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Analysis of mutual inductance and coupling factor of inductively coupled coils for Wireless electricity (Article)

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Abstract

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A basic analysis of inductive coils and its parameter calculations are presented. The simulations of mutual inductance, coupling factor calculations are demonstrated with graphical analysis. Three different lab-scale coil models such as square, circular and rectangular coils are wound to evaluate the magnetic field by experiment, to validate the performance of Wireless Power System (WPT). In the open literature, circular coils are employed in most of the works, but few works have been reported in the parameter analysis. Further investigations on parameter exploration seems as a prerequisite for magnetic field measurement by estimating the parameters such as mutual inductance(M), coupling factor(k), magnetic flux(Φ) and magnetic field(B). It helps us to select the coils according to the applications. In this work, it is observed that circular performs well than other shaped coils in terms of parametrical analysis which are mentioned above. The simulation, and experimental results are tabulated as well as supported graphical plots are shown as proving circular coils performs well in the WPT scenario. © 2006-2017 Asian Research Publishing Network (ARPN).

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