International Review on Modelling and Simulations

Volume 9, Issue 5 , 2016, Pages 1-12

Contribution to Reconfigured Multi-Level Inverter FedDouble Stator Induction Machine DTC-SVM Control

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Abstract: The Dual Stator Induction Machine (DSIM) meets well with the need for high power applications. In the recent years, it has been increasingly used for variable speed drives. However, its control strategy is still a subject of research due to its complex structure, though it offers more reliable application in use due to the presence of double stators. The fault detection and localization in an inverter are profitable for better diagnosis and the inverter reconfiguration is the most required process to ensure acceptable service continuity. This paper tackles, on the one hand, a control strategy based on the Direct Torque Control combined with the Space Vector PWM of a DSIM (DTC-SVM-DSIM) and on the other hand, a three-level inverter fault detection and localization, reconfiguration of the inverter when operating under open-circuit IGBT switch faults. Several results are presented to illustrate the enhancement of torque and flux quality owed to the proposed control strategy and also to show the improvement of the open-circuit fault detection and localization method for better diagnosis as well as the inverter reconfiguration impact on the drive system service continuity.

Keywords : DSIM, Multi-level Inverter, NPC, DTC, SVM, Reconfiguration