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EXPERIMENTAL STUDY OF PHOTO VOLTAIC SYSTEMS AND CONVERTERS

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ABSTRACT

The Power converters control the flow of power between two systems by changing the character of electrical energy: from direct current to alternating current, from one voltage level to another voltage, or in some other way. We will do starting with a look at the standards concerning grid connection of distributed resources, and its working way through how photo-voltaic cells workings, to how photo-voltaic modules with electrical converters can be arranged. Some different converter topologies suitable for use with photo-voltaic are found, and based on these topologies; solutions for how to control these converters have been examined. These control system involve the methods for utilizing the maximum power from the solar panels, methods for synchronizing with the grid and methods for current and voltage control.

This model is simulated in the Simulink and the experiments are made on a laboratory setup, where focus has been on the control system. Therefore the linear system models of the control system have been made, and these have formed a basis for the optimization of the control systems. The simulations have been made using the Simulinks, and the control systems for the converters have been implemented in two DSP's, one for each converter.

Most of the tests made in the simulations and the experiments have been made with the operating conditions close to the ideal. In order to verify how the system handles varying operating conditions, and to see if it coincides with the requirements in the standards, more extensive and effective testing should be made of the system.

KEYWORDS: Photo Voltaic Systems and Converters, Voltage Level to Another Voltage, Two DSP's, Simulink