

## ABSTRACT

**Ulfah Planita Byztuti**, *Bachelor Degree Majoring in Physics Engineering Faculty of Engineering Telkom University, February 2014, Hydrogen Flowrate Control System in Polymer Exchange Membrane Fuel Cell (PEMFC) Using PID Method, Guidance Lecturer : Mamat Rokhmat, M.Si. as Guidance Lecturer I and Reza Fauzi Iskandar, M.T. as Guidance Lecturer II.*

*Hydrogen flowrate control system developed for PEMFC 100 Watt according to close – loop system using Mass Flow Controller's actuators added by PID controller and feedback signals comes from HSVS voltage sensor. The system used to controlling hydrogen flowrate to stabilize PEMFC output voltage when it connected to load. Control system is needful to prevent decrease of PEMFC output voltage that caused by loss when current density of PEMFC is increase. PID as controller is obtained from gain constantan in root locus according to PEMFC transfer function. PEMFC transfer function is obtained from zero and pole that tuned by system identification method using identification tools in MATLAB. Validation of PEMFC transfer function using transient response, NRMSE, and NMBE Method. As result for PID implementation, the output voltage stable at rate 15.575 V, increased from 14.778 V before PEMFC controlled and it connected to DC motor 12V 1A as load. The output voltage decrease from 16 V to 14 V before controlled. Besides, the controller results the actual overshoot system 0.0088% with rise time 1 s and settling time 39 s which far from prediction of rise time 0.2 s and settling time 5.52 s in simulation.*

*Keywords : PEMFC, PID, Mass Flow Controller, PEM Fuel cell 100 Watt.*