ABSTRACT

Radar is a device used to monitor land or sea. The man-pack radar is portable radar, this radar consists of several parts, namely the antenna system, IF and RF components. To get the optimum observation results, the antenna must be directed and continuously moving with certain angles and speeds using the driving motor. Therefore, it is necessary to control radar man-pack antennas which can maintain the rotating speed of the drive motor and can transmit the angular position of the antenna.

The sensors used in this study were rotary encoder and proximity sensor. Rotary encoder is used to detect the position of a DC motor, while the proximity sensor functions as a sensor 0 (reference angle) so that the angle position can be calculated accurately. Arduino functions as a data collector sent from a rotary encoder to its angular position, the PID control is used as a controller for the antenna rotation angle so that the antenna rotation is always constant.

The results obtained from the tests are the values of Kp, Ki, and Kd which are different for each load used, namely for 1 kg load, pwm0 = 60, Kp = 0.3, Ki = 4, and Kd = 0. For a load of 2 kg the value of pwm0 = 65, Kp = 0.3, Ki = 4, and Kd = 0. For 3 kg loads pwm0 = 60, Kp = 1, Ki = 4, and Kd = 0. For a load of 4 kg the value of pwm0 = 60, Kp = 1.1, Ki = 4, and Kd = 0. Rise time can be accelerated in two ways, namely by increasing the value of pwm0 and the constant Kp. The larger pwm0 value affects overshoot while the enlarged Kp value tends not to affect overshoot. The system can reach setpoint even if it is given a glitch.

Keywords: man-pack radar, PID, motor control, rotary encoder, azimuth sensor.