

Comparison of the Thermal Characteristics of Induction Motor, Switched Reluctance Motor and Inset Permanent Magnet Motor for Electric Vehicle Application

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Abstract : Modern day electric vehicles require compact high torque/power density motors for electric propulsion. This necessitates proper thermal management of the electric motors. The main focus of this paper is to compare the steady state thermal analysis of a conventional 20 kW 8/6 Switched Reluctance Motor (SRM) with that of an Induction Motor and Inset Permanent Magnet (IPM) motor of the same rating. The goal is to develop a proper thermal model of the three types of models for Finite Element Thermal Analysis. JMAG software is used for the development and simulation of the thermal models. The results show that the induction motor is subjected to more heating when used for electric vehicle application constantly, compared to the SRM and IPM.

Keywords : electric vehicles, induction motor, inset permanent magnet motor, loss models, switched reluctance motor, thermal analysis

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