

03/30/2022

Dear Prof. Tsorng-Juu Liang

Editor-in-Chief of

IEEE Journal of Emerging and Selected Topics in Power Electronics

We would like to submit the enclosed manuscript entitled “Fault Tolerant Multi-Tx/Multi-Rx Inductive Power Transfer System with a Resonator Coil” which we wish to be considered for publication in the IEEE Journal of Emerging and Selected Topics in Power Electronics. The paper is an original piece of work, and it has not been published in whole or in part previously.

The paper presents a novel multi-transmitter (Tx) /multi-receiver (Rx) inductive power transfer (IPT) system. Although conventional multi-Tx/multi-Rx IPT systems increase fault tolerance and reliability, they are prone to unequal power-sharing between the modules due to the coupling differences, which is inevitable in dynamic applications such as contactless slip rings. The unequal power distribution problem is solved with active converters on the Rx side by peers. The proposed method, on the other hand, introduces a middle-stage resonator (MSR) coil to balance the power distribution. An analytical design methodology of the proposed system to avoid bifurcation, which is significant to reduce switching losses, is presented. The selection of the number of modules is investigated under the consideration of fault tolerance and sizing. A 1 kW 2Tx/1MSR/4Rx IPT experimental setup is built to verify the design methodology, and the results are coherent with the analytical calculations. The system is tested with single/double Rx and single Tx open-circuit faults. The proposed system provides high fault tolerance and reliability with equal power-sharing between modules, which can be used in contactless slip rings, or other dynamic applications.

The paper is composed according to the IEEE journal submission format. No conflict of interest exists in the submission of this manuscript, and the manuscript is approved by all authors for publication.

I appreciate your consideration of our manuscript, and I look forward to receiving comments from the reviewers.

Kind regards,

Ozan Keysan