ANALYTICAL CALCULATION OF MUTUAL INDUCTANCE BETWEEN LATERALLY MISALIGNED CIRCULAR COILS IN WIRELESS POWER TRANSFER SYSTEMS

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Abstract

This talk introduces an enhanced computational method for accurately calculating mutual inductance between misaligned circular coils in wireless power transfer (WPT) systems. The method determines the radial and axial magnetic field components of the primary coil and integrates their normal component over the secondary coil plane to obtain the magnetic flux. Mutual inductance is then derived by dividing this flux by the excitation current. Validation against theoretical and experimental results for lateral displacement scenarios shows excellent agreement with existing literature, confirming the method's accuracy and reliability. The approach combines computational efficiency with improved predictive capability, making it a valuable tool for the design and optimization of WPT systems.