

SUBSYNCHRONOUS RESONANCE DAMPING USING INDUCTION MACHINE DAMPING UNIT

DISSERTATION

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FOR THE AWARD OF THE DEGREE

OF

**MASTER OF TECHNOLOGY
IN
POWER SYSTEM**

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CERTIFICATE

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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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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