MODELLING THE CHARACTERISTICS OF A 6/4 SWITCHED RELUCTANCE MOTOR USING NEURAL NETWORK

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ABSTRACT

Switched Reluctance Motor (SRM) are almost always operated within the saturation region and therefore has a very large operation region. This yields very strong nonlinearities, which makes it difficult to derive a comprehensive mathematical model for the behaviour of the machine. Neural Networks can be used to overcome such problems. This paper presents Neural Networks as a tool to model the characteristics of the motor. The flux-linkage versus current relationship as a function of rotor position for a 6/4 SRM was modelled using Neural

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INTRODUCTION

1.0 INTRODUCTION

Switched Reluctance Motors (SRM) are almost always operated within saturation region for a very large range of operation. This yields very high nonlinearities which makes it difficult to derive a model (which requires comprehensive mathematics) of the SRM. Thus, to obtain satisfactory results and the optimisation of motor combination in terms of maximising the torque at a given speed and minimising the overall drive cost require the development and the use of an accurate simulator. Neural Network is used i.e. Neural Works as a tool, to solve these kind of problem.

Recently, Stephenson and Corda [1] proposed a quite successful method to model the flux-linkage as a function of current and rotor position. This method is then being modified by Torey and Lang [2], who have proposed a method to provide analytical expressions for the flux-linkage and current for every rotor position within a single summary equation.

The method above [1][2], have some disadvantages, namely ; the complex mathematical modelling, the computation time, and the lack of accuracy. Another approach for modelling the magnetic nonlinearity of the SRM is using Neural Network. Since Neural Network technique does not require any prior information regarding the SRM system apart from the input and output signals, it is quite simple and cost effective.