Consensus secondary control in power system

This paper presents the application of fuzzy logic PID secondary voltage control to the Egyptian power system model. ... a consensus protocol for secondary control of voltage and frequency was ...

This paper introduces a consensus-based secondary distributed control approach to restore critical bus voltages to their nominal values and properly distribute current among converters. The critical bus takes the lead in ...

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In this overview, the consensus-based DSC methods are classified into five groups of dynamic consensus, leader-follower consensus, finite-time consensus, PI consensus, and event-triggered consensus. These consensus-based DSC strategies are investigated, ...

With the help of the communication systems in power systems [11], the secondary control is converted to a consensus-based control to realize voltage restoration and proportional current sharing [12], [13]. As every coin has two sides, the introduction of sparse communication networks inevitably leads to communication delays [14].

for each battery converter. This design combines consensus control with secondary frequency control. When the system has a load change, the proposed control can bring system frequency back to the nominal value and keep the battery SoC/power consensus. The proposed control is validated by simulation of a high fidelity 14-bus microgrid model ...

Recently, a few attempts have been made to solve the problem of ESUs participating in the LFC of power systems. For instance, the authors in [33] consider the impact of the HESS on the deregulated power system and provide a PI-based cascade controller for the LFC design. The authors in [34] take the ESS and the demand response into account and ...

In this paper, a simplified consensus-based distributed secondary control for BESSs in DC microgrids is proposed with only one virtually defined state variable being transmitted, ...

The main idea of consensus technique for secondary control is to calculate the secondary terms by an algorithm using local and transmitted measured signals and errors. ... When secondary control is activated, power-sharing is affected, and deviations are clearly produced. However, the nature of the consensus control algorithm allows to rapidly ...

In this paper, a consensus-based multiagent system (MAS) is proposed as a solution to restore voltage/frequency deviations and enable true power sharing. The invention of an Intelligent Distributed

Secondary Control Scheme (IDSCS) can efficiently achieve hoped-for outcomes. The proposed IDSCS features estimation and compensation sublayers.

This framework proposes a distributed resilient finite-time secondary control scheme so that DC bus voltage regulation, active power sharing, and energy level balancing of BESSs while maintaining the state of charge (SoC) of the individual BESS remain in the safe range. ... the analysis of these consensus control based system performances ...

For effective control of battery energy storage units, a Voltage-Power (V-P) reference-based droop control and leader-follower consensus method is employed. The control approach consists of ...

In this paper, distributed secondary control of AC microgrid (MG) is studied and the influence of communication delay on its control performance is analyzed and verified. Firstly, a secondary control strategy for the MG is designed to achieve frequency recovery and proportional active power dispatch. Secondly, the stability of the MG system is analyzed in the frequency ...

Figure 1. Series-connected DC MGs formed by DGs interconnected through power lines. Figure 2. Electrical structure of ith DG with resistive load.; Figure 3. Structure of the optimal cooperative secondary control strategies based on the FA-MAS model: $ u_{r,i}^{[1]} $ and $ u_{r,i}^{[2]} $, respectively denote proportional and economic current sharing. ...

DOI: 10.1016/j.ijepes.2023.109627 Corpus ID: 265081676; A simplified consensus-based distributed secondary control for battery energy storage systems in DC microgrids @article{Su2024ASC, title={A simplified consensus-based distributed secondary control for battery energy storage systems in DC microgrids}, author={Jialei Su and Kang Li and Chen ...

In this overview, the consensus-based DSC methods are classified into five groups of dynamic consensus, leader-follower consensus, finite-time consensus, PI consensus, and event-triggered consensus. These consensus-based DSC strategies are investigated, reviewed, and assessed in detail.

It consists of three layers of control: primary control, secondary control, and tertiary control. At the primary level, to improve current sharing performance, droop control is usually applied.

A novel distributed secondary control based on PI consensus algorithm is proposed to realize the restoration of voltage/frequency and also accurate reactive/active power allocation and a detailed small-signal model is established to show the impact on the system stability. The conventional voltage observer based distributed control can make a tradeoff between voltage ...

a secondary frequency control via simulation results. Index Terms--Consensus method, subgradient method, eco-nomic dispatch, frequency regulation, power system tool box. I. INTRODUCTION The objective of this

paper is to propose and implement a distributed control algorithm based on consensus and sub-gradient method.

This paper introduces a consensus-based secondary distributed control approach to restore critical bus voltages to their nominal values and properly distribute current among converters.

The proposed distributed secondary consensus-based FTC method is applied and verified using a hypothetical multi-agent MG system. Fig. 3 shows the schematic single-line diagram of the multi-agent MG test system, and Table 4 represents the parameters of the MG test system, including the load, DGs, and line parameters. A communication topology graph ...

In this paper, a simplified consensus-based distributed secondary control for BESSs in DC microgrids is proposed with only one virtually defined state variable being transmitted, where a cascaded control framework consisting of an SoC controller and a voltage controller is used to regulate DC bus voltages.

The disturbance observer is designed to supplement the secondary frequency control for the ESA, therefore the system frequency response and recovery can be improved and the effectiveness of the entire scheme for power system frequency control is validated under a variety of scenarios that include contingency and normal operation. In future power systems, ...

In this paper, a consensus-based multiagent system (MAS) is proposed as a solution to restore voltage/frequency deviations and enable true power sharing. The invention ...

Semantic Scholar extracted view of "Consensus-based secondary frequency control under denial-of-service attacks of distributed generations for microgrids" by Bingyu Wang et al. ... The cybersecurity issues of the power systems during the LFC operation is studied, and a survey is conducted on the security analysis of LFC. Expand. 15. PDF.

Distributed cooperative control methods are widely used in the islanded microgrid control system. To solve the deviation of frequency and voltage caused by the droop control, it is necessary to recovery the frequency ...

It can be seen from group 1 in Table 4 that before the secondary control is added, the output voltage of each unit is lower than the voltage reference value, the average voltage deviation is 4.13 V, and the output current of each converter does not satisfy the ratio of the droop coefficient. The average current deviation is large. It can be seen that after adding the ...

Multi-terminal DC transmission (MTDC) systems have attracted much attention due to their significant advantages in long-distance and high-capacity transmission. To improve their reliability and operation performance, a distributed fixed-time secondary control of frequency restoration and active power sharing is proposed under event-triggered communication, which ...

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In this paper, a distributed self-triggered H ? consensus-based secondary control scheme is proposed to be used in voltage and frequency restoration control of AC MGs system. In the research, the external interference, the uncertainty of the communication link, the time-varying delay, and several common instability factors in topology ...

To conduct the simulations, while applying the proposed control in and (), All the DGs are connected to the microgrid at 0 s imposing the frequency of the microgrid as well as the voltage of each Bus and supplies the loads connected to the microgrid while applying the conventional droop control up to t = 10 s.At t = 10s the proposed consensus-based nonlinear ...

Due to advances of distributed control in multi-agent systems (Olfati-Saber et al., 2007), the distributed consensus-based secondary control has been considered in isolated MG (Yazdanian and Mehrizi-Sani, 2014).The methods can achieve general agreements among connected agents by exchanging local information only, thus it needs less requirement on ...