شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومـــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات

لم ترد بالأصـــل

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Investigation of Switched Reluctance Generator Characteristics

A thesis Submitted in Partial Fulfillment for the Degree of

Master of Science

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Abstract

The current thesis presents an investigation for the performance and characteristics of switched reluctance (SR) machine in its generating mode. The effect of different operating parameters has been considered. The performance of switching reluctance generator is studied when connected to a common network and when feeding an isolated load.

The thesis provides a survey about switched reluctance machine system components and its performance in both motor and generator modes of operation. The differences between motor and generator modes are discussed on the basis of energy conversion principles to achieve clear understanding of the generator operation.

Switched reluctance machine magnetization characteristics are inherently nonlinear. The available models of switched reluctance machine are numerical in nature. A software development kit (SDK), oriented towards switched reluctance system simulation, is designed and implemented in C++, it implements object oriented programming (OOP) technique. The SDK contains software libraries to simulate SR machine with different models, different drive topologies and different types of electric supplies and loads. The developed SDK is fully compatible with Microsoft Foundation Class (MFC) library and designed to be fully extendable and modifiable for future work.

The software package is developed under *Microsoft Windows* operating system. It implements graphical user interface (GUI) based on multi document interface(MDI). Such package is efficient to study and compare the design and performance of different machine and drive configurations.

The performance of switched reluctance generator based on the nonlinear magnetization characteristics is extensively studied. A deterministic simulation

to study the effect of different operating parameters (like speed, switching angles, bus voltage, and load resistance) is performed. The simulation includes the performance of switched reluctance generator when connected to a common network or feeding isolated load. The results represent a useful guide to design and operation of switched reluctance generators.

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