ABSTRACT

Stability is very important in the operation of an electric power system. In stability, a system is said to be stable if the power generated to maintain the machine in a synchronous state is sufficient to overcome disturbances. This is because stability greatly affects disturbances, which can affect the stable condition of the system. The stability of the electric power system is divided into steady state stability and transient stability. Steady state stability relates to the ability of the electric power system to return to a stable condition or operating point, after a small disturbance such as a change in load. While transient stability relates to the ability of the system to return to a steady state, after a major disturbance such as a short circuit, line termination, transfer or termination of the load.

Instability in the system can have a fatal impact, including oscillations that arise when the system can disrupt synchronization on the generation side, which allows the generator to be separated from the system. Therefore we need a tool to stabilize the generator system so that it can operate optimally, this tool is known as a power system stabilizer (PSS). The power system stabilizer (PSS) is a tool that can increase the stability limit, by adjusting the excitation of the generator, to provide attenuation of synchronous machine rotor oscillations. To get a good attenuation of oscillations, research uses the addition of a PID system so that the oscillations that occur can be minimized optimally and the system is always in a stable condition, when there is a disturbance or change in load.

This study aims to analyze the modeling of the three systems with system conditions given disturbance, at the input step in each modeling system of 0.8 p.u, then compare the three models, through the output rotor angle response. The results obtained after running the simulation show that the PSS system can reduce overshoot and settling time, with overshoot values from 65.2% to 13.3% and settling time values from 6.13 s to 2.4 s. Damping with the PID-based PSS system in reducing overshoot and settling time. In the rotor angle response with an overshoot value of 65.2% to 5.81% and a settling time value of 6.13s to 2.28s. From this comparison of electric power systems, a single machine system with PSS PID is a system that has the ability to dampen power system oscillations better.

Keywords : Stability, Single Machine, Power System Stabilizer, PID