THE DC-TO-DC CONVERTER USING CUK CONVERTER

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ABSTRACT

This thesis presents the implementation of Cuk converter for DC-to-DC converter. The design is based on Peripheral Interface Controller field programmable that acts as a controller. The output voltage is controlled using well-known Pulse Width Modulation (PWM) technique. With continuous input and output current, wide output voltage range and small output filter, Cuk topology has gathered more and more attention in recent years. Soft switching is especially important to a Cuk converter because the power handling capability requirements of semiconductor devices are higher than those of other topologies. Satisfactory agreement between simulated and laboratory results were observed.

TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE

CHAPTER 1

INTRODUCTION

1.1   Background Power Electronics

Power electronic is the technology that links the two major traditional divisions of electrical engineering, namely, electric power and electronic. It has shown rapid development in recent times, primarily because of the development of semiconductor power devices that can efficiently switch large currents at high voltages, and so can be used for the conversion and control of electrical energy at high power levels. The parallel development of functional integrated circuits for the controlled switching operation of power electronic converters for specific applications has also contributed to this development. Power electronic techniques are progressively replacing traditional methods of power conversion and control, causing what may be described as a technological revolution, in power areas such as regulated power supply system, adjustable speed DC and AC electric motor drive, high voltage DC links between AC power network, etc.

Power electronics is the technology of converting electric power from one form to another using electronic power devices. Several type of solid state power semiconductor devices have been develop in recent years, making it possible to build efficient power converters with excellent facility for control of output parameters, such as voltage, current or frequency. In static power converter, the power semiconductor devices function as switches, which operate statically, that is, without moving contact. The time durations, as well as the turn ON and turn OFF operations of these switches, are controlled in such a way that an electrical power source at the input terminals of the converter appears in a different form at its output terminals. In most types of converters, the individual switches in the converter are operated in a particular sequence in one time period, and this sequence is repeated at the switching frequency of the converter [1].