CHAPTER I

INTRODUCTION

1.1 Electronic Ballast

Electronic ballast is a device intended to limit the amount of current in an electric circuit. Why electronic ballast was choosing in this project? It is because the electronic ballast has a greater efficiency. For T8 lamps, the overall electronics ballast of efficacy can be as much as 15 % to 20 % higher than magnetic ballast systems.[1] Electronic ballast do not generate as much internal heat, thereby reducing losses within the ballast itself. In addition, the high frequency operation of the fluorescent lamp reduces the losses in straight tube fluorescent lamps. Electronic ballast has ability to drive more lamps. Single electronic ballast can drive up to 4 lamps and has eliminated the need of tandem wiring. Compared to conventional magnetic ballast, only up to 2 lamps can driven. The advantage of electronic ballast is reduced lamp flicker while the high frequency operation of the lamp cycles the lamp so rapidly that flicker is imperceptible. Electronic ballast are also lighter in weight where an electronic components as not as heavy as the core and coil construction used for magnetic ballasts. Then the lighting fixtures weigh less and can be more streamlined in design. Electronic ballasts for small diameter lamps (T5 or smaller) are available that detect the end of life of the lamp and shut it off before the lamp overheats enough to melt sockets and cause the lamp wall to crack and break. Electronic ballasts are helping save energy that is consumed worldwide for feeding fluorescent lamps. Besides reduce the consumption the low cost self-oscillating command circuits have the attractiveness of its simplicity.

This project presents design methodology in developing the self-oscillating electronic ballast (SOEB). Figure 1 shows one of the most common used circuit to supply fluorescent lamps. The SOEB behaviour as a nonlinear system but does not find expressions that represent the inherent nonlinear behaviour of SOEB. The nonlinear of SOEB does not allow one to define methodology derived from a linear-circuit analysis unless the necessary considerations are made. [2]

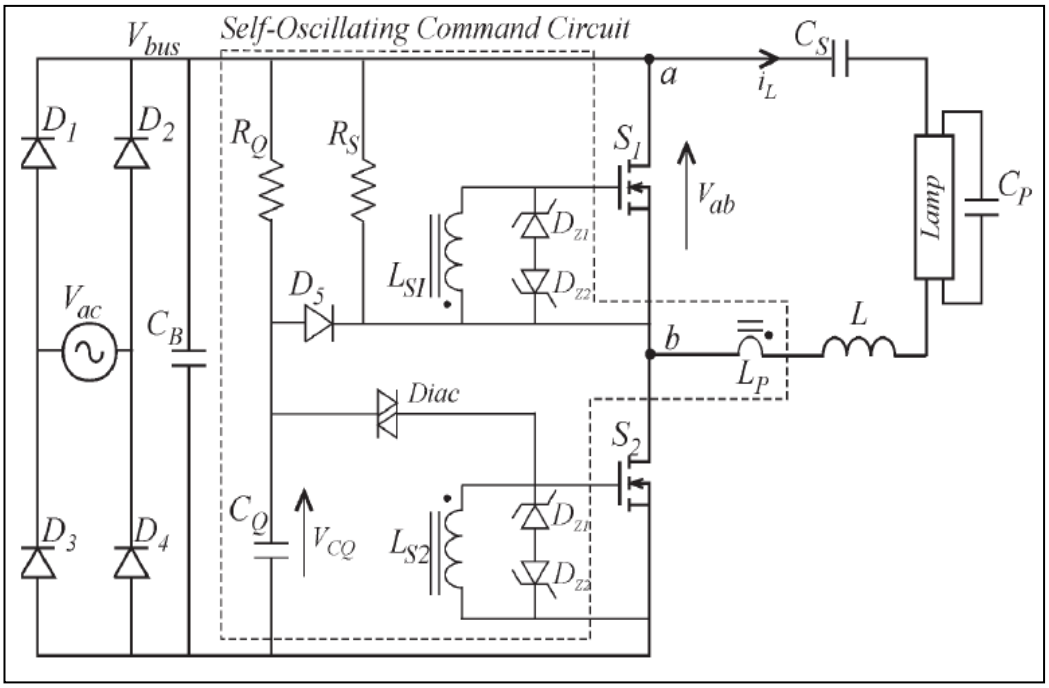

Figure 1.1: The Self-oscillating command circuit.

However, many different types and methods to design of electronic ballast have been proposed. Analyses of 3 types design methodology of SOEB are carried out; by using zener diode, two-stage electronic ballast and single-stage electronic ballast.

1.2 Problem Statement

1. The SOEB is analysed and designed from different perspectives circuit and methods.
2. The low cost and the simplicity of the SOEB design are vital.

1.3 Objective

The objectives of this project are:

i. To develop the different methodology circuit of self-oscillating electronic ballasts (SOEB).

ii. To simulate and analyse the proposed ballast circuitry.

iii. To compare the result of each proposed ballast circuitry.

1.4 Scope of Project

The scopes of this project are to design self-oscillating electronic ballast (SOEB). In addition, simulation the performance will be made using in ORCAD/PSPICE/Simulink and then analysed the results.

1.5 Outline of Thesis

Chapter I consists of the overview of the project, which includes the problem statement, objectives and scope.

Chapter II includes all the paper works and related research as well as the studies regards to this project. This literature reviews all important studies which have been done previously by other research work.

Chapter III illustrates the operation and the parameters involved in a design methodology for self-oscillating electronic ballast. The circuit topology that uses power electronics approach for SOEB is described in detail.

Chapter IV presents the simulation design of self-oscillating electronic ballast using ORCAD/PSPICE/Simulink. It also consists of the simulation results and