ABSTRACT

The increase in population makes the occupancy of the Greater Bandung area very dense. There is research data regarding ambient air temperature in the Tokong Nanas Building, Telkom University which is read at the measurement station, namely 14.4°C – 43.9°C, the lowest occurred in August while the highest was in July. The changing outside air temperature greatly affects the temperature in the measurement room. The main objective of this research is to control the temperature in the measurement room so that it is at a set-point value of 25 ± 1°C. The method used is an open system (without and with styrofoam), ON-OFF control, and Proportional Integral (PI) control. The results of the comparison of water temperature using a temperature sensor (DS18B20) with a digital thermometer (ST-300) has a Mean Absolute Percentage Error (MAPE) value in cold – hot and hot – cold conditions of 1.87% and 1.88%. Performance without and with styrofoam in the measurement room is conditioned without control so as to produce fluctuating temperatures. Performance ON-OFF and PI controls operate using thermoelectrics and heating elements. The results of the ON-OFF control performance reduce fluctuations but do not reach the setpoint. Tests without control are carried out to obtain the transfer of functions of the PI control system. This system uses the values of Kp = 100 and Ki = 0.5, resulting in a temperature that can reach the setpoint because the measurement for 24 hours is in the range of 24.4 – 26.4°C.

Keywords : ON-OFF control, Proportional-Integral control, styrofoam, temperature