World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:17, No:01, 2023

Mechanical Tension Control of Winding Systems for Paper Webs

Authors : Glaoui Hachemi

Abstract : In this paper, a scheme based on multi-input multi output Fuzzy Sliding Mode control (MIMO-FSMC) for linear speed regulation of winding system is proposed. Once the uncoupled model of the winding system was obtained, a smooth control function with a threshold was selected to indicate how far away the case was from the sliding surface. nevertheless, this control function depends closely on the higher bound of the uncertainties, which generates overlap. So, this size has to be chosen with broad care to obtain high performances. Usually, the upper bound of uncertainties is difficult to know before motor operation, so, a Fuzzy Sliding Mode controller is investigated to resolve this problem, a simple Fuzzy inference mechanism is used to decrease the chattering phenomenon by simple adjustments. A simulation study is achieved and that the indicate fuzzy sliding mode controllers have great potential for use as an alternative to the conventional sliding mode control.

Keywords : Winding system, induction machine, Mechanical tension, Proportional-integral (PI), sliding mode control, Fuzzy logic
Conference Title : ICAEET 2023 : International Conference on Applied Electrical Engineering and Technology
Conference Location : Istanbul, Türkiye
Conference Dates : January 30-31, 2023