ABSTRACT

Distribution of goods is a very important part in the production chain. The effectiveness of production process is depend on goods delivery from one point to another point. Automation in manufacturing industry, especially on distribution process is popular used to increase the effectiveness of production. One application of the automation is a goods vehicle that moves automatically, called Automated Guided Vehicle. Stability of movement is taking directly effect to safety of goods that carried by Automated Guided Vehicle. Loads and contour that varies cause instability movement for the vehicle in delivery process. Industry needs vehicle that has a stable movement with loads and contour variation.

On this final project, the author will devise, implement, and analyze Fuzzy Inference System method that integrated by PID controller on Automated Guided Vehicle speed control system with loads and contour variation thus obtained stable response of speed as a setpoint. The input of the system is come from encoders and ultrasonic sensor. The information that being processed by Fuzzy Inference System has output which are right and left tire speed in Pulse Width Modulation form also constant variable of proportional, integral, and derivative controller. Obtained speeds and variable constant become a setpoint and PID controller parameter of the system. In the experiment, the vehicle is operated in the real industrial condition with variation of loads.

As an experiment result, fuzzy inference system method gave a good result for Automated Guided Vehicle movement. It is proved by the speed of right and left tire as a fuzzy output successfully move according to the railing wall condition. The error of Automatic Guided Vehicle distance that loaded has a bigger value which is 67,3% while the other is 9,93%. The integrated PID controller with fuzzy inference system successfully make the actual speeds approach their setpoint with error 3,12% and maximum overshoot reach 68,75% for the right tire and 2,06 for error of the left tire with maximum overshoot reach 1,9%, in 70 kg load condition error of right tire is 0,93% with maximum overshoot 76,5% and error of left tire is 0,84% with maximum overshoot 93,54% and in 150 kg of load condition error of right tire is 6,36% with maximum overshoot 69,4% and error of left tire is 7,4% with maximum overshoot 35,92%.

***Key Words** : Automated Guided Vehicle, stable, Fuzzy Inference System, PID*