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Abstract : In this paper a new resonant circuit model with perforated capacitor is developed to describe the wireless power transfer system (WPTs)-based inductive method. Since the compensation of leakages is necessary to improve efficiency, the effects of certain geometrical parameters are investigated for inductive power transfer (IPT) by considering distinct perforated capacitive for various dielectrics. Analysis of IPT system using this circuit model indicated that the efficiency is affected by the gap ratio as well as the hole size ratio and the number of holes along the section of perforated capacitor. The results show that the IPT system with the new resonant circuit can achieve a high efficiency over a range of operating conditions. At resonance condition, this approach provides a clear advantage due to the high efficiency related to the geometrical parameters of perforated capacitors. Both resonance frequencies and efficiency values are compared with respect to conventional method that use classical resonant circuit where the proper parameters are determined to maximize efficiency.

Keywords : Inductive power transfer (IPT) ; Resonant circuit ; Geometrical parameters ; Maximum efficiency ; Perforated capacitor

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