

THE GENERATION OF A SINGLE-PHASE PWM FOR AC-TO-AC CONVERTER USING FPGA.

Thesis is presented in partial fulfillment for the award of the bachelor of
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ABSTRACT

A power converter incorporates an array of power switching devices that helps to convert and control electrical energy transformations under the guidance of control electronics. The general classification of converters on functional basic includes; AC-DC converters (rectifier), DC-DC converter (chopper), DC-AC converter (inverter) and AC-AC converter at the same frequency (AC controller) or different frequency (Cyclo-converter). Often a practical power electronic system may combine one or more forms of circuit to achieve the final conversion process.

This report present the development of a single-phase Pulse Width Modulation (PWM) using Field Programmable Gate Array (FPGA) for AC-to-AC converter system. Four types of PWM are considered such as Sinusoidal, Third's harmonic injection, Multiple's harmonic injection and lastly modified signal.

The Xilinx FPGA devices feature a gate-array-like architecture with a matrix of logic cells surrounded by a periphery of I/O cells. FPGAs combine an abundance of logic gates, registers, and I/Os with fast system speed. The development software provides the facilities to program the device easily. Design can easily be retargeted between FPGA device families, as long as the different device family has sufficient capacity.

The design flow for Xilinx FPGA consists of three main steps. The procedures of this steps and the technique to generate the PWM pattern is discussed in detail.

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