Real-Time Switches Fault Diagnosis for Voltage Source Inverter Driven Induction Motor Drive

H. MERABET, T. BAHI, K. Bedoud, D. DRICI

Abstract: Induction machine is the frequently used for electrical drive applications in almost many industrial processes due to its simple and robust construction. Speed control of induction machine is required depending on the type of application. Speed of the induction motor can be varied by varying frequency or by variation of the terminal voltage. Variable voltage can be fed to induction machine using the voltage source inverter which is found efficient technique of controlling induction motor drive. The potential faults that occur in inverter are the open and short circuit switch fault. The cost of this schedule can be high, and this justifies the development of fault diagnostic methods. In this paper we present a reliable strategy for diagnosis and detection of open and short circuit switch faults in plush width modulation of voltage source inverter (PWM-VSI) using the fuzzy logic approach. The principle of the proposed approach is based on the acquisition of stator currents, to calculate the average absolute values of currents (AAVC), which allows the real-time detection and localization of inverter IGBT open or short-circuit faults using just the motor phase currents. A model of the system is built using MATLAB/SIMULINK. Simulation results are presented showing the monitoring approach performance under distinct operating conditions.

Keywords : open circuit fault, short circuit fault, Fuzzy logic, modeling, simulation