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Adaptive Sliding Mode Control Based on Fuzzy Systems Applied to the Permanent Magnet Synchronous Machine

S. Bentouati [1*], A. Tlemçani [2], N. Henini [3] and H. Nouri [4]

[1] *Laboratory of Mechanics, Physics, Mathematical Modeling (LMP2M), University of Medea, Medea 26000, Algeria.*
[2] *Laboratory of Research in Electrotechnics and Automation (LREA) University of Medea, 26000, Algeria.*
[3] *Laboratory of Renewable Energies and Materials (LREM), University of Medea, 26000, Algeria.*
[4] *Power Systems Electronics and Control Research Group, Department of Engineering Design and Mathematics, Bristol, U.K., BS16 1QY.*

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Abstract: This paper develops an adaptive sliding mode control based on fuzzy systems. In this control technique, the possibilities offered by Sugeno type fuzzy systems, in terms of their ability to approximate continuous nonlinear functions, are exploited, and the Lyapunov theory is used to establish a parametric adaptation law ensuring the global stability of the system. In addition, the control law includes a sliding mode term, which has the role of compensating the effects of the reconstruction errors. This technique is applied to control a permanent magnet synchronous machine. The results obtained show the effectiveness of the proposed method.

Keywords: *fuzzy systems; fuzzy adaptive law; sliding mode; reconstruction errors; permanent magnet synchronous machine.*

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* Corresponding author: mailto:bentouati.smain@gmail.com