CONTACTLESS POWER TRANSFER METHODS FOR ELECTRIC VEHICLES CHARGING

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ABSTRACT

Contact-less power transfer(CPT) is divided basically into four methods. Inductively coupled power transfer(ICPT) is the well known technology for Electric Vehicles(EVs) charging . However it is hard to estimate the parameters of the coil and to set the resonance frequency, it has been developed to obtain high efficiency with large air gap . Mainly, to have a good magnetic coupling and to develop compact design are the two conditions have to be fulfilled for better power transfer. To increase the transferred power with large air gap ICPT system have to be tuned at the track frequency. This paper reviewed the resonant topologies, equivalent circuit analysis and design criteria of the ICPT system. The availabilities of Static charges scenarios are the advances of the ICPT. In addition This paper focuses on the design criteria and simulating with mathematical model of Series-Series(SS), Series-Parallel(SP), Parallel-Series(PS) and Parallel-Parallel(PP) Compansated topologies of the ICPT system which are used most common. The EV charging with ICPT method needs maximum alignment primary and secondary coils to have efficient power transfer due to driver mistake while parking mistake to correct position. Basic compensating topology Series-Series(SS) offers efficient power transfer over large air gap with high misalignment toleration. The SS compensation model was experimentally tested and the results compared with the simulation. The future recommendations of EVs charging also has been given with this study.

Keywords: Contact-less Power Transfer(CPT), Inductively coupled power transfer(ICPT), Wireless power transfer(WPT), Electric Vehicles(EV), Wireless battery charge