

Data transmission through energy coil of wireless power transfer system

This paper describes the theory and limitations of this emerging technology through the design and construction of a wireless NiCd battery charger, as well as through an investigation of ...

free wireless power transfer system with stable output power and efficiency for autonomous underwater vehicles," IEEE Trans. Power Electron., vol. 34, no. 5, pp. 4005-4008, May 2019.

The power transfer efficiency (PTE) is a crucial aspect for effective wireless power transfer (WPT) applications. The quality factor (Q) of the WPT coil plays a critical role in ...

Range, Power, and Efficiency-Increasing Technologies This section discusses techniques that can increase the range, power, and/or efficiency of a wireless power transfer system. The main strategies considered are beamforming, repeaters, power transfer through uvs, and medium optimization.

This paper proposes a novel inductive and capacitive combined wireless power transfer (IC-WPT) system for unmanned aerial vehicle (UAV) applications. First, a new compact inductive and capacitive combined coupler is presented. The magnetic field coupled power transmission of the compact coupler contains one magnetic transmitting unit, which is ...

As a new type of power transmission technology, wireless power transfer (WPT) has received extensive attention worldwide. In recent years, WPT technology has achieved energy transmission under non-physical connections between power supplies and electrical equipment in electric vehicles, mobile phones, robots, medical equipment, helicopter rotors, rotor ...

A novel method, which integrates bidirectional data communication into a high-power WPT system, is proposed, and the crosstalk interference between two carriers is discussed. For wireless power transfer (WPT) systems, communication between the primary side and the pickup side is a challenge because of the large air gap and magnetic interferences. A novel method, ...

The importance of Wireless Power Transfer (WPT) lies in its potential to make a significant contribution to sustainability. Traditional approaches to the distribution of electricity are associated with substantial inefficiencies, resulting in notable losses during the processes of transmission and storage [1, 2]. WPT systems that utilize resonant inductive coupling, radio ...

The transfer of contactless energy through an air gap is called wireless power transfer (WPT). Because this method is clean and reliable, it has been proposed for various applications including electric vehicle battery charging. Tesla demonstrated the transfer of electrical power from an air gap via magnetic coupling in the 1890s.

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Inductive or magnetic coupling between two coils is the basic principle that is described for wireless power transfer and communication below (see Fig. 1). The equivalent circuit for such systems is illustrated in Fig. 2, including source, load, primary and secondary coils and matching networks for the primary and secondary sides. The matching networks are either ...

The prototype experiment verifies the good power transmission performance of the proposed WPT system under the conditions of space change, misalignment, offset, and tilt. Tx coil can transfer power to the Rx coil placed around it with a DC-DC efficiency of up to 82.3% at a power level of 24 W and operating frequency of 500 kHz.

3 WPT Simultaneously with the Wireless Data Transmission The wireless power and data transmission system with resonant coils tuned at one single working frequency is analyzed in [6-8]. The transmitted working frequency is modulated at the same time by the data transmission. In order not to be influenced by the 294 E.N. Baikova et al.

This section discusses techniques that can increase the range, power, and/or efficiency of a wireless power transfer system. The main strategies considered are beamforming, repeaters, power transfer through uvs, and medium optimization. 5.1. Beamforming A well-known approach to improving the performance of RFPT systems is phased array transmission.

A new methodology for ensuring that a three-coil wireless power transfer system is more energy efficient than a two-coil counterpart is presented in this paper. The theoretical proof and the conditions for meeting the objective are derived and practically verified in a practical prototype. The key features of the magnetic design are to: 1) shift the current stress from the ...

Wireless power transfer (WPT), inspired by Nikola Tesla's innovative concept in the 1880s, has evolved from conventional wired methods to become a vital, convenient, and safe technology in modern life. 1 Initially, WPT research focused on using microwave technology for long-distance applications like solar space power stations (SSPSs). 2 With the rise of electric ...

The existing energy modulation simultaneous wireless power and data transfer (EM-SWPDT) system will cause severe load voltage drop and power efficiency reduction at the data transmitting. Besides, those methods can only achieve simplex communication. To solve these problems, this article proposes a single coil half-duplex communication EM-SWPDT ...

