

**SIMULATION OF TWO-STACK TWO-PHASE SWITCHED  
RELUCTANCE (SR) DRIVE USING XCOS**

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## **ABSTRACT**

This paper describes the designing, modeling and simulation structure for a two-stack two-phase Switched Reluctance (SR) Drive. This simulation presents the performance of the proposed SRM motor especially the torque expression that have a relationship between machine flux linkages or inductance and the rotor position. This project also to approve that the two phase of SR motor has a high torque density, high speed and has much more flat static torque characteristic besides the occurring of torque ripple and acoustic noise. Torque ripple minimization can be possessed by controller unit system such as speed controller and current controller. Thus, PI controller is applying in the system to improve its performance. Scilab/Xcos software are used to predict and simulate the performance of the motor.

# TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
	TITLE	
	DECLARATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	viii
	LIST OF TABLES	x
	LIST OF SYMBOLS AND ABBREVIATIONS	xi
1	INTRODUCTION	
	1.1 BACKGROUND OF PROJECT	1
	1.2 PROBLEM STATEMENT	4
	1.3 OBJECTIVES OF PROJECT	5
	1.4 SCOPE OF WORK	5
	1.5 REPORT ORGANIZATION	6
2	LITERATURE REVIEW	
	2.1 INTRODUCTION	7
	2.2 SWITCHED RELUCTANCE MOTOR (SRM)	7
	2.2.1 Principle Operation of SRM	9
	2.2.2 Advantages of SRM	12
	2.2.3 Disadvantages of SRM	14
	2.3 CHARACTERISTICS OF SRM	15
	2.3.1 Flux-linkage Characteristics of SRM	15
	2.3.2 Inductance Characteristics of SRM	16
	2.3.3 Torque Characteristics of SRM	17

# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND OF PROJECT

A Switched Reluctance Drive also known as Switched Reluctance Motor (SRM) is an electric machine that converts the reluctance torque into mechanical power. It has been proposed for variable speed applications since 1969. Although the reinvention has been possible due to the advent of inexpensive, high-power switching devices, the origin of this motor can be traced back to 1842. SRM is the simple motor structure compared to induction and synchronous machines because there are no windings or permanent magnets on the rotor. For its stator windings, it has wound field coils of a dc motor[1]. Stator windings on diametrically opposite poles are connected in series or parallel to form one phase of the motor. Several combinations of stator and rotor poles are possible, such as 6/4 (6 stators and 4 rotors), 8/4, 8/6, 10/6, 12/6 and 12/8. Figure 1.1(a) shows 12/8 pole of SRM. The configurations with higher number of stator/rotor pole combinations have less torque ripple.

Switched reluctance (SR) motors usually have three, four or more phases. The greater number of phases, the less of torque ripple and it will be smoother torque transitions from one phase to another phase. But for this paper, the structured of two-phase SRM is choose to be analyzed due to simple structure and also cost reason [2]. The two-phase switched reluctance motor is attractive due to the advantages of its simplicity, low expected manufacturing cost, fault tolerance capability, high