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Peer Review

Review of: "Resonant Inductive Coupling Power Transfer for Mid-Sized Inspection Robot"

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The paper deals with the design of a resonant inductive wireless charging system for a mobile robot. Some simulation and experimental results are presented. The main disadvantage of the paper is that it is not clear what the novelty of the paper is. In the reviewer's opinion, the novelty is low because there are plenty of papers describing design and optimisation issues of different types of wireless resonant-inductive charging systems. The authors did not propose any new control method, topology, optimisation procedure, and so on.

Other comments:

1) "Two operational principles exist; power delivered to load (PDL) and power transfer efficiency (PTE) ...". PDL and PTE are not operational principles. They are parameters of a WPT system.

2) When calculating efficiency, you should also consider losses in the primary-side inverter and the secondary-side rectifier and dc/dc converter. You should consider not only conduction losses but also dynamic losses.

3) The experimental part is poorly described because: a) it is not clear how CC/CV charging is achieved; b) what the role of the secondary-side dc/dc converter is; c) how you measured the system efficiency?

4) If the authors use two power converters at the secondary side of the charging system to achieve CC/CV charging modes, then it is a bad solution because the secondary side must be as compact as possible. Moreover, additional power converters decrease efficiency significantly. It is better to achieve CC/CV charging by using the primary-side inverter phase shift control (in this case, wireless communication will be necessary).

5) The efficiency results should be shown not only as functions of the distance between the coils but also for different values of equivalent load resistances because when charging a battery, its equivalent

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input resistance increases. Does the system operate at an optimal load?

6) Figure 5. In the reviewer's opinion, the charger operates incorrectly because: a) the charging current is highly pulsating and unstable (and this is not acceptable in the charging process); b) in CC mode, the current average value is too low; c) in CV mode, the average charging current should decrease exponentially, but according to the results, the average value is almost constant.

7) For longer transmission distances, it is better to use a 4-coil resonant inductive WPT system with self-resonating high-Q coils. Why did the authors use a simple 2-coil system?

8) The authors constantly highlight 100 W of power, but the average charging current is very low to achieve even 10 W of power. Instead of demonstrating the charging of 0.8 AH batteries, it is much better to demonstrate the charging of 10 AH batteries because 12 V 0.8 AH batteries are unsuitable for powering a 100-W robot.

Declarations

Potential competing interests: No potential competing interests to declare.