RESONANT INVERTER DESIGN FOR INDUCTION HEATING

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ABSTRACT

This thesis presents a hardware development of a Resonant Inverter designed for low power Induction Heating. This Resonant Inverter technique is introduced to minimize the number of power switching devices used in the system. The performance at 50 kHz and the dc to ac power MOSFET inverter in generating high frequency flux to heat stainless steel vessels are investigated. In this design, power MOSFET (IRF840) with rating 500V / 8A has been used as resonant inverter with operating frequencies up to 50 kHz. The heating coil used a few layers designed as concentric flat coils connected together in away to produce maximum flux to be penetrated in the magnetic material vessel.

IN THE NAME OF ALLAH,
THE MOST BENEFICENT AND MERCIFUL.

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CHAPTER 1

INTRODUCTION

1.1 General

Induction Heating is an alternative method to heat a metal vessel. Conventionally hot plate is used to heat up the metal vessel. Induction heating phenomena depends on the losses produced in a ferromagnetic materials known as eddy current loss. These losses provide ohmic power loss and cause local heating.

The previous work was developed by using High Frequency H-Bridge (15 kHz) and (38.4 kHz) Inverters [1,2]. In this project, the inverter circuit is used in Resonant Inverter producing 50 kHz. The resonant frequency operates at 50 kHz which is a recommended frequency for induction heating purposes. The main advantage of using this frequency is to prevent the stress on the power device during switching. The technique also reduces the number of power switching devices used which in this case eliminate the possibility of short circuit in any part of the inverter circuit.

Many types of vessels are used as load with the exciting coil. Ferromagnetic vessels such as stainless steel is the most suitable vessel material for induction