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## Estimation of Permanent Magnet Temperature using d-axis Current for IPMSM

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Permanent magnet (PM), such as NdFeB, in the interior permanent magnet synchronous motor (IPMSM) used to be irreversibly demagnetized when the motor operate at high temperature. Therefore, the motor is designed considering irreversible demagnetization of PM. However, it is difficult to optimize motor design because we can't forecast the exact temperature of PM when the motor operate. In addition, it is difficult to measure the temperature of PM using thermocouple because of rotating the rotor. So, this paper proposes the method which it estimates the temperature of PM using reduction of d-axis current to know irreversible demagnetization of the PM. The estimated the temperature of PM is first obtained using experiment and then it is compared with the simulation data, such as d-axis current and torque, to verify the correlation between simulation and experimental results design.

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