Inductive Energy Storage Technology

Electric vehicle (EV) inductive charging is a technology that allows an EV to charge its energy storage system remotely without physical connections. It is an exemplary solution for EV charging due to the associated advantages in terms of automation, safety in harsh environments, reliability during environmental disasters, flexibility, and ...

An inductive energy storage pulsed-power generator with storage inductor and opening switch can probably realize a lightweight, compact and high-power laser system. But the technology for opening high current is now very difficult, so that the opening switch is being developed and there is a few applications using the generator. The purpose of ...

Abstract: The all-solid-state inductive energy storage pulse forming line modulator is a brand-new solution to achieve a high repetition rate, high voltage gain, and short pulse output. However, due to the non-ideal dynamic ...

For pulsed power generation, the energy storage unit is one of the most fundamental components. The common energy storage methods in the current pulse power systems are capacitive energy storage (CES) and inductive energy storage (IES), each with its own advantages and disadvantages. In this study, we have tested a circuit using both CES and ...

In this paper, we identify key challenges and limitations faced by existing energy storage technologies and propose potential solutions and directions for future research and ...

All these years the GIT-12 has been used for the research of the inductive energy storage technology with various plasma opening switches (POSs). The goal of the research is to improve the energy coupling between the Marx generators and different radiating loads, and to provide desired output voltage (or current) amplitude depending on the load ...

The operation of the electricity network has grown more complex due to the increased adoption of renewable energy resources, such as wind and solar power. Using energy storage technology can improve the stability and ...

Utilization of inductive storage in production of intense charged particle beams, laser beams, and hot dense plasmas of interest in thermonuclear fusion studies and in other research areas is very attractive because of its inherent compactness associated with energy storage in the form of magnetic fields. A major problem in utilizing inductive energy sources ...

Pulsed power generation using solid-state linear transformer driver (LTD) with inductive energy storage has been experimentally studied. This is a feasibility study in order to explore this new approach by proving its operation principle and demonstrating its typical performance. Magnetic cores in LTD modules are used as

intermediate energy storage from which the electrical ...

Opening switches are critical components for inductive storage systems and also find applications in pulse compression and power distribution systems. Inductive storage systems are very attractive because the stored energy density is orders of magnitude larger than can be stored in capacitors. This chapter shows a typical schematic of an inductive energy storage ...

Summary form only given. By using the technology of energy storage inductor and electro-exploding wire opening swtich (EEOS) drived by pulsed capacitors, we studied the inductive-energy-storage pulsed power source. Based on the researches of EEOS with different material, different parameters and different quench medium, an excellent opening switch has ...

Using an inductive storage technology and pulse forming circuits, a shorter pulse current rising time is obtained. The inductor energy is fed back to the input source not discharged to the load, resulting in a fast pulse trailing edge and energy saving. Thus the pulse current response observed when using this proposed technique is found to be much faster when compared to ...

With high penetration of renewable energy sources (RESs) in modern power systems, system frequency becomes more prone to fluctuation as RESs do not naturally have inertial properties. A conventional energy storage system (ESS) based on a battery has been used to tackle the shortage in system inertia but has low and short-term power support during ...

In this article, a novel circuit topology concept that can generate bipolar pulses based on linear transformer driver (LTD) topology is presented. Different from traditionally ...

As new energy technology and capacitor energy storage continue to evolve, users may encounter numerous questions related to capacitors. To make informed decisions about their selection and usage, it is ...

Solid-state Marx generator circuits have been widely studied in recent years. Most of them are based on capacitive energy storage (CES), with the basic principle of charging in parallel and discharging in series. In this article, we propose a solid-state Marx circuit using inductive energy storage, where inductors play the role of principal energy storage element.

Considering the above requirements, there are several basic concepts that can be used for high-voltage pulse generation. The key idea is that energy is collected from some primary energy source of low voltage, stored temporarily in a relatively long time and then rapidly released from storage and converted in high-voltage pulses of the desirable pulsed power, as ...

