Microgrid Game Theory Paper

How can a microgrid based on Mas be used in a game?
Establish a structure of microgrid based on MAS to study the behavior of different investors accuratelyin a game,by which the agents can simulate the rational people's action,including cooperation and non-cooperation,and the game process can be presented more smartly. Validate the proposed game model through case analysis.

What is the main objective of a microgrid?
In the isolated mode,a microgrid can meet a large portion of the energy demand of the consumers under its coverage using its generation units. In general,in the modern power systems,the main objective of a microgrid is the reliable supply of energy to its consumers with minimum cost and high reliability. 1.2. Literature review

What is a scenario-based model for energy management of a microgrid?
In , a scenario-based model is introduced for the energy management of a microgrid considering DR programs. In the proposed model, wind turbines, PV panels, fuel cells, and combined heat and power (CHP) units served as the distributed energy sources.

Does microgrid configuration affect energy consumption scheduling?
The joint optimization of microgrid configuration and energy consumption scheduling is formulated as a leader-follower Stackelberg game to model the coordination between microgrid configuration and energy consumption scheduling , while the uncertainty of wind power and solar power is not considered either.

How did microgrid No 4 solve a generation deficit?
In microgrid no. 4,as seen in Figure (6-d),a very large portion of the microgrid load demand was met by the wind turbine and the generation deficit was tackled by buying from the network. However,the purchased load was extremely lower than the other microgrids.

Why do microgrids purchase less energy at noon?
Considering Figure (6-a),microgrid no. 1 purchase less energy from the network at noon,which was caused by the presence of PV panelsin this microgrid and supply of a large portion of the consumers' demand by PVs within these hours.

Nash game theory and the Q-learning algorithm. Finally, the efficiency and effectiveness of the proposed method were validated, which were verified by real-world case studies. Keywords: Multi-energy microgrid, coordinated scheduling, multi-agent, game theory, Nash Q learning. NONMENCLATURE Symbols

In this paper, two techniques of game theory are considered for sizing and comparative analysis of a grid-connected networked microgrid, based on a multi-objective imperialistic competition ...

An unprecedented game theoretic model is proposed by means of Stackelberg strategy to peruse the competition among MGs aggregators and DSO in order to attain the equilibrium point that can maximize the profit of all players who participate in retail market. In the competitive electricity markets, each microgrid (MG) aggregator strives to maximize its own ...

Abstract: This paper introduces a multi-objective optimization based on a game theory technique for sizing and cost minimization of a grid-connected multi-microgrids. The multi-microgrid ...

This paper proposes game theory method to solve the multi-objective optimal operation problem of microgrid. By converting the initial objects into game players and the functions to utility ...

Day-ahead dispatch of microgrid is based on game theory in this paper. To be specific, utility is the leader in this game, and it has the right to determine the price of electricity, include electricity purchased from users and sold to users. After the price is announced by utility, users draw up plans accordingly. These plans publish the quantity

Game theory is a branch of applied mathematics that is, most notably, used in economics as well as in engineering and other disciplines. Game theory attempts to mathematically capture ...

Simulation results show that the proposed algorithm yields a reduction in terms of the average power losses (over the distribution line) per micro-grid, reaching up to 31% improvement relative to the non-cooperative case. Micro-grid distribution networks that use distributed energy sources are expected to lie at the heart of the emerging smart grid ...

This paper focuses on performing peer-to-peer (P2P) energy trading in a grid-tied multi-microgrid system (MMS). To do so, three microgrids, each consisting of distributed energy resources (DERs ...

This paper proposes a novel game-theoretic model for peer-to-peer (P2P) energy trading among the pro-sumers in a community. The buyers can adjust the energy consumption behavior based on the price ...

This paper presents an interactive algorithm based on game theory for optimizing an energy management system (EMS) of a microgrid. As agents in game, load, storage and energy resources adopt an individual strategy and through a potential game, they are able to reach a Nash Equilibrium. Results show energy dispatch for four different agents conditions, ...

Future distribution networks may consist of several microgrids. In this paper, a new method is proposed based on the game theory to form the microgrids coalitions. Compared to the previous methods, the proposed method takes into account both power losses and service charge in the bidding strategy of microgrids and calculation of their utility.

