MODELING AND TRANSIENT STABILITY ANALYZING OF TYPE 1 SPEED GOVERNOR MODEL (IEEEG1) USING DYNAMIC COMPUTATION FOR POWER SYSTEM (DCPS)

This thesis is presented in partial fulfillment for the award of the Bachelor of Electrical Engineering (Honours)

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ABSTRACT

The objective of this thesis project is to investigate and understand the stability concept of power system, with the main focus on stability theories and power system modeling. The thesis looked into the effects that advanced control techniques have on electrical power generation system and transmission system. The thesis first explained the definition of power system stability and the need for power system stability studies. It then proceeded to discuss on the various stability problems after which the thesis provided a brief introduction on basic control theory and study.

The thesis presents the modeling of type 1 speed governor model (IEEEG1) and transient stability analysis. The dynamic computation for power system (DCPS) software modeling was used in the system. The simulation is done for the six test bus system and the study involved electrical power, rotor angle, voltage magnitude and speed of the machine. In simulation, the Euler method was used to linearized each block diagram and modified the block diagram of the IEEEG1 model. The thesis also present the comparison of critical clearing time at bus 100, bus 200, bus 300, bus 400, bus 500 and bus 600 after faults was occurred in the system.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This thesis is concerned with understanding, modeling and analyzing of power system stability and control the problem. Such problems constitute very important considerations in the planning, design and operation of modern power system. The complexity of power systems is continually increasing because of the growth in interconnections and use of new technologies [9]. The ability of a power system to maintain stability depends to a large extent on the control available on the system to damp the electromechanical oscillations. Hence, the study and design of power system controls are very important.

The system stability that is of most concern is the characteristic and the behavior of the power system after a disturbance. Governor can be classified into steam turbines, water turbines or diesel engines. They can control the mechanical power delivered to the generator. As the load of the power system keeps varying, the generator in the power system will respond to the changing load and in order to maintain power balance in the system, the system frequency will be maintained closed to nominal value. The speed and frequency control will be critical in system control and protecting the governor from getting damaged [6].

Power system stability can be defined as the ability of a power system to remain in the state of operating equilibrium under normal operating conditions and to return to an acceptable state of equilibrium after experiencing disturbances, small or large.

Governor system provide mechanical running torque to synchronous machine in power system, as the kind of medium running turbine it can classify by steam, gas, water power turbine. This program acts linear of governor system using in our country. System disturbances may typically result in oscillatory transients. In a stable system these