Deep learning energy storage

In this work, we introduce a hybrid deep learning strategy for optimizing the electrolysis process in solid oxide electrolysis cell (SOEC), utilizing concentrated solar (CS) to preheat the inlet gas. The integration of thermal energy storage (TES) section between CS and SOEC serves to smoothen energy fluctuations, extending the operational ...

Optimal Planning of Hybrid Energy Storage Systems using Curtailed Renewable Energy through Deep Reinforcement Learning Dongju Kang a,, Doeun Kang b,c,, Sumin Hwangbo b,c, Haider Niaz d, Won Bo Lee a, J. Jay Liu d, Jonggeol Na b,c, a School of Chemical and Biological Engineering, Seoul National University, Gwanak-ro 1, Gwanak-gu, Seoul, 08826, Republic of ...

While the need for sustainable energy sources is increasing due to global warming, their power generation capacity is growing significantly worldwide in an effort to reduce greenhouse gases [1], [2], [3].According to the International Renewable Energy Agency report in 2021, the global net generating capacity through renewable sources increased by 2.3 times, ...

This paper presents a hierarchical deep reinforcement learning (DRL) method for the scheduling of energy consumptions of smart home appliances and distributed energy resources (DERs) including an energy storage system (ESS) and an electric vehicle (EV). Compared to Q-learning algorithms based on a discrete action space, the novelty of the ...

The deep learning method can construct a robust mapping between input features and outputs. With input and output sequence lengths increasing, the deep learning method can learn more information about battery anode potential, thereby achieving accurate anode potential construction. ... J. Energy Storage, 46 (2022), Article 103782. View PDF View ...

Secondly, the energy storage management is transformed into Markov decision process and solved by deep reinforcement learning. The state space, action space and reward function of the interaction between agent and environment are established, and the value function is approximated through the deep Q network.

Lithium-ion batteries (LIB) have been widely applied in a multitude of applications such as electric vehicles (EVs) [1], portable electronics [2], and energy storage stations [3]. The key metric for battery performance is the degradation of battery life caused by many charging and discharging events.

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