Effect of wireless power transfer using research paper

Environment, Electricity

Wireless technology is one of the most novel and interesting innovations of modern times. Prices of wireless devices have sharply declined and producers of electronic goods are finding it increasingly hard not to integrate wireless technology into their goods. Designing and setting up a wireless network can be done by almost anyone at a very low cost. It does not require a lot of technical knowhow and this is what makes it even more interesting.

The article investigates the relay effect to extend the energy transfer distance. The results indicate that power efficiency can be improved drastically using one or more relay resonators. The results are described practically and theoretically on a technique for wireless power transfer using long-lived, strongly-coupled electro-magnetic resonances. Transfer of wireless power using strongly coupled electromagnetic resonators is a newly discovered technology. even though this technology is capable of transmitting electrical energy over a long distance than most of the traditional field methods, its effective distance is not sufficient in some appliances. In this article, a relay effect is investigated to extend the distance over which energy is transferred. Theoretical study is carried out based on a number of equations. An experiment is conducted to validate the theoretical results and exhibit the efficacy of the relay approach. The results indicate that the power transfer efficiency can be enhanced extensively using more than one relay resonators. This approach considerably perks up the performance of the current two-resonator system and facilitates a curved path in the space to be used for transfer of wireless power using smaller resonators.

The current techniques available for wireless power transfer are generally classified into the nonradiative modes and radiative. High-power radiation requires a complex tracking system and poses safety concern, while a nonradiative mode works only in close-range across a small gap. To conquer these problems, an upcoming technology for wireless power transfer, known as wireless electricity, has been reported. it is based on strongly coupled nonradiative magnetic resonance. An experiment was conducted with two indistinguishable coils utilized as electric wireless resonators; a bulb whose power was 60 watt was wirelessly lit eight feet away from the source of power with a 40% power transfer efficiency. This system did work well even when a nonresonant blocked the line of sight between the two resonators.

The graph above indicates a systematic resonant and a nonresonant energy exchange in two object lossless.

The graphs indicate that the two frequencies of the coupled system are alienated by lambda. Precisely when, the difference in natural frequencies of the coupled modes is lambda.

wireless electricity still has a long way to be safely and widely accepted and implemented in society, in place of some of the currently wired systems hence theoretical advancements and necessary and crucial in this early stages of development. As a result the article focuses on theoretical proof and aspects Of concepts other than scrupulous wireless electricity applications. Nonetheless, Zhang envisions many possible applications, such as medicine, consumer and transportation industry in which examples of wirelessly powered cell phone, Tv and laptops have been verified using the two-resonator designs. Zhang strongly believes that the relay effect examined in this article will lessen the short-term problem in the current designs and speed up practical adoption of the wireless electricity.

The article describes how a theory based on intergrated equations accounts for the wireless electric system mechanism, where swapping of power can be analytically expressed and conforms to a periodic manner. The diagram below illustrates the summary of the exchange of energy of a two-object lossy system. (a) Resonant strong coupling with identical resonators. (b) Resonant strong coupling for resonators with different decays. (c Resonant weak coupling. (d) Nonresonant case.

The article has presented, the expansion of the current wireless electric scheme ‘ source-device’ where more than one relay resonators are supplemented to increase power transfer efficiency, make longer the transmission distance, and facilitate a wireless curved transmission pathway in space. The ‘ source-relay” projected device scheme prevail over the midrange drawback of the current wireless electric systems and gives way for new appliances which necessitate arbitrarily and long range, directed transfer of wireless energy and resonators that are small In size. The fundamental advantage of using the non-radiative mode lis that huge amount of power not singled out up by the gadget remains bound to the surrounding area of the source, rather than being radiated into the surroundings.

References

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