In this paper, the principle of inductive energy storage(IES) is applied to twisted pair wire(TPW), served as energy storage unit for generating nanosecond pulse. As a kind of transmission line, the electromagnetic field constraint of TPW is realized by twisting, so it has greater bent flexibility than coaxial transmission line,

which makes it possess a higher ...

DOI: 10.1109/APCCAS.2008.4746414 Corpus ID: 19210344; HTS inductive magnetic energy storage with power control technology @article{Jin2008HTSIM, title={HTS inductive magnetic energy storage with power control technology}, author={Jianxun Jin and Xiaoyuan Chen}, journal={APCCAS 2008 - 2008 IEEE Asia Pacific Conference on Circuits and Systems}, ...

An inductive energy storage pulse power system is being developed in BARC, India. Simple, compact, and robust opening switches, capable of generating hundreds of kV, are key elements in the ...

PPS with energy recovery and inductive storage topology (MIEF-PPS). The MIEF-PPS operates in an interleaved pulse-width modulation (PWM) current-loop control under steady-state ...

Two methods of output voltage adding using pulse forming lines (PFLs) have been studied and compared. Both methods use inductive energy storage (IES) instead of traditional capacitive energy storage (CES), which means that the PFLs are charged by current instead of voltage. One of the methods (Type A) used an additional transmission-line-transformer (TLT) to achieve ...

A review of opening switch technology for inductive energy storage. K. Schoenbach M. Kristiansen G. Schaefer. Engineering, Physics. Proceedings of the IEEE. 1984; A review of the state of the art in opening switches is presented. The general operating principles and present and potential future operating parameters for several switch categories are discussed. ...

In this article, we propose a solid-state Marx circuit using inductive energy storage, where inductors play the role of principal energy storage element. When combined with an opening ...

An inductive energy storage switch system for the destruction of solid materials is reported. This is based on creating a pulsed electric breakdown in the solid dielectric, which then propagates in the specimen. This scheme provides a higher destruction effectiveness compared to a capacitive energy storage system. The higher energy efficiency is attributed to ...

A new type of vacuum arc thruster in combination with an innovative power processing unit (PPU) has been developed that promises to be a high efficiency (~15%), low mass (~100 g) propulsion system for micro- and nanosatellites. This thruster accelerates a plasma that consists almost exclusively of ions of the cathode material and has been operated with a wide variety of ...

When an inductive circuit is completed, the inductor begins storing energy in its magnetic fields. When the same circuit is broken, the energy in the magnetic field is quickly reconverted into electrical energy. This electrical energy appears as a high voltage around the circuit breakpoint, causing shock and arcs. An accidental shorting of the ...

Inductive Energy Storage Technology

Superconducting magnetic energy storage (SMES) technology has been progressed actively in recent years. This paper introduces two controlled energy release schemes aiming to achieve a SMES design. Two practical experimental circuits have been made to study the principles and properties of magnetic energy storage and release. A ...

Key words: explosive driven ferroelectric generator, inductive energy storage, electrical exploding opening switch, high power, fast rising time, fast pulse (EDFEG), [1-3]? ...

The all-solid-state inductive energy storage pulse forming line modulator is a brand-new solution to achieve a high repetition rate, high voltage gain, and short pulse output. However, due to the non-ideal dynamic characteristics of the switch and the fixed physical space size of the transmission line, it"s difficult to realize the generation and control of high-voltage short pulses.

Design and demonstration of micro-scale vacuum cathode arc thruster with inductive energy storage circuit. / Li, Yueh Heng; Pan, Jun You; Herdrich, Georg. In: Acta Astronautica, Vol. 172, 07.2020, p. 33-46. Research output: Contribution to journal > Article > peer-review

the development of an inductive energy storage device [6], the com-bination of the inductive energy storage device and the trigger-less ignition method [16], and the use of a compact magnetic coil for col-limating and accelerating plasma [12,17]. In addition, Neumann et al. [18] demonstrated a Mg-fuelled centre-triggered pulsed cathodic arc thruster and it explored higher ...