

This study discusses a hybrid battery-FCs energy storage and management system for a hybrid electric vehicle (HEV), as well as an integrated PMSM's passivity-based control (PBC) technique to ...

4. Electric Drives Multiple Choice Questions on Speed Control of Direct Current Motors & Induction Motors. The section contains Electric Drive multiple-choice questions and answers on shunt and series motor speed control, speed control basic principles, speed controlling using rotor resistance and inductance, rotor voltage injection, slip energy recovery, current source speed ...

The primary control goals of most HEV control strategies are optimizing fuel consumption and tailpipe emission without compromising the vehicle performance attributes and the auxiliary ...

The theoretical aspects of energy exchange in the energy storage systems were presented as a base for a continuous simulation model of electric transport power supply.

Enhancing transportation efficiency is the preeminent place to start efforts to minimize emissions of carbon dioxide which is a crucial malefactor in global warming. Due to awe-inspiring advantages over vehicles with internal combustion engines, use of electric vehicles (EVs) finds application in a variety of areas. However, energy storage system (ESS) of the EV plays an ...

It is based on electric power, so the main components of electric vehicle are motors, power electronic driver, energy storage system, charging system, and DC-DC converter. Fig. 1 shows the critical configuration of an electric vehicle ( Diamond, 2009 ).

1 INTRODUCTION 1.1 Motivation. A good opportunity for the quick development of energy storage is created by the notion of a carbon-neutral aim. To promote the accomplishment of the carbon peak carbon-neutral goal, accelerating the development of a new form of electricity system with a significant portion of renewable energy has emerged as a critical priority.

Since the electric motor functions as the propulsion motor or generator, it is possible to achieve greater flexibility and performance of the system. It needs more advanced energy management strategies to enhance the energy efficiency of the system.

A real-time unified speed control and power flow management system for an electric vehicle (EV) powered by a battery-supercapacitor hybrid energy storage system (HESS) is developed ...

Control and Optimization of Electric Ship Propulsion Systems with Hybrid Energy Storage by Jun Hou ...

1.1.2 Energy Storage Devices for All-Electric Ships . . . .6 ... 6.1.2 Motor Load Following Control with HESS . . . .80

Energy storage integration is critical for the effective operation of PV-assisted EV drives, and developing novel battery management systems can improve the overall energy efficiency and lifespan of these systems. Continuous system optimization and performance evaluation are also important areas for future research.

BLDC motor control is easier, less complex, and less expensive than the PMSM motor control. The latter, however, achieves lower noise and fewer harmonics in the current waveform. Normally, BLDC motors perform better with a six-step trapezoidal algorithm, whereas PMSMs motors perform better with sine wave commutation algorithms.

This process converts some of the vehicle's kinetic or potential energy into electrical energy. The electronic control system is responsible for monitoring the braking situation of the vehicle and controlling and adjusting the motor. The energy storage system is the part of the regenerative braking system used to store electrical energy ...

in light electric vehicles with hybrid energy storage and machine learning control R. Punyavathi<sup>1</sup>, A. Pandian<sup>1</sup>, Arvind R. Singh<sup>2</sup>, ... Additionally, dead-beat control based on the motor

The equation representing the dynamics of an electric motor is formulated as follows 18: ... A review of energy management strategies based on model predictive control. J. Energy Storage 56 ...

This paper designs a robust fractional-order sliding-mode control (RFOSMC) of a fully active battery/supercapacitor hybrid energy storage system (BS-HESS) used in electric vehicles (EVs), in which ...

Regenerative braking technology is essential for reducing energy consumption in electric vehicles (EVs). This study introduces a method for optimizing the distribution of deceleration forces in front-wheel-drive electric vehicles that complies with the distribution range outlined by ECE-R13 braking regulations and aligns with an ideal braking distribution curve. In addition, using a fuzzy ...

These advancements in machine learning-based control algorithms not only enhance the efficiency and performance of electric vehicle drives but also pave the way for future innovations in autonomous driving and intelligent transportation systems. Algorithm for Multi-layered ML pattern recognition model implementation is shown in Fig. 3.

Electric vehicles have steadily improved as a viable remedy to address the challenges of energy consumption and ecological pollution. However, the limited vehicle range has become an obstacle to the popularization of pure electric vehicles due to the slow development of battery energy storage in the electric vehicle industry [1,2].Regenerative ...

Classified by the form of energy stored in the system, major EES technologies include mechanical energy storage, electrochemical/electrical storage, and the storage based ...

This chapter presents hybrid energy storage systems for electric vehicles. It briefly reviews the different electrochemical energy storage technologies, highlighting their pros and cons. After that, the reason for hybridization appears: one device can be used for delivering high power and another one for having high energy density, thus large autonomy. Different ...

During energy storage, the motor works in the motor state, the electric energy is accelerated by the power electronic converter to drive the flywheel, and the energy is converted from electric energy to kinetic energy. ... a flywheel energy storage control model was established in MATLAB/Simulink for simulation. The model consists of two parts ...

His current research focus is on the design and control of power electronic converters for renewable energy systems, battery energy storage systems, and electric drives. Huai Wang is currently a professor at the Department of Energy, Aalborg University, Denmark, where he leads the Reliability of Power Electronic Converters (ReliaPEC) group. He ...

The hybrid energy storage system gives full play to complementary advantages of the two energy sources and makes up the shortcomings of the traditional single-energy storage system ( Traor&#233; et al., 2019 ). In this paper, the energy management and the nonlinear control strategy of HESS for electric vehicles are studied.

The load levelling is performed locally, at the level of the single propulsion electric motor, so optimizing the storage device contribution; ... In this paper, the design and control of an electrical energy storage system for hybrid diesel electric ship was considered to perform load levelling in irregular wave conditions. A preliminary ...

An electric vehicle consists of power electronic converters, energy storage system, electric motor and electronic controllers [15]. ... There are six components in the drive train: electric motor, power electronic controller, battery, motor control, battery control, and interface to the vehicle. The interface between the vehicle & the motor ...

The hybrid energy storage system gives full play to complementary advantages of the two energy sources and makes up the shortcomings of the traditional single-energy storage ...

This article employs the concept of realizing an electric vehicle (EV) driven by an induction motor (IM) with an ultracapacitor (UC) as a sole energy storage device for a short distance range in city drive. In battery-driven EVs, the performance of batteries will extensively degrade during frequent start, stop, acceleration and deceleration of the vehicle.

This paper explores an overview of an electric propulsion system composed of energy storage devices, power electronic converters, and electronic control unit. The battery with high-energy density and ultracapacitor with high-power density combination paves a way to overcome the challenges in energy storage system. This study aims at ...

This paper presents a cutting-edge Sustainable Power Management System for Light Electric Vehicles (LEVs) using a Hybrid Energy Storage Solution (HESS) integrated with ...

The optimization of the train speed trajectory and the traction power supply system (TPSS) with hybrid energy storage devices (HESDs) has significant potential to reduce electrical energy ...

This main objective of this project is to control the hybrid energy storage system in order to increase the lifetime and performance of an electric vehicle battery source.

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