# Fuzzy control applied to microgrid

## Overview

Can a fuzzy logic-based energy management system improve microgrid performance?

This paper proposes a fuzzy logic-based energy management system (EMS) for microgrids with a combined battery and hydrogen energy storage system (ESS), which ensures the power balance according to the load demand at the time that it takes into account the improvement of the microgrid performance from a technical and economic point of view.

Can fuzzy logic control be used to design an isolated microgrid?

Since fuzzy logic control (FLC) has proven to be a powerful tool for dealing with the nonlinearities of a microgrid and the application of fuzzy-based EMS for isolated microgrids is rarely reported in the literature, this study proposes the application of an FLC for the EMS's design of an isolated microgrid.

Can fuzzy systems detect faults in microgrids?

Based on this, Bukhariet et al. [ 32] developed two different fuzzy systems to detect, classify, and locate the faults in microgrids, and Oliveira et al. [ 10] proposed a fuzzy-based methodology approach for microgrids under an islanded operation that aimed to maximize the number of supplied customers during a minimum period of time.

Can fuzzy-based EMS be used for grid-connected microgrids?

On the one hand, regarding fuzzy-based EMS for grid-connected microgrids, the authors in design an EMS for a microgrid comprising PV and WT generators, battery ESS, electric vehicles (EV), and dynamic electricity prices and tariffs.

What is the proposed microgrid system?

The proposed microgrid comprises a hybrid photovoltaic (PV) and wind system that is integrated with a battery storage system. This integrated setup is

designed to provide power to an off-grid community. Figure 1 depicts the schematic representation of the proposed microgrid system.

What is a microgrid (MG)?

The Microgrid (MG) consists of a hybrid photovoltaic (PV) system and a wind energy conversion system (WECS) that utilizes a permanent magnet synchronous generator (PMSG). The system employs an optimal torque-controlled maximum power point technique (MPPT) algorithm to optimize power output.

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### Intelligent Type-2 Fuzzy Logic Controller for Hybrid ...

Several studies focus on utilizing Type-2 FLC in energy management, such as for AC microgrid control [31,32,33,34,35]; battery storage integration into DC microgrids [36,37,38], among other studies.

### Energy Management and Voltage Control in ...

Microgrids, comprising distributed generation, energy storage systems, and loads, have recently piqued users' interest as a potentially viable renewable energy solution for combating climate change. According to the ...

### Scalable Fuzzy Control for Nonlinear DC Microgrids Under Plug ...

This article proposes a novel scalable fuzzy voltage control scheme for nonlinear direct current microgrids (DCmGs) composed of DGUs and constant power loads (CPLs) interconnected via ...

### Fuzzy Droop Control for SOC Balance and Stability Analysis of DC

The unbalanced state of charge (SOC) of distributed energy storage systems (DESSs) in autonomous DC microgrid causes energy storage units (ESUs) to terminate operation due to ...


## Adaptive intelligent techniques for microgrid control systems: ...

Fuzzy Logic Control Applied for Microgrids References o Fuzzy logic control is utilized to find the required performance of four area systems with proportional integral control.

## A Fuzzy Control Strategy for Coordination of Solar PV and Battery

4 ???· Abstract --In this paper, a robust fuzzy control strategy is. proposed for the coordination of a pho tovoltaic system with. maximum power point tracking control and battery ...

## Fuzzy Logic Control of a Battery Energy Storage System for ...

Article Fuzzy Logic Control of a Battery Energy Storage System for Stability Improvement in an Islanded Microgrid Naowarat Tephiruk 1,*,+, Weerawoot Kanokbannakorn 1, Thongchart ...

## Adaptive intelligent techniques for microgrid control systems: A ...

Fuzzy logic control applied for microgrids References o Fuzzy logic control is utilized to find the required performance of four area systems with proportional integral control ...

## Scalable Fuzzy Control for Nonlinear DC Microgrids Under Plug ...

The plugging-in/-out of renewable distributed generation units (DGUs) often alters the microgrid size and coupling terms, resulting in computational burdens and voltage shocks. This article ...

## Distributed Consensus Fuzzy Control Method and Fractional Order Control ...

Although field medical microgrids have been widely studied as an important component of future medical power systems, current sharing control in field medical microgrids ...

## Optimal battery management in PV + WT micro-grid using MSMA ...

1 ??· In modern energy systems, managing energy within a microgrid (MG) poses significant challenges due to the unpredictable nature of renewable energy sources. This article ...

## Fuzzy-Based Efficient Control of DC Microgrid Configuration for PV

The bidirectional converter provides a regulated output with a fuzzy logic controller (FLC) during charging and discharging. The fuzzy control is implemented to maintain a decentralized power ...

## A novel control approach based on hybrid Fuzzy Logic and ...

An adaptive sliding mode controller (ASMC) based on fuzzy logic is applied to control hybrid smart microgrid power systems under uncertainty and the Lyapunov theory proves the stability of the ...

## (PDF) Voltage stability of a photovoltaic DC microgrid using fuzzy

This article employs a fuzzy logic controller (FLC) to investigate voltage stability in a PV-based DC microgrid. Several photovoltaic (PV) modules, a DC-DC converter, and loads ...


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