ABSTRACT

Unmanned Aerial Vehicle (UAV) or commonly called an unmanned aircraft is a technology that is able to fly manually or autonomously with remote control. UAV technology has been developed for various needs in both military and business matters. Currently, the development of multirotor type UAVs is related to industrial developments, one of which is in the field of monitoring. On the multirotor flight controller, there is a stabilizer mode which functions to balance the UAV. The use of this mode is useful for industrial needs that require a multirotor type of UAV to fly stable.

In this research, the authors used the STM32F103C8 blue pill by adding an IMU sensor as a homemade flight controller. The IMU sensor uses 3-axis for roll, pitch, and yaw movement in stabilizer mode. For supporting the stabilization mode, authors used a PID control system for each multirotor motion variable working to produce an output value that is in accordance with or close to the set point value.

The results of the research from the stabilize mode on a multirotor, the authors succeeded in making a flight controller with a PID control system based on the gain value determined using the root locus method which was then refined by PID tuning. The accuracy of the data on the realization of the PID control system for each multirotor motion variable was successfully determined by the root mean square error (RMSE) method.

Keywords: *Unmanned Aerial Vehicle (UAV), multirotor, stabilizer, flight controller, PID control system, RMSE, root locus.*