ICRERA 2023

12th INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY RESEARCH AND APPLICATIONS

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Abstract

Title: Load-Independent High-Frequency Inverter and Its Applications

The emergence of next-generation semiconductor devices, such as GaN devices, has lowered the barriers to achieving high frequencies in power converters, reaching the megahertz range. In this context, high-frequency inverters are gaining popularity and finding applications in various areas, including single-phase DC/AC inverters, the power transmission component of wireless power transfer, and the DC/AC conversion part of resonant converters. These are used many applications, such as micro-grid converter, rechargeables battery charging, power supply for environment IoT devices, and so on. However, high-frequency inverters are highly sensitive to load and reactance variations. The load variations affect the converter performance, especially power conversion efficiency. Soft switching achievement and output control are mandatory technologies for this issue, which are major research topics on high-frequency inverters. The development of technologies contributes to the energy saving of electrical products.

This presentation will focus on a load-independent high-frequency inverter that demonstrates robustness against load variations. The load-independent inverter theoretically guarantees constant output voltage and soft switching in the presence of load variations WITHOUT any control! As a result, they have attracted significant attention, especially for wireless power transfer applications. The presentation will cover the fundamental operation of the load-independent inverter, design principles for wireless power transfer utilizing load-independent characteristics, and several specific applications.