

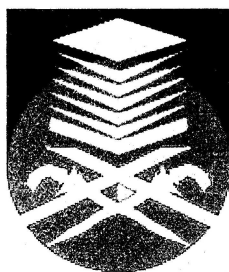
SAFE COMMUTATION STUDIES FOR SINGLE PHASE MATRIX CONVERTER OPERATION AS INVERTER

This thesis is presented as fulfillment for the award of the

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ABSTRACT

The aim of this project is to study safe commutation of the single phase matrix converter operation as inverter. The XILINX chip XC4005XL field programmable gate array (FPGA) is used to control input voltage of a fully controlled single phase Insulated Gate Bipolar Transistor (IGBT) bridge inverter. Sinusoidal Pulse Width Modulation (SPWM) technique was used to calculate the switch duty ratio to synthesize the AC output. The model was implemented using MATLAB/Simulink with the SimPowerSystem Block Set. Safe-commutation strategy was implemented to solve switching transients by establishing a current path for the stored energy of the inductance in the load to dissipate during dead-time, thus avoiding the generation of voltage and current spikes. Investigations are also made on the behaviour of using filters to reduce ripples in the output waveform. Simulation and experimental results for with commutation and without commutation strategy are presented to verify proposed operation.

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