ANALYSIS OF 500W 2000RPM SWITCHED RELUCTANCE MOTOR USING 2D FEMM.

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ABSTRACT

This paper presents the idea of using the FEMM simulation software as an alternative to other simulation to other simulation today. The FEMM is used to simulate the single-phase Switched Reluctance Motor in order to gain result of the motor and to compare the outcome this software. The single phase Switched Reluctance Motor is a simplest electrical machine to construct where the motor only consist of the excitation winding stator and magnetic rotor with saliency. The single-phase Switched Reluctance Motor is easy to construct by using this software.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

The switched reluctance motor is made of steel and copper. Both the rotor and stator have a steel core of laminated metal silica steel and salient poles. The winding around the pole of the stator are diametrically connected, two and two, as phase winding. The motor windings are made as phase pole windings and are mounted on each of the pole pieces on the stator. This makes the motor very robust and suitable for harsh environment. A Switched Reluctance Motor (SRM) is rotating electric machine where both stator and rotor have salient poles. The stator winding is comprised of a set of coils, each of which is wound on one pole. SRM differ in the number of suitable combination of stator and rotor poles. The motor is excited by a sequence of current pulses applied at each phase. The individual phases are consequently excited, forcing the motor to rotate. The current pulses need to be applied to the respective phase at the exact rotor position relative to the excited phase [1]. The stator consists of simple concentric windings. There are neither windings or bar wires on the rotor. Stator windings on diametrically opposite poles are connected in series from to a single phase. When the stator pole pair is energized by the phase winding, the nearest rotor pole pair is attracted toward the position, where the magnetic path has the minimum reluctance. Thus, by energizing the consecutive stator phases in sequence, it is possible to develop a torque in either direction of rotation [2-4]. In a SRM, only the stator presents windings, while the rotor is made of steel lamination without conductors or permanent magnets. This very simple structure reduces greatly its cost. Motivated by this mechanical simplicity together with the recent advances in the power electronics components, much research has being developed in the last decade.