The data communication always needs to be implemented in application of the Wireless Power Transfer (WPT) technology. However, there are also some problems need to be dealt with in practical applications. For example, the interference between power transfer and communication is serious, when the power and data are transmitted through the same coupling coil. A simple ...

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For the problem of the unstable underwater wireless energy transmission system, Tohoku University and NEC Corporation jointly developed an underwater charging electromagnetic field induction wireless power transfer system, which uses a conical coupling coil to improve the coupling coefficient and has high device stability. However, the ...

High-efficiency medium-range wireless power transfer using magnetically coupled resonators requires a wireless data link between the contactless coils to regulate power. Multiplexing the

The first wireless power transfer (WPT) systems date back to the end of the nineteenth century and are rooted in the ideas of Nikola Tesla 1,2,3 recent years, the rapid expansion of battery ...

This paper proposes a data transmission for parallel line fed wireless power transfer system. We focus on power receiver-to-source transmission link and employ the load ...

Figure 1 shows a wireless power transfer system with two magnetically-coupled coils. In the transmitter coil, the electric energy is converted to magnetic energy which is picked up in the receiver coil where it is converted back to electrical energy. Figure 1 A resonant wireless power transfer system consists of a driven LC-resonator on the

Wireless powering (or wireless power transfer, WPT) provides an efficient solution to transfer energy to the system without any physical connection from the outer environment but only through i) a transmitter connected to an external power source or ii) an integrated energy scavenger/harvester within the system itself (Figure 2).

Charging an electric vehicle is simplified through the wireless transfer of energy. In the case of a stationary WPT system, it is only necessary for the drivers to park their vehicles and depart from them. ... WPT is a dependable and safe energy source that can be used to support data transmission in these specific scenarios as well as recharge ...

Qi Wireless Charging and Data Transfer: The Qi wireless charging standard, which is commonly used for wireless charging of smartphones, has a feature called "Qi Data over Wireless Power" that enables the transfer of small amounts of data (such as authentication or device identification) alongside the wireless charging process. This can be used ...

In fact, the distance considered is between the last turn of coil 2 and first turn coil 3. For the power transfer evaluation, it is interesting to compute a relative power transfer, defined as the ratio P_3 / P_{MAX} , where, as mentioned ...

It is assumed here that power transfer coils in the MRWPT system are employed as antennas for data communication. The frequency characteristics of the antennas change due to coil displacements. The power

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transfer coils are modeled as a band pass filter (BPF) and the frequency characteristics of the filter are presented in this letter.

The wireless power transfer (WPT) system is used for the transmission of energy without a direct physical cable connection, which is useful to power loads where using cables is hazardous and ...

This paper proposes a design scheme for a wireless power transfer (WPT) system based on multi-relay coils to solve the power supply demand of 500 kV transmission line online monitoring equipment. The relationship between the operating frequency and the coil loss is established to analyze the influence of the number of relay coils and the coil distance on the ...

This paper gives an overview of optimizing wireless power transfer systems using magnetic coupling. Optimization aims to maximize either the power transfer efficiency or the ...

As an emerging research field, Wireless Power Transfer (WPT) has attracted wide spread attention recently. In this study, the coil design of WPT system for optimal transmission efficiency is investigated. We deduce Tthe design criteria are deduced to meet various conditions of transmission distance and load. The results of simulation and experiment show the ...

The IPT system belongs to wireless power transfer (WPT) or a branch in contactless power transfer (CPT). The system detects instantaneous load mainly through power injection and resonance mode. Although it can wirelessly transmit power from one side to another, it cannot transmit data at the same time.

This paper delved into the thermal dynamics and stability of Wireless Power Transfer (WPT) systems, with a focus on the temperature effects on the coil structure. Using the Finite Element Method (FEM), this study investigated both unidirectional and bidirectional coupling field simulations, assessing their impacts on the transmission efficiency of LCL-resonant WPT ...

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