

ABSTRAK

Penelitian ini akan membahas tentang perancangan dan analisa Kestabilan dan Kekokohan sistem *Automatic Voltage Regulator* (AVR) dengan pengendali Proporsional Integral Diferensial (PID) berdasarkan pendekatan tanggapan frekuensi terhadap variasi parameter. Variasi parameter yang dilakukan meliputi variasi konstanta penguatan dan konstanta waktu amplifier, variasi konstanta penguatan dan konstanta waktu eksiter, variasi konstanta penguatan dan konstanta waktu generator serta variasi konstanta penguatan dan konstanta waktu sensor. Perancangan pengendali Proporsional Integral Diferensial (PID) ini dilakukan berdasarkan kriteria perancangan tertentu. Analisa yang dilakukan meliputi analisa kestabilan dan analisa kekokohan serta analisa sensitivitas menggunakan perangkat lunak Matlab. Kestabilan dan kekokohan merupakan faktor - faktor penting yang harus diperhatikan dalam operasi sistem kendali. Kestabilan dan kekokohan sistem tenaga listrik akan terganggu jika ada gangguan. Ada 2 jenis gangguan yang sering terjadi dalam operasi sistem tenaga listrik diantaranya gangguan berat dan gangguan kecil. Kestabilan ini merupakan salah satu indikator sistem tenaga listrik saat terjadi gangguan kecil. Jika gangguan ini terus terjadi secara terus menerus setiap waktu akan berakibat terjadinya perubahan parameter – parameter pada sistem kendali terutama perubahan pada output generator. Hasil analisa yang diharapkan yaitu sistem menunjukkan bahwa kestabilan dan kekokohan sistem eksitasi generator pada saat diberikan metoda Pendekatan Tanggapan Frekuensi menunjukkan hasil stabil yang sesuai dengan kriteria perancangan. Dengan perbandingan antara sistem eksitasi generator tanpa metoda dengan yang telah diberi metoda Pendekatan Tanggapan Frekuensi.

Kata Kunci : Sistem *Automatic Voltage Regulator* (AVR), Analisa Kestabilan, Kekokohan, Proporsional Integral Diferensial (PID), Pendekatan Tanggapan Frekuensi, Parameter.

ABSTRACT

This research will discuss the design and analysis of system stability and robustness Automatic Voltage Regulator (AVR) with a controller Proportional Integral Differential (PID) based on the frequency response approach to parameter variations. Parameter Variation undertaken include strengthening the constant variation and amplifier time constant, constant variation strengthening and exciter time constant, constant variations and the time constant generator reinforcement and strengthening constant variations and the time constant of the sensor. The design of the controller Proportional Integral Differential (PID) is performed based on certain design criteria. Analysis was conducted on the analysis of the stability and robustness analysis and sensitivity analysis using Matlab software. The stability and robustness are the important factors that must be considered in the operation of the control system. The stability and robustness of the power system will be disrupted if there is interference. There are two types of disturbances that often occur in the operation of the power system including severe disruptions and minor disturbances. This stability is one indicator of the power system during a minor annoyance. If this disorder continues to occur continuously at any time will result in a change in the parameters in the control system, especially changes to the generator output. Expected results of the analysis indicate that the system is stability and robustness of generator excitation systems at the time given Frequency Response Approach method showed stable results in accordance with design criteria. By comparison between the generator excitation system without any method by which have been given method Frequency Response Approach.

Keywords: Automatic Voltage Regulator System (AVR), Analysis of Stability, Robustness, Proportional Integral Differential (PID), Frequency Response Approach, Parameter.