

Desain Sistem Kendali pada Antena Pelacak Menggunakan Sensor GPS dan Tekanan Udara Berbasis Metode PID

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ABSTRACT

The development of technology in the field of communication has developed rapidly. One of them is a wireless communication system where information can be sent via a signal with the media in the form of an antenna. The directional antenna is one type of antenna with a one-way radiation pattern only. This type of antenna's advantages is that it has a long range and high sensitivity compared to other antennas. Antenna tracker is a tool that functions to direct the antenna and track the presence of a signal source to keep communication running. Antenna tracker has two actuators to move the antenna towards a horizontal angle (azimuth) and a vertical angle (elevation). In controlling the actuator, a closed-loop control system is needed so that the process of directing the antenna is more stable with a minimal steady-state error value and setting time. This study will design a tracker antenna prototype by implementing a PID control system with the title as a final project, namely "Design of Pid Control on Tracker Antenna Using Global Position Station (Gps) Barometric Pressure Based on Atmega 2560 Microcontroller". This research is a tracker antenna that can direct the antenna at azimuth and elevation angles using the PID control system. The system uses the MPU6050 sensor to correct the elevation angle and the HMC5883 compass sensor to correct the azimuth angle. The PID setpoint is derived from a mathematical calculation between the GPS sensor and the air pressure sensor at the signal source and the tracking antenna. The angle error's maximum value is 2σ with an average error of 0.23σ at the azimuth angle and 0.3σ at the antenna elevation angle. The PID control constant parameter values at the Azimuth angle are $K_P = 16.0$, $K_I = 0.27$, $K_D = 1.52$. While the PID control constant parameters at the elevation angle are $K_P = 12.5$, $K_I = 0.17$, $K_D = 1.39$.

Keywords: tracking antenna, PID (Proportional Integral Derivative), GPS (Global Positioning System), air pressure sensor