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Theoretical Study and Simulation of Five Levels NPC Converters Cascade Dedicated for Wind Energy Conversion System

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Nowadays, multilevel converters are significantly appeared in the industry owing to their advantages in high-power applications. The main problem in converter cascades is the DC voltage which must be maintained at its reference value to avoid overvoltage stress on the semiconductor. This paper presents one control method of regulating the DC voltage of five-level Neutral Point Clamped (NPC) converter cascade applied in a wind energy conversion system based on doubly fed induction generator (DFIG). The proposed method consists of controlling the average value of the DC voltage instead controlling the global DC voltage or controlling four DC voltages, individually. To verify the validity of the proposed method, theoretical study has been done and simulation was carried out in a MATLAB Simulink environment.

Keywords: Multilevel Converters, Neutral Point Clamped (NPC), DFIG, Wind turbine.

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