



## MODELING OF THE INDUCTANCE VARIATION AND CONTROL OF THE SWITCHED RELUCTANCE MOTOR BASED ON FUZZY LOGIC

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**ABSTRACT**—Switched Reluctance Motors (SRMs) are increasingly popular machines in electrical drives, whose performances are directly related to their operating conditions. Their dynamic characteristics vary as conditions change. Recently, several methods of the modeling of the magnetic saturation of SRMs have been proposed as analytical functions. However, the SRM system is non-linear and cannot be adequately described by such models. Fuzzy Logic (FL) is known that might overcome this problem.

This paper introduces an attempt to use fuzzy logic to model of the inductance variation of the switched reluctance motor and to control the switched reluctance motor using fuzzy model. Fuzzy based modelling does not require an accurate mathematical model which is very difficult to obtain from a switched reluctance motor because of its inherit nonlinearities. The modelling method in this paper differs significantly from previous modelling methods. An application of fuzzy sets to the SRM drive control was also applied to the speed loop, replacing the conventional PI controller. Fuzzy logic controller (FLC) was optimised by using neural network. Simulation results were verified through experimental results and fuzzy logic model was proven to be reasonably accurate. The results of applying the fuzzy logic controller to SRM were compared to those obtained by the application of a conventional PI system. Compared to a PI control the fuzzy logic control provided a better response in terms of accuracy, and insensitivity to changes in operating conditions.

**Key Words:** Fuzzy estimator, Fuzzy controller, Switched reluctance motor

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