SUBSYNCHRONOUS RESONANCE DAMPING USING INDUCTION MACHINE DAMPING UNIT

DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE

OF

MASTER OF TECHNOLOGY
IN
POWER SYSTEM

Submitted by:

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2015

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I, **Sanjeet Kumar Mahto**, Roll No. 2K13/PSY/16 student of **M. Tech. (Power System)**, hereby declare that the dissertation titled **"Subsynchronous Resonance Damping Using Induction Machine Damping Unit"** under the supervision of **Prof. Narendra Kumar**, Professor, Department of Electrical Engineering, Delhi Technological University in partial fulfilment of the requirement for the award of the degree of Master of Technology has not been submitted elsewhere for the award of any Degree.

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ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Prof. Narendra Kumar for his guidance and assistance in the dissertation. The technical discussions with him were always been very insightful, and I will always be indebted to him for all the knowledge he shared with me. His prompt responses and availability despite his constantly busy schedule were truly appreciated. He always helped me in all the technical and non-technical issues during the production of this dissertation. Without his consistent support, encouragement and valuable inputs, this dissertation would not have become possible.

I would like to express my deep gratitude to Prof. Madhusudan Singh, Head, Department of Electrical Engineering for providing his support during my project.

I would also like to thank my batch-mates and friends who encouraged and helped me in completing the dissertation. A special mention to Saurabh, Anuj, Sidhant and Faizan for their continued support and motivation.

Finally, I express my deep sincere thanks to my Parents, my brother who motivated and encouraged me for higher studies, without which it wouldn't have been possible.

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ABSTRACT

Power transmitted through a power system network is influenced by three parameters namely voltage, impedance and phase difference. Development of high voltage and high current power semiconductor devices has led to flexible AC transmission systems (FACTS). Series compensation has been widely used to enhance the power transfer capability. However, series compensation gives rise to dynamic instability and subsynchronous resonance (SSR) problems. Many preventive measures to cope with this dynamic instability problem in series compensated lines have been reported in literature. Induction machine damping unit can be used to damp out SSR oscillations. This is best suited for study of induction generator effect and torsional interaction effects.

The main focus of this thesis is to analyse IMDU characteristics to damp subsynchronous resonance. IMDU is coupled to T-G shaft. The advantage of using IMDU to damp SSR is that we need no other controller. The IEEE First Benchmark Model for subsynchronous studies is used to study Eigenvalues analysis and time domain simulations. The optimal location of IMDU along the T-G shaft has been determined by performing Eigenvalues analysis. It is found that locating IMDU after the IP turbine yields the maximum damping effect.

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