

**DC TO DC CONVERTER:
BUCK-BOOST CONVERTER**

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Electrical Engineering (Hons.)

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ABSTRACT

This thesis presents Buck-Boost converter. This is a type of DC converter that can either step up or step down voltage input. It is a class of switching-mode power supply (SMPS) containing at least two semiconductor switches (a diode and a transistor) and at least one energy storage element.

The characteristic and performance of the buck-boost converter was proved with the results and findings from conducted experiment with the Buck-Boost converter model and the simulation. Circuit simulation has been carried out using PSIM software 7.1.2 version. Result from theoretical, simulation experiment and has been compared to each others.

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CHAPTER 1

INTRODUCTION

1.1 Background

The three most common single-transistor, unisolated DC to DC converter are introduced and analyzed under assumption of ideal, lossless circuit components; transistor, diode, inductor, capacitor and load resistor. The three topologies have similar circuit waveforms which under the assumption of a large output smoothing capacitor, may be considered to be piece-wise linear, that is rectangular, trapezoidal or triangular.

Furthermore, the converters have similar inductive switching characteristics. At transistor turn on the device current must rise to its full circuit value before the device voltage can fall from its off-state level, and conversely at turn off the device voltage must rise to its off state level before the device current can fall

The characteristic of the three converters are examined in each two operating mode; continuous current inductor current and discontinuous inductor current. In the former mode the inductor current is always continuous while in the latter the inductor current falls to zero during the transistor off-period

Throughout the following analysis the transistor is assumed to operate with a fixed frequency of period T , and the transistor on-time to period ratio or duty ratio (D) is denoted. The circuit components are assumed lossless and the output ripple is very small.