

RINGKASAN

Intanto Oktavian, Jurusan Teknik Elektro, Fakultas Teknik Universitas Brawijaya, Februari 2016, *Pengaturan Putaran Engine Saat Kecepatan Idle Berdasarkan Suhu Udara Masuk Berbasis Metode Fuzzy Pada Motor Bensin*, Dosen Pembimbing : Muhammad Aziz Muslim dan Goegoes Dwi Nusantoro.

Sistem bahan bakar tipe injeksi merupakan langkah inovasi yang sedang dikembangkan untuk diterapkan pada sepeda motor. Seiring dengan berkembangnya Teknologi dunia otomotif pun mengalami banyak perubahan dan muncul berbagai terobosan atau inovasi baru baik di bagian mekanik maupun kelistrikannya. Salah satu contoh perkembangan dunia otomotif adalah penggunaan *Engine Control Unit* (ECU). Kandungan udara yang masuk sangatlah dipengaruhi oleh temperature. Sehingga penelitian ini difokuskan pada pengendalian injeksi bahan bakar yang disesuaikan berdasarkan temperature udara masuk *intake manifold*.

Penelitian ini dilakukan dengan menggunakan sepeda motor vario 110 FI sebagai plant penelitian dengan Kontrol Logika *Fuzzy* (KLF) sebagai sistem kontrol. Dalam penelitian ini KLF menggunakan 5 *membership function* untuk masukan *error* dan referensi kecepatan serta keluaran lebar pulsa injeksi, metode inferensi *Max-Min*, dan metode defuzzifikasi *Center of Area* (COA).

Hasil penelitian didapatkan rata-rata RPM berkisar antara 1500 rpm pada kondisi suhu dikisaran 27° Celsius. Pada kondisi ini sistem memberikan injeksi minim yang berkisar antara 1,7 – 1,9 ms karena massa jenis udara dirasa kurang. Dari hasil *output* proses *fuzzy* didapatkan *error steady state* sebesar 1,07%. Pada pengujian suhu 23° Celsius sistem memberikan injeksi sangat minim yang berkisar antara 2-2,7 ms. Dari hasil *output* proses *fuzzy* didapatkan *error steady state* sebesar 1,35%. Dari hasil variasi dua perubahan suhu tersebut, maka bisa disimpulkan bahwa Kontrol Logika *Fuzzy* dapat menjaga kecepatan putaran *engine* sama dengan *setpoint*.

Kata kunci : *Engine Control Unit*, sistem injeksi, suhu udara masuk *intake manifold*, Kontrol Logika *Fuzzy*, Vario 110FI

SUMMARY

Intanto Oktavian, Department of Electrical Engineer, Engineering Faculty of Brawijaya University, February 2016, *Control of Engine Rotation during Idle Velocity According to Intake Air Temperature Based on Fuzzy Method on Petroleum Fueled Motorcycle*, Academic Supervisor : Muhammad Aziz Muslim and Goegoes Dwi Nusantoro.

Injection fuel system is a new innovation that is being developed to suit the engines on motorcycle. Along with the growth of technology, the automotive world also had many developments and innovations in its mechanical and electricity department. One of its development is the use of Electrical Control Unit (ECU). Intake air temperature has an effect on injection duration, because air intake is heavily affected by its temperature. This research is focused in fuel injection controls, which had been adjusted in its intake air temperature.

This research was done with Vario 110 FI motorcycle as its research plant, with Fuzzy Logic Control (FLC) as its control system. In this research, the FLC used 5 membership function for error intake and velocity reference, also output width of injection pulse, inference Max-Min method, and *Center of Area* (COA) defuzzification method.

The results of this research show the average RPM of 1500 rpm in 27° Celsius. In this condition, the system gave minimum injection of 1,7 – 1,9 ms caused by the use of lower air density. In this temperature, the established error steady state from the fuzzy process is 1,07 %. When the temperature was changed to 23° Celsius, the system gave very minimum injection of 2-2,7 ms. In this temperature, the established error steady state from the fuzzy process is 1,35 %. From the variation of these two processes, it's concluded that Fuzzy Logic Control can maintain the engine circular velocity similar with the setpoint.

Keywords : *Engine Control Unit*, injection system, intake air temperature, Fuzzy Logic Control, Vario 110FI