AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

EFFECT OF EXCITATION CONTROL ON IMPROVING THE SUBSYNCHRONOUS RESONANCE STABILITY BOUNDARIES

BY

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A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS OF THE DEGREE OF MASTER OF

SCIENCE IN ELECTRICAL ENGINEERING

SUPERVISED BY

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DEPT. OF ELECT. POWER & MACHINES

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CAIRO - 1990

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master in Electrical Engineering .

The work included in this thesis was carried out by the author in the Department of Electrical Power and Machines , Ain Shams University , from October 1986 to June 1990 .

No part of this thesis has been submitted for a degree or a qualification at other University or institution .

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ACKNOWLEDGEMENT

The author would like to thank Prof. Dr. A. K. Al-Kharashi so much for all he has done for him . His encouragement and fruitful remarks will always guide him in his future life .

The author has the honour to dedicate this modest thesis to Prof. Dr. M. A. Badr , thanking him for all the efforts he has exerted so that it could be finished .

The author can hardly find the words to express his thankfulness,appreciation and gratitude for all the help and the useful guidance Dr. Badr offered him during his supervision . He will be always indebted to him and will never forget his care .

I am particularly grateful to my parents and my brother for their unwavering support and encouragement .

AIN SHAMS UNIVERSITY

"EFFECT OF EXCITATION CONTROL ON IMPROVING THE SUBSYNCHRONOUS RESONANCE STABILITY BOUNDARIES "

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ABSTRACT

The subsynchronous resonance (S.S.R) phenomenon in series compensated power systems has been the focus of considerable interest over the last two decades . This phenomenon refers to the excessive shaft torque pulsations resulting from an interaction between the electromagnetic and the electromechanical system oscillations at specific frequencies .

In this thesis, the physical nature of the S.S.R phenomenon, the factors affecting its presence as well as the available methods of its handling are discussed. A supplementary excitation controller using properly chosen signals is proposed as a possible method for avoiding the serious consequences of this phenomenon .

For this purpose , the mathematical models and the corresponding digital computer simulations needed for performing the aimed at investigations are developed . These are based on a linearized version of the system equations . In addition , analytical investigations are carried out in order to realize the limitations imposed on the different techniques of supplementary excitation control .

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