

# Microgrid with Attention Mechanism

What is a microgrid & how does it work?

Typically, microgrids are internally coupled with multiple energy sources, including renewable energy, energy storage, loads, and microturbines, to achieve integrated scheduling and complementary utilisation of energy. Each microgrid can effectively manage and coordinate the local active and reactive power.

Which model is used to optimize microgrids?

Model 1: Only active optimization is considered, coordinating the microgrids to affect the power flow. Model 2: Uses coordinated active and reactive power optimization, coordinating microgrids and reactive devices to affect power flow. Model 3: Based on Model 2, the reactive power support of microgrid to distribution network is further considered.

Does a microgrid achieve economic optimality by coordinating internal devices?

These two-way interactions highlight that a microgrid achieves economic optimality by coordinating internal devices: a microgrid optimal scheduling model was thus formulated in detail for this work as follows: 2.2.1.

What is the operation status of a microgrid?

The operation status of the devices during the current time period is of particular importance, as the devices in the microgrid are affected by the upper and lower bounds constraints specified as (47) The agent takes actions based on the current state to interact with the environment.

Can microgrids improve the reliability of power systems?

In recent years, microgrids have been increasingly utilised and developed as an effective means of facilitating the consumption of renewable energy sources to enhance the reliability of power systems.

Why is distributed optimization a problem in microgrids?

The first is that each microgrid has internal autonomy in decision making, which makes it difficult to implement centralised regulation, while distributed optimization is slow to converge for non-convex models. In addition, traditional methods in large-scale multi-microgrid scenarios can be slow to solve and convergence cannot be guaranteed.

Market Mechanisms and Trading in Microgrid Local Electricity Markets: A Comprehensive Review ... with growing attention given to transactive energy networks that enable energy trading between ...

To address the issues of instability and inefficiency that the fluctuating and uncertain characteristics of renewable energy sources impose on low-carbon microgrids, this research introduces a novel Knowledge-Data-Driven Load Frequency Control (KDD-LFC) approach. This advanced strategy seamlessly combines pre-existing knowledge frameworks ...

Besides the single microgrid, multi-microgrids (MGs) get more attention to efficiently utilize DERs with the energy share and information exchange among microgrids [13], [14], [15], [16]. Like the application in single microgrid, the blockchain [17] and multi-agent control [18] can be implemented in the multi-microgrids. When the distribution network is considered, ...

This work introduces a novel method for event classification in microgrids, utilizing combined low-rate PMU data and harmonic synchrophasor time series. Central to our approach is the usage of a state-of-the-art transformer neural network, based on the attention mechanism, to effectively discern HIFs from other faulty and non-fault events.

A new voltage compensation mechanism is presented in this study to resolve the control issues of DC microgrid in a distributed manner. In this mechanism, a fractional-order voltage compensation term is used in the outer controller loop which eliminates the voltage deviation in the steady-state condition.

A new voltage compensation mechanism is presented in to resolve the control issues of DC microgrid in a distributed manner. In this mechanism, a fractional-order voltage compensation term is used in the outer controller loop which eliminates the voltage deviation in the steady-state condition, but there is no information regarding state of PV, DG, battery and ...

Direct-current (DC) microgrids have gained worldwide attention in recent decades due to their high system efficiency and simple control. In a self-sufficient energy system, voltage control is an important key to dealing with ...

In recent years, researchers and practitioners have focused a lot of attention on the popular study themes of Industry 4.0, ... presents a complete blockchain-based platform for managing energy that integrates a bilateral trading mechanism and optimizes how a microgrid's energy is distributed. Additionally, a number of industries have seen the ...

sustainability in areas such as microgrids. **KEYWORDS** microgrid, energy management, deep reinforcement learning (deep RL), real power loss, attention mechanism (AM) 1 Introduction 1.1 Background and related works With the exacerbating energy crisis and environmental pollution, solar and wind energy

Considering the variability and uncertainty of solar energy and weather conditions, an attention mechanism is introduced to improve the model's ability to capture critical information. By incorporating an attention mechanism, the model can automatically focus on the most important input variables, enhancing prediction stability.

The attention mechanism can be understood as a process of addressing information, where the attention value is computed by calculating the attention distribution based on the key and associating it with the value. This ...

Power oscillations in microgrid systems, driven by the variability of renewable energy sources like solar and

wind, pose significant operational challenges. These oscillations cause grid ...

Previous research mainly focuses on the short-term energy management of microgrids with H-BES. Two-stage robust optimization is proposed in [11] for the market operation of H-BES, where the uncertainties from RES are modeled by uncertainty sets. A two-stage distributionally robust optimization-based coordinated scheduling of an integrated energy system with H-BES is ...

A multi-agent deep reinforcement learning (MADRL) method is used to protect the data privacy of each microgrids. Moreover, attention mechanism, which pays attention to crucial information, is presented to overcome the problem of slow convergence caused by the dimensionality explosion of the optimized variables. Two types of agents, controlling ...

First, the self-attention mechanism is introduced based on a bidirectional gated recurrent neural network (BiGRU) to explore the time-series characteristics of solar power output and consider the influence of different time nodes on the prediction results. ... Yuchen Duan et al. Prediction and scheduling of multi-energy microgrid based on BiGRU ...

This model is specifically designed for optimizing the energy management of microgrids. The model utilizes a heuristic method to optimize the deep learning model for energy management. ... Attention mechanism time series depthwise separable CNN: Enhanced prediction accuracy using attention mechanism: UCI: Prediction accuracy of 88.9%: Need for ...

Web: <https://www.arcingenieroslaspalmas.es>