Layout optimization of the secondary coils for wireless power transfer systems

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Abstract

Due to the complexity of wireless power transfer systems, little literature to date has addressed the development of systematic and efficient design framework for determining the optimal layout of coils. Through introducing the concepts of fixed grid-based coil representation and effective turns, this paper proposes a novel layout optimization in order to determine the optimal layout of the secondary coils when the primary coils are given. In numerical examples, the secondary-coil layouts are successfully determined to maximize the induced voltages while satisfying coil mass constraints. The optimized layouts are then validated through the experiments under the same conditions.