

Electromagnetic-Thermal Coupled Analysis of PMSM with Cooling Channel

Authors : Hyun-Woo Jun, Tae-Chul Jeong, Huai-Cong Liu, Ju Lee

Abstract : The paper presents the electromagnetic-thermal flow coupled analysis of permanent magnet synchronous motor (PMSM) which has cooling channel in stator core for forced air cooling. Unlike the general PMSM design, to achieve ohmic loss reduction for high efficiency, cooling channel actively used in the stator core. Equivalent thermal network model was made to analyze the effect of the formation of the additional flow path in the core. According to the shape and position changing of the channel design, electromagnetic-thermal coupled analysis results were reviewed.

Keywords : coupled problems, electric motors, equivalent circuits, fluid flow, thermal analysis

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