Abstract
Combustion is an exothermic reaction that occurs very fast, where energy freed as thermal and flame. Furnace is boiler part which serves as the combustion chamber. In the combustion chamber requires a control system capable of producing perfect combustion process, whereby the control system is known as flow ratio control system of air and fuel. Combustion process to occur optimally, then the value of the ratio between the fuel can be determined by the law of mass equilibrium. To improve the performance of the controller, so in this final project fuzzy algorithms applied in making a gain-gain tuning of PID controllers, such as Kp, Ti, and Td. The simulation results show that the output response of the PID fuzzy gain scheduling (FGS) has a good performance, as indicated by an Mp of 2.05%, seconds Tr at 2.6, Tp at 11 seconds and Ts at 25 seconds with Kp = 0.75 Ti=1 dan Td = 1, while the conventional PID has amounted to 14.75% Mp , Tr at 3.2 seconds, Tp at 9.07 and Ts at 40 seconds with Kp = 0.75 Ti=2 dan Td = 1.5.

Keyword : Combustion, Fuzzy logic, Mass balance, Gain scheduling PID, Air to Fuel Ratio Control (AFRC).
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