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In the transactional processes within a multi-building microgrid system, it is imperative to safeguard stakeholders" interests and ensure stable, economically efficient operation. Therefore, this paper proposes an integrated interactive control of distribution systems with multi-building microgrids based on game theory. Initially, an interactive framework ...

The proposed multi-objective problem in this paper is converted into a single-objective problem by employing a cooperative game theory approach and a mixed integer nonlinear programming ...

To improve the efficiency of the entire network rather than focusing on improving the efficiency and reliability of each microgrid, this paper proposes a coalitional-game-theory-based local power ...

Aiming at the energy optimization problem of multi-microgrid system, a energy optimization method of multi-microgrid system is proposed based on cooperative game theory in this paper. Firstly, taking economic cost as the objective function, a cooperative game model of multi-microgrid system is established based on the cooperative game theory. Secondly, taking ...

This paper focuses on performing peer-to-peer (P2P) energy trading in a grid-tied multi-microgrid system (MMS), and develops a game theory-based structure to derive, solve, and verify the multi-objective function (MoF) with the intention of allocating the correct sizing of each DER and finding out the optimum payoff values.

The fundamental concepts of game theory are streamlined, an overview on the applications of game theoretical concepts in various micro-grid optimization problems are presented, a novel game theory approach to micro-grid design and analysis is presented. The technology of Smart Grid is believed to be the future of power system networks. Smart Grid ...

Simulation results show the convergence of the algorithms and the effectiveness of the proposed model to handle P2P energy trading, and it is emerging as an alternative to cost-intensive energy storage systems. This paper proposes a novel game-theoretic model for peer-to-peer (P2P) energy trading among the prosumers in a community. The buyers can adjust the ...

Simulation results verified the effectiveness and good convergence of the proposed method and demonstrated that the proposed hierarchical game strategy can improve the economic benefits of each participant, which is conducive to the establishment of friendly grid-connected MGC. To realize the win-win benefits and resource coordination of the multilevel operating entities of a ...

In this paper, a structure of a microgrid based on multi-agent system (MAS) is established, and a game-theory-based optimization model is presented for the capacity configuration of these agents. The economic interests between the agents and their actions are analyzed by the game model.

The optimal operation of microgrid (MG) is an important problem to attain significant benefits, which mainly improves the cost reduction in energy operation and also lowers the emission of environmental pollutants. The integration of renewable energy sources is one of the key factors to achieve significant microgrid operational benefits. A multi-objective MG optimal operation ...

In this paper, a hybrid RTG crane consisting of a small-sized diesel generator (DG), a ternary material lithium battery, and a supercapacitor (SC) is studied, and a hybrid RTG crane energy ...

The ever-growing penetration rate of distributed energy resources in the building sector, coupled with the ongoing improvements in electrification policies within the transportation industry, has posed challenges to cost-effectiveness and reliable operation of the utility grid. This study conducts a comparative study on electricity transactions between multi-microgrids comprising ...

This paper proposes two different techniques of cooperative game theory to optimize the sizes of generation resources and batteries, and maximize the profit of clustered microgrid in grid ...

This paper presents a novel coordinated energy management approach for hybrid AC/DC distribution system with microgrid clusters considering multiple market players, which is modeled as a bi-level optimization problem by using non-cooperative game theory and robust optimization. This paper presents a novel coordinated energy management approach for ...

This paper presents a hierarchical microgrid management system using task sharing and an evolutionary game theory based dispatch strategy as a coordination algorithm to integrate the three main control levels needed for microgrid operation, which can be considered as a distributed intelligent system. Expand

This paper introduces static and dynamic competitive optimal control of DC/DC converters in DC microgrids based on game theory considering mutual effects. Using static and dynamic game theories, the conditions for competitive optimal control of DC/DC converters in Nash equilibrium with static and dynamic states are determined.

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Based on the analysis of the characteristics of microgrid power generation, low network loss and low pollution, the microgrid power market is established based on multi-agent theory to solve the power interaction between microgrid (MG) and active power distribution network. Considering an imperfectly competitive power market, the Nash game theory is used ...

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