

Development of High Accuracy Analysis Method for Wireless Energy Transfer with High Efficiency

Project Representative

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Abstract

Wireless energy transmission technique, which is the transmission of electrical energy from a power source to an electrical load without interconnecting conductors, is attracting attention as improvement of convenience. A short-distance wireless charging system of low power becomes widely used in the market, and a middle- or a long-distance wireless transmission technique with resonant coupling has been developed toward high power. With wireless energy transfer, efficiency and standby energy are more significant problems. Efficiency of wireless energy transfer by electromagnetic induction can be improved close to a high-frequency inverter system such as switching power supply through system design with emphasis on efficiency. The aim of the project is to develop a wireless energy transfer with high efficiency through the computation of the eddy current loss of the coils in the wireless energy transfer.

In this report, the eddy current in the coil is analyzed using the three-dimensional finite element method, and the effects of the eddy current on the AC resistance are clarified quantitatively.

Keywords: large-scale simulation, electromagnetic field analysis, wireless energy transfer, AC resistance