COMPUTER AIDED DESIGN
OF THREE PHASE INDUCTION MOTOR
USING C++

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ABSTRACT

The purpose of this paper is to design a small three phase general purpose induction motor of the squirrel cage type using computer. That is to translate the guideline of designing a small three phase induction motor to a computer program. The design is for a general purpose small induction motor (up to 10kW) of the squirrel cage type and the computer language used is C++. The design is to determine the frame size, the stator windings and the rotor windings. There are two main inputs for the design, i.e. the motor rated output either in kW or hp and the synchronous speed of the motor in rpm. The constants are the supply voltage and the frequency which are 415V and 50Hz respectively. From the main inputs and the constants, the other specifications such as the flux density of the air-gap (specific magnetic loading), the ampere-conductor per metre (specific electric loading), the full-load efficiency and power factor are determine from tables. From these data the frame of the induction motor are calculated. Then the stator specifications are calculated and lastly, the rotor specifications are calculated.

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1. INTRODUCTION

To design any machine involves lengthy calculations which may have to be repeated several times to meet the required specifications. The calculation done manually would take several hours and maybe a few days to get the desired results. Thus, to save the time of the designer, computer can be used to perform the calculations. A computer program would take only a few seconds to perform the calculations. Thus, a man made-machine, the computer, can be used as a tool to design other machines much faster than the design done manually.

In this project, the three-phase induction motor is chosen because it is one of the most common form of drive for industrial and domestic applications and also due to its simple construction. The C++ computer language is used because of its versatility and also it is widely used in the local industries nowadays.

Actually in designing an induction motor there are two main aspects to be analysed. The first part is the actual design of the induction motor and the second part is the analysis of the performance and operation of the designed induction motor. This paper only involved the first part, i.e. the design of the induction motor.

The main focus of the design is for small three phase induction motors. The program is written so that the user only needs to key in the rating of the induction