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Comparative Analysis of Electromagnetic Characteristics for HTS Motor Considering PWM Schemes in Voltage Source Inverter

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The inverter system must be necessary for a high-temperature superconducting (HTS) synchronous motor control in any electric propulsion system such as ship, vehicle, and aircraft. HTS motors for electric propulsion are driven and controlled by pulse width modulation (PWM) input voltage with harmonics, which is made in voltage source inverter (VSI) by a various switching pattern. Therefore, from this perspective, it is important to apply analysis methodology considering the real PWM switching patterns of VSI. In this paper, three PWM schemes such as sinusoidal, third harmonic injection and space vector PWM, respectively were considered for driving a 1.5 MW-class HTS synchronous motor for electric ship propulsion. The various performance characteristics of HTS motor were analyzed by co-simulation method based on ANSYS-Maxwell and Simplorer platform.

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