

Due to the short distance between urban rail transit stations, a large amount of regenerative electric energy will be generated. Studying how to recuperate regenerative braking energy and control the voltage fluctuation of the traction network within allowable range can result in economic as well as environmental merits, which has important practical significance in ...

This study aims to examine the significant impact of the frequent starting and braking of the urban rail trains on the voltage of the traction network. A hybrid energy storage system comprising a ...

This paper describes a methodology for designing hybrid energy storage systems for urban railway applications integrating lithium batteries and supercapacitors and the effectiveness of the hybrid ESS is shown on a real case study presenting catenary-less zones. Currently, lithium batteries are characterized by higher energy density but they require an ...

energy storage in rail transit, civil vehicles and other fields is summarized, and the future development prospects of power grid frequency regulation and uninterruptible power supply are prospected.

The stationary supercapacitor energy storage systems (SCESS) in urban rail transit systems can effectively recover the regenerative braking energy of the trains and reduce the fluctuation of the traction network voltage. Generally, the charge/discharge states of SCESS is determined by the voltage of the traction network; however, in actual operation, the fluctuation of the no-load ...

In this paper, a novel architecture of urban rail transit based on hybrid energy storage system (H-ESS) is proposed. Supercapacitor (SC) and UPS are used to smooth the pulse power of the ...

Aiming to the safety issues of traction grid voltage caused by the high power and short period of huge braking energy in urban metro, a dual DC/DC hybrid energy storage system composed of super ...

The application of stationary super capacitor energy storage systems (SCESS) is an effective way to recover the regenerative braking energy of urban rail transit vehicles. The benefits of these systems' application largely depend on the design of the energy management strategy (EMS).

The regenerative braking quantification, design control, and simulation of a hybrid energy storage system for an electric vehicle in extreme conditions is presented ... Taking the urban rail transit metro in a certain area (4M2T) as an example, the relationship between the running speed of metro and the speed of traction asynchronous motor is ...

Due to the short distance between stations, frequent acceleration and braking for urban rail trains cause voltage fluctuation in the traction network and the regenerative braking energy loss. In this study, a hybrid energy storage system (HESS) was proposed to recover braking energy and stabilize the traction network voltage, where the on-board ultracapacitors ...

In urban rail transit, hybrid energy storage system (HESS) is often designed to achieve "peak shaving and valley filling" and smooth out DC traction network power fluctuation.

The experimental results show that HESS could stabilize the metro voltage within a safe voltage of 580 V and achieve 100% braking energy recovery by optimal energy distribution between two different types of energy storage systems, which are only 79.9% and 39.2% in other single energy storage system by contrast.

Hybrid energy storage technology, which consists of lithium-ion batteries (LiB) and super capacitors (SC), is an effective way to ensure the safety of power supply and realize energy saving in metro by reusing the braking power. Aiming at the optimal configuration and control of the metro hybrid energy storage system (HESS), an energy management strategy ...

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1. Introduction. Urban rail vehicles providing public transport services within metropolitan areas include tramways, light rail, metro, and regional or commuter rail vehicles [1]. These vehicles are operated in railway systems with relatively short distance between stations and are electrically powered [2]. Due to their electric drive train and large capacity they are ...

6 ???&#0183; Abstract. The energy consumption of urban rail transit systems is influenced by the coordination between power supply system and train operation. Currently, these two aspects ...

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