

## **ABSTRACT**

### **DETERMINATION OF LOCATION AND PARAMETERS SETTING OF UNIFIED POWER FLOW CONTROLLER (UPFC) USING GENETIC ALGORITHM TO INCREASE POWER SYSTEM SECURITY IN LAMPUNG TRANSMISSION SYSTEM**

**By**

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Power system stability is the main aspect of all kinds of power system operation. Flexible Alternating Current Transmission System (FACTS) devices are used to achieve voltage stability when the power system experiences a single contingency and sudden load increase.

The load flow analysis in this research is carried out with Newton-Raphson method. The parameters of *Unified Power Flow controller* (UPFC), are modelled into power flow equation and thus it is used to determine the power injection in terms of voltage and power angle. The genetic algorithm (GA) method is used for identifying the optimal location and parameter setting of UPFC. The proposed GA methods are simulated using MATLAB. These procedures are applied for the chosen power system network of 24 bus Lampung.

Results show that the installation UPFC using method GA for determination of optimal installation and setting parameter under the worst conditions (there are voltage violation on eight bus) able to eliminate voltage violation. With the biggest value of the voltage profile improvement is 19.14 %. This condition obtained optimal installation location is between New Tarahan and Sebalang with setting parameter  $V_{cr}$  and  $V_{vr}$  is 0.1142 p.u and 0.8765 p.u respectively.

**Key Words:** Unified Power Flow controller (UPFC), genetic algorithm (GA), Flexible AC Transmission Systems (FACTS), Optimal Parameter setting, PLN Lampung region