Optimization of Switched Reluctance Motor for Drive System in Automotive Applications

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Abstract : The purpose of this work is to optimize a Switched Reluctance Motor (SRM) for an automotive application, specifically for a fully electric car. A new optimization approach is proposed. This unique approach transforms automotive customer requirements into an optimization problem, based on sound knowledge of a SRM theory. The approach combines an analytical and a finite element analysis of the motor to quantify static nonlinear and dynamic performance parameters, as phase currents and motor torque maps, an output power and power losses in order to find the optimal motor as close to the reality as possible, within reasonable time. The new approach yields the optimal motor which is competitive with other types of already proposed motors for automotive applications. This distinctive approach can also be used to optimize other types of electrical motors, when parts specifically related to the SRM are adjusted accordingly.