بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Ain Shams University
Faculty of Engineering

Stability Enhancement of Synchronous Generators Using ANN-Based Power System Stabilizers

M. Sc. Thesis
By

Eng. Tarek Kamal Abd El-Galil Metwally
B.Sc. Electrical Power Engineering

Submitted in Partial Fulfillment of the Requirements for the
M. Sc. Degree in Electrical Engineering

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Approval Sheet

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STATEMENT

This thesis is submitted to Ain Shams University in partial fulfillment of the requirements for the M.Sc. degree in Electrical Engineering.

The included work in this thesis has been carried out by the author at the Electrical Power and Machines Department, Ain Shams University. No part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

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ABSTRACT

This thesis presents a theoretical and experimental study of the performance of a synchronous generator connected to an infinite bus via two parallel transmission lines, when it is equipped with an automatic voltage regulator and a power system stabilizer (PSS). The excitation loop together with other factors such as weak transmission, and load characteristics may lead to negative damping into the network. As a result, minor disturbances could set off sustained oscillations. PSS has been proven as an effective way of damping system oscillations. The PSS suggested in this thesis depends on the artificial neural network technique.

The thesis presents a mathematical model for the synchronous generator equipped once with a lead-lag PSS, and then with ANN based PSS. The lead-lag PSS is used for two main purposes, firstly to train the ANN network, secondly it has been experimentally implemented to validate the simulation results further obtained when the machine should be equipped with ANN-based PSS.

An artificial neural network (ANN) trained to function as a power system stabilizer (PSS) is presented. In order to make the proposed ANN PSS work properly, it was trained over the full working range of the generating unit with a large variety of disturbances. Data used to train the ANN PSS are collected from two main sources. The first is the output of a well tuned lead-lag PSS fitted to the machine. The second source of data is the synchronous machine deviation from its nominal value.