# Abstract

Electric vehicles are becoming more popular as a way to reduce greenhouse gas emissions and pollution levels in the air. EV gets power from pack of batteries. Charging in EVs can be done in two ways; wired and wireless. Wireless charging helps in reducing the size of the battery. Wireless charging makes the charging process automated, convenient and unaffected from chemicals, dirt and weather, spark-free and hands-free because of no use of wire for charging. Despite its attractiveness, Inductive Power Transfer suffers from a high leakage inductance, more so when the pads are misaligned. The misalignment lowers the coefficient of coupling, lowering the system's overall efficiency.

This thesis focus on the design and simulation of the Polarized Pad in order to have more power available on the receiver side, which can be used for quick battery charging, and to have a system that has more tolerance to misalignment at least in one direction. As a result, a double-sided LCC compensation network is proposed, whose resonant frequency is independent of load state and coupling.

Compensated inductors (from LCC) make the system bulky and less attractive to buyers. Integration of compensated coil with the main coil saves the extra space of magnetic cores for compensated inductors outside the coupler. However, integration of compensated inductors with the main coil, results in the addition of extra coupling between main and compensated coils, which is also discussed.

The model is simulated and verified using Ansys Maxwell's Finite Element Analysis to determine the various parameters coupling coefficient, self and mutual inductances. MATLAB Simulink is used to determine the amount of power transferred and efficiency calculation. A voltage source inverter with a frequency of 95 kHz and battery as the load is considered in this thesis. The maximum efficiency achieved is 95.09% with 5.4 KW power output with a 200 mm distance between the coils.