FUZZY SLIDING MODE CONTROLLER FOR CASCADED MULTILEVEL INVERTER

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A project report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Engineering (Electrical-Power)

Faculty of Electrical Engineering
Universiti Teknologi Malaysia

JANUARY 2015

This thesis is dedicated to my father

ACKNOWLEDGEMENT

First praise is to Allah, the Almighty, on whom ultimately we depend for sustenance and guidance. Second, apart from my efforts, the success of any project depends largely on the support and guidelines of many others who support me at every step I followed.

I would like to show my greatest appreciation to my supervisor Dr. Shahrin Md Ayob. I would thank him for his tremendous support and help. I feel motivated and encouraged at every time I attend his meeting. His knowledge, advices and patience have also got me overcome numerous difficulties encountered while doing the tasks.

I would like to express my very great appreciation to my wife for her valuable and constructive caring during the progress this project.

ABSTRACT

This research provide an analytical study to sliding mode controller and fuzzy sliding mode controller for cascaded 5-Level inverter. The cascaded 5-Level inverter used in this research is implemented based on phase shifted Pulse width modulation technique. An output LC filter is used to reduce harmonics elements. The system is implemented mathematically using a state space representation. Then the averaging model is obtained on order to prepare the system's equations to be appreciated with sliding mode method. After modeling the system, sliding mode controller is designed. Lastly, Fuzzy logic controller is designed with desired scaling factor to fuzzify the sliding surface. Both controller are connected to three types of load to identify their behavior. The simulation results show that the proposed fuzzy sliding mode controller is more robust than sliding mode controller.

ABSTRAK

Penyelidikan ini menghasilkan jajian analitikal alat kawalan mod sliding dan mod fuzzy sliding kepada 5 tahap jujukan alat penyonsang. Alat kawalan 5 tahap jujukan alat penyongsang yang digunapakai di dalam kajian ini adalah berdasarkan teknik modular pertukaran lebar denyutan.   Oleh itu, penapis LC digunakan untuk menurunkan elemen harmoni. Secara matematiknya, sistem ini dilaksanakan secara'a state space representation. Kemudian model pemurataan diperolehi untuk menyediakan persamaan sistem untuk kaedah mod sliding. Kemudian model ini direkabentuk. Akhir sekali, alat kawalan fuzzy direkabentuk berdasarkan pengukuran yang diperlukan untuk fuzzify permukaan sliding.