

**SIMULATION OF LINE START PERMANENT MAGNET
SYNCHRONOUS MOTORS AND ITS PERFORMANCE ANALYSIS**

APPROVAL PAGE

SIMULATION OF LINE START PERMANENT MAGNET SYNCHRONOUS MOTORS
AND ITS PERFORMANCE ANALYSIS

This thesis is presented in partial fulfillment for the award of the
Bachelor Engineering (Hons) in Electrical Engineering

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Approved by:

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of
scope and quality for the award of the degree of Bachelor of Engineering (Hons)

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Abstract

Line start permanent magnet (LSPM) synchronous motor is noted as an alternative to the induction motor because it offers a very high efficiency and unit power factor. A squirrel cage is provided in the LSPMSM to accelerate the rotor from standstill, whilst the magnets make the motor run at the synchronous speed. In this paper, the LPSM is modeling using Matlab/Simulink. The Simulink simulation then used to explore the behavior of torque component during the starting run or motor from standstill. The ability motor to synchronize with various values of magnet field strength, mechanical loading, and rotor inertia is also examined.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Line-start permanent magnet synchronous motor (LSPMSM) is a kind of high efficiency synchronous motor. A squirrel cage is provided in the LSPMSM to accelerate the rotor from standstill, whilst the magnets make the motor run at the synchronous speed. Compared to the traditional three-phase induction motors, the LSPMSM has typical advantages such as higher efficiency and power factor within a wide load range. This kind of motor could be a more efficient solution for general use applications than the induction motor.

The LSPMSM has been widely studied since it was first presented. A lot of experiences have been accumulated, and the machine has been applied to some particular industrial occasions. However, due to the complexity of the magnetic circuit and the rotor structure of the LSPMSM, the characteristic need further study [1].

In this work, the simulation of LSPMSM is developed using MatlabSimulink. Then, the synchronizing process has been studied which indicates the effective