

Can hybrid on-board ESS be used in urban rail transport?

In the application of hybrid on-board ESS on urban rail transport was studied. According to the results of calculations, it is shown that the use of ESS reduces losses in the traction network by 43%, decreases peak current by 32%, extends the battery life by 16.3%, and stabilizes the voltage of the traction network. ...

Can a lithium battery be used to feed urban railway systems?

Currently, lithium batteries are characterized by higher energy density but they require an accurate charge and discharge profile to increase its lifetime, and it is not easily to be obtained feeding urban railway systems.

Can hybrid electric trains be used in intercity lines?

References [17,18] optimized the volume and energy consumption of the on-board ESS of EMU. Hybrid electric trains have good application prospects in intercity lines, snowstorm or freezing rain weather-prone areas. AC-DC-AC locomotives are mostly used in AC electrified railways.

What are the applications of hybrid electric trains?

Hybrid electric trains have good application prospects in intercity lines, snowstorm or freezing rain weather-prone areas. AC-DC-AC locomotives are mostly used in AC electrified railways. At present, some trains have been equipped with DC 110 V battery packs for auxiliary power supply.

What is ground energy storage access scheme of electrified railway?

Table V. Ground energy storage access scheme of electrified railway. Its voltage level is high, which can reduce the loss caused by energy transmission in the line to a certain extent, and the capacity of ESS is large. It has a low voltage level and is only suitable for short-distance transmission to supply power to station loads.

How to select energy storage media suitable for electrified railway power supply system?

In a word, the principles for selecting energy storage media suitable for electrified railway power supply system are as follows: (1) high energy density and high-power density; (2) High number of cycles and long service life; (3) High safety; (4) Fast response and no memory effect; (5) Light weight and small size.

Based on the summary of the existing research, the access scheme of the urban rail ground ESS can be divided into AC side access ((1)/(2)) and DC side access ((3)/(4)). Download: Download high-res image (203KB) ... [53] proposed a multi-mode hybrid energy storage fuzzy control strategy. Chong et al. [54] ...

With the rapid development of urban rail transit in China, the problems of increasing operating energy consumption and large voltage fluctuations of the traction network have become increasingly prominent. In recent years, energy storage-type regenerative braking energy absorption and utilization devices with the purpose of energy-saving and voltage regulation ...

DOI: 10.1016/j.est.2024.113155 Corpus ID: 271619247; Improved multi-objective differential evolution algorithm and its application in the capacity configuration of urban rail photovoltaic hybrid energy storage systems

At present, previous studies have shown that regenerative braking energy of urban rail transit trains can reach 30-40% of traction energy consumption [].If the energy storage system equipped on the train can recycle the braking energy, the economical and environmental protection of urban rail transit systems will be greatly improved.

In the field of urban rail transit, an optimal method with the minimum energy storage capacity configuration and an optimal recovery power target has been proposed for an on-board HESS, which can quickly recover braking energy and be used for starting and accelerating. The results showed that this method can effectively reduce operating costs ...

The fourth section applies the IMODE algorithm to configure the capacity of the urban rail photovoltaic-hybrid energy storage system, with specific optimization objectives outlined in Section 4.2. ... Study on Adaptive Energy Management and Optimal Capacity Configuration of Urban Rail Ground Hybrid Energy Storage System [J] Transactions of ...

The installation of stationary supercapacitor energy storage systems in urban rail transit will effectively recover the regenerative braking energy of the trains and reduce the energy consumption ...

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 ...

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. In this paper, a variable gain K iterative learning control (K-ILC) is proposed to balance the DC regulated voltage characteristics and the optimal lifetime of the battery storage system in the ...

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. ... Research on time-phased control strategy of urban rail ground hybrid energy storage device based on train operation status. Trans China Electrotech Soc, 34 (S2 ...

Therefore, the proposed MOGOA is applied to the capacity configuration problem of the urban rail hybrid energy storage systems (with ground batteries and on-board ultracapacitors) of Changsha Metro Line 1 in China, aiming to achieve the minimum voltage fluctuations of DC traction network and the lowest life-cycle cost of HESS simultaneously ...

In recent years, the introduction of Energy Storage System (ESS) into rail transit has increased the ratio of regenerative energy recovery. However, the investment of energy storage devices and ratio of energy saving varies due to different types of ESS. To overcome the problem, hybrid energy storage system (HESS) is an effective solution to ...

MORE The ground hybrid energy storage device of urban rail transit takes into account the functions of absorbing the remaining regenerative braking energy of the train and driving the power failure train as a backup power source. Based on the actual operation status of the urban rail transit power supply system, the paper establishes a simulation ...

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