Graduate School of Science and Technology Master's Thesis Abstract

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Abstract

Many applications of inductive power transfer technology have already existed recently, for example charging smartphone battery, biomedical implants, electric vehicles, consumer electronics and industrial applications. In case of the electrical vehicle (EV), wireless charging is becoming popular as an efficient method to increase the driving range, reducing the battery size and the manufacturing cost. In this method, many transmitter coils which are buried under the road allow the EV can be dynamically charged while it is moving. To reduce power electronic redundancy in such a dynamic charging system, the transmitter coils can be driven by only one single radio-frequency (RF) power supply via a common RF feeder. However, this design suffers from a standing wave problem which causes the change in output power and efficiency as the EV travels along the road. To solve this problem, we suggest a system in which the transmission line is driven by two power sources located at both its ends. As a consequence, voltage standing wave generated by one power source is complemented by that of the other, resulting in constant load power and transmission efficiency along the charging pad. To verify the system's capacity of stable output power and efficiency as expected, we will simulate the system in some situations with lossless and lossy line at a frequency of 85 kHz.