

## **ABSTRACT**

*One of the important control systems in the industrial world and everyday life is the temperature control system. Production equipment that is widely used by using temperature control is the water heating system. This water heating system must be controlled with the right temperature according to the set point so that the temperature can be controlled so that users get the water temperature they need because some drinks need the right temperature to make it. In today's life, in the design of a control system there are many control system methods that can be applied, including the Bang-bang control system method and the fuzzy control system method. The two control systems have different characteristics, performance, and produce different parameter values even though they are in the same control system. Thus it is necessary to conduct a research that can describe the comparison of the control results of Bang-bang control and fuzzy control. The research was conducted by comparing the performance of the bang-bang control system and the fuzzy control system by analyzing the mean square error (MSE) value parameters of the two control systems using LabVIEW software. From the results of the study it was found that the fuzzy control system has the best performance for the water heater control system with fast time rise and time settling values of 1650 seconds and has a small MSE value of 0.7 compared to bang-bang control systems with hysteresis values. 1 which has a time rise value of 1440 seconds, a time settling of 1770 seconds, and an MSE value of 1.28.*

**Keywords:** *Control System, Bang-bang Control, Fuzzy Control, Water Heater Control.*