## 2022 9th International Power Electronics Systems and Applications (PESA)

## Title

Dynamic Wireless Power Transfer System for Electric Vehicles - Development and Challenges.

## Abstract

Electric vehicles (EVs), such as on-road cars, vessels and automated guided vehicles (AGVs), plays a vital role in the rapid development of e-transportation. Although EV is environment-friendly and cost-efficient, the limited carried battery capacity results in finite driving range. The cabled charging, which is a widely-used charging method, still requires the stop-to-charge manner and sufficient power stations. In contrast, the dynamic wireless power transfer (DWPT) system allows the vehicles can be re-powered during its driving. The DWPT technology will significantly make the transportation more efficient, and users would never be worried about being stuck in the road due to continuous on-road powering. The main challenges in the practical application of DWPT system are unstable coupling, limited system efficiency and low system stability. In order to solve these issues, the key research effort concentrates on ferrite structure, compensation network and control method. Based on the modularized EV and 3D marine robot charging systems, a universally-applicable ferrite optimization algorithm and adaptive control methods are discussed. In addition, the sensing technology based on the DWPT is also investigated. The core characteristics of the proposed methods are reduced the complexity (e.g., no position sensor and communication unit involved) and improve the dynamic performance of the system.

## Brief Bio



Prof. Pan received his B.Eng in 1997 from Changchun Polytechnic University, and Ph.D from Department of Electrical Engineering of Hong Kong Polytechnic University in 2007. Currently, he is working in College of Mechatronics and Control Engineering, Shenzhen University. He was promoted to full professor in 2013 and later the Vice Dean of the college. His main research interests are motor design and control, wireless power transfer, wave power generation and robotics.