

The PV generation system is composed of multiple PV generation modules, each consisting of a PV array and a boost converter directly connected to the common DC bus. For the purpose of maximizing the utilization, it is assumed that the PV generation system can always operate at the maximum power point.

It is estimated that by 2030, the share of global renewable energy generation in total power generation will increase from 10 % in 2021 to 40 % and will further increase to 70 % in 2050 (Biorl, 2022). At the same time, the PV industry has achieved rapid growth over the past decades in China and contributed significantly to the global energy supply.

For the first optimization process in getting the optimal BESS output power for each hour, the maximum iteration number and the population size, n in all algorithms, are set to be 50 and 10, respectively, while, for the second optimization process in obtaining the optimal BESS size, those parameters are set to be 100 and 50, respectively, for three algorithms, ...

Photovoltaic power generation is episodic and volatile because of the climate and environmental influences (Rahman et al., 2022). The episodic and volatile impacts the stability and reliability of the electrical grid when connected (Ren et al., 2022). Accurate photovoltaic power forecasting facilitates photovoltaic grid connection safety and helps users to make decisions ...

This paper presents a new capabilities methodology with accurate analysis to simulate the intermittent nature of SPV energy including normal generators associated with ...

1. Introduction In the past ten years, the PV power generation technology has been developing rapidly. Since the cost of power generation has been decreasing and this technology has very low carbon emission in the process of power generation, it will be the most promising source of electricity.

Compared with the traversal algorithm, NSGA-II saves 94% of the computation time and provides more accurate size specifications for the PV and battery integrated system. ...

The massive deployment of photovoltaic solar energy generation systems represents a concrete and promising response to the environmental and energy challenges of our society []. Moreover, the integration of renewable energy sources in the traditional network leads to the concept of smart grid []. According to author [], the smart grid is the new evolution of the ...

The irradiance data of a certain place in a certain year are shown in Figure 12 can be seen from the figure that the irradiation intensity is relatively high in summer and ...

Another graphical technique has been given by Bin et al. [4], Kaabeche et al. [5] and Markvart [6], to optimally design a hybrid solar-wind power generation system. However, in both graphical methods, only two parameters (either PV and battery, or PV and wind turbine) were included in the optimization process.

Yong Zhang, Wei Wei, Decentralised coordination control strategy of the PV generator, storage battery and hydrogen production unit in islanded AC microgrid, IET Renewable Power Generation, 10.1049/iet-rpg.2019.0842, 14, 6, (1053-1062), (2020).

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