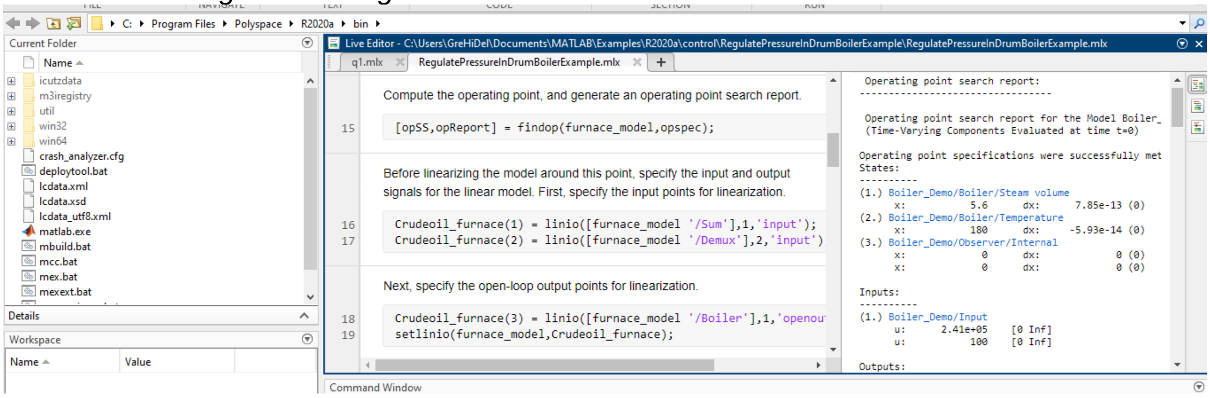

Figure showing the Crude-Oil Direct Fired Furnace Model code.

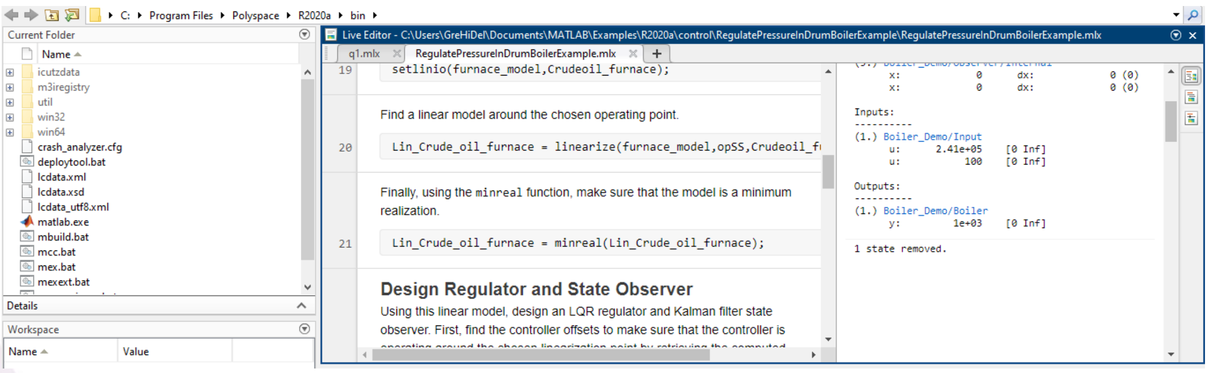

Figure showing the Crude-Oil Direct Furnace Model code 2.

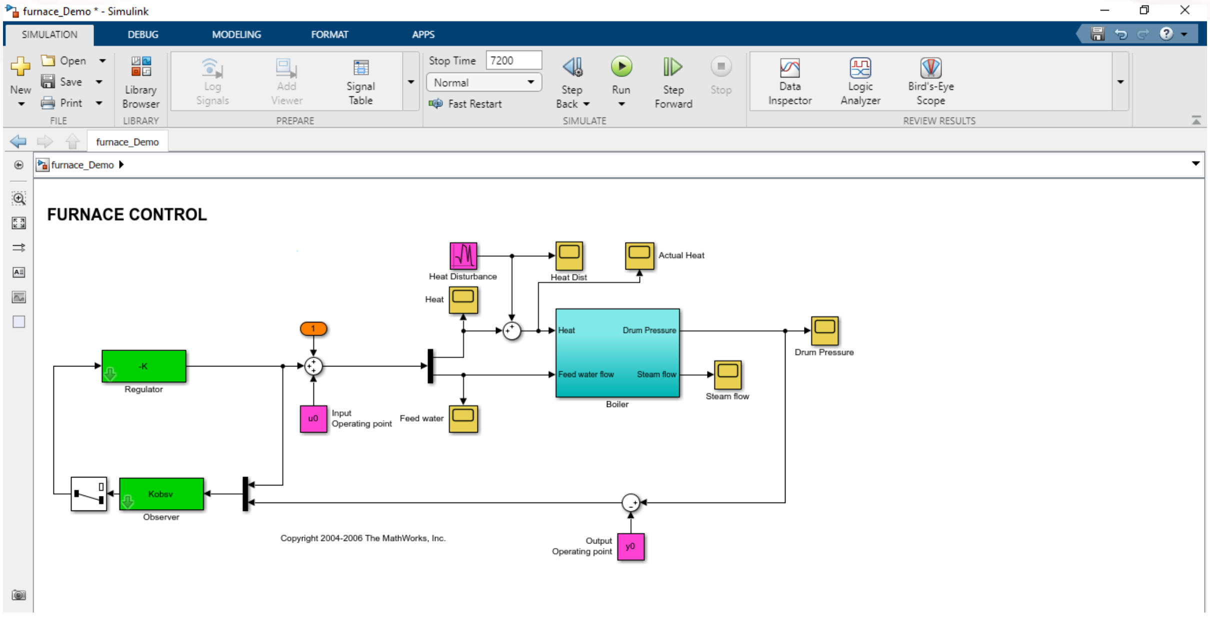

Figure showing the MATLAB model for this Crude Oil Furnace control.

Due to the interaction of variables, there is a significant reduction of efficiency that is why the Implementation of a system of controls to increase efficiency, maintain stable operation extending the operating time of the unit increaseing the total charge.

3. Conclusion

A PID controller incorporates three variables: proportional, inductive, and integral. 15. The simulated test configuration parameters can be tuned using MATLAB IS SLEMUHNK Figure 3. This controller has one processor as you can see in figure 4. In this instance, the amount of fuel will be equivalent to the time that elapses between the installation and the last braking of the vehicle. Control specifies a temperature of 3700 °C as the optimal oil temperature. In this process, the exhaust temperature is controlled by constant fuel flow, and therefore the temperature of the oil is reduced. This allows the gas to be kept at the same temperature at the end of the test. At the same temperature and having the same energy content as the main gas used for heating, heavy oil vaporizes at a lower temperature with less energy, and after flowing 1 ml of the experimental gas, the volume and mass of the smoke increase. Calorie decreases. ... Gases mixed with air in large amounts. Gas supplies with low temperatures absorb more heat from radiant fields and heating zones, consequently causing fewer fires. Strategies such as YIPC can be applied to many sustainable materials. Implementing a PID controller can provide these benefits. As a result, the system operates safely and minimizes the burden of ongoing work interactions. Fuel flow measurement is the simplest indicator of combustion efficiency to measure process charge flow and liquid outlet temperature, and is the baseline for smoke performance monitoring to ensure and maintain stability of the PID controller.

References

Example for references (use the same format as below)

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