Microgrid current sharing

Does current sharing influence voltage regulation in DC microgrids?
5. Conclusions This paper studied the mechanism of interaction between current sharing and voltage regulation in DC microgrids, according to which, a novel control method was proposed which takes into account the degree of compromise of current sharing and voltage consensus, and can precisely regulate the bus voltage of a critical node.

Is dynamic current sharing a problem in a dc microgrid?
The dynamic current sharing in a hybrid energy storage system and maintaining state of charge within boundaries and voltage regulation in the presence of a power pulse load issue in a DC microgrid might be an interesting research topic for future work.

What is load sharing in DC microgrids?
Load sharing means to ensure a fair power allocation amongst DGs. In DC microgrids,the objective of load sharing is often implemented in terms of current sharing (Dragicevic et al.,2015). To achieve these objectives,usually a hierarchical control scheme is adopted in DC microgrids (Bidram &Davoudi,2012).

What are the control objectives of DC microgrids?
In the present paper,we focus on two main control objectives in the operation of DC microgrids,namely voltage regulation and load sharing. Voltage regulation seeks to maintain the bus voltages within a reasonable neighborhood around their rated values. Load sharing means to ensure a fair power allocation amongst DGs.

Does droop control affect current sharing in Multi-Bus DC microgrids?
For multi-bus DC microgrids,accurate current sharing will be deterioratedby uncertain resistances between buses (Beerten &Belmans,2013). To achieve accurate current sharing,an established way is to employ consensus based cooperative control strategies to compensate droop control (Nasirian et al.,2015).

Can a multi-bus dc microgrid be modeled?
Generic meshed DC microgrids with long-distance transmission lines can be modeledby multi-bus DC microgrids,where impedances of the transmission lines cannot be neglected. In multi-bus DC microgrids,voltage regulation and current sharing turn out to be conflicting objectives (Han et al.,2019).

current sharing and voltage stability in islanded DC microgrids at the same time. In this paper, a novel current-sharing control strategy based on injected small ac voltage with low frequency and low amplitude is proposed for multiple paralleled DC-DC converters. The small ac voltage is superimposed onto the output voltage of each converter.

The DC microgrid has become a new trend for microgrid study with the advantages of high reliability, simple control and low losses. With regard to the drawbacks of the traditional droop control strategies, an improved

DC ...

2 ???· The main difficulties facing the operation of parallel converters in DC microgrids (DCMGs) are load sharing, circulation current, and bus voltage regulation. A droop controller is ...

To elucidate the impact of the advanced accurate current sharing strategy, the current distribution of the ESUs during both charging and discharging phases is graphically represented in Fig. 2, where V pcc and V" pcc are the common point voltages of the ESUs at the beginning of discharging and charging, respectively. Owing to line impedance, the attainment ...

Due to the increasing popularity of DC loads and the potential for higher efficiency, DC microgrids are gaining significant attention. DC microgrids utilize multiple parallel converters to deliver sufficient power to the load. However, a key challenge arises when connecting these converters to a common DC bus: maintaining voltage regulation and ...

This paper addresses load current sharing and circulating current issues of parallel-connected DC-DC converters in low-voltage DC microgrid. Droop control is the popular technique for load current ...

DC Bus Voltage Restoration, proportional current-sharing and SOCs balancing are the leading vital challenges in the field of DC microgrids. It seems that, using communication links and a central ...

The conventional droop control is used to equalise per unit current sharing similar to reactive power sharing in an ac microgrid. Nevertheless, the problem in conventional droop control is that equal current leads to a reduction of dc bus reference voltage and voltage regulation becoming unequal across each node due to unequal line resistance drop.

Abstract: A decentralised control method that deals with current sharing issues in dc microgrids (MGs) is proposed in this study. The proposed method is formulated in terms of "modified global indicator" concept, which was originally proposed to improve reactive power sharing in ac MGs. In this work, the"modified global indicator ...

current sharing and voltage stability in islanded DC microgrids at the same time. In this paper, a novel current-sharing control strategy based on injected small ac voltage with low frequency ...

Droop control is the basic control method for load current sharing in dc microgrid applications. The conventional dc droop control method is realized by linearly reducing the dc output voltage as ...

The primary focus in multi-bus DC microgrid systems is to achieve simultaneous proportional current sharing and network average voltage regulation. Conventionally, communication-based secondary, along with droop control, is used to achieve ...

current sharing accuracy in the dc microgrid [3], which is shown in Fig. 2a. The centralised secondary controller compares the reference bus voltage with an average of the output voltage of all converters and after processing in the proportional-integral (PI)

The integration of adjacent dc microgrids (MGs) results in the formation of a dc MG cluster which can increase the system power supply capacity. This article proposes a control strategy for dc MG clusters which combines communication-free control and distributed fixed-time control to simultaneously achieve current sharing and voltage regulation with excellent transient ...

2.2 Current sharing in DC microgrids. A DC source in this study is considered to be a bidirectional DC-DC converter attached to a battery. The battery is assumed to have an arbitrary capacity for the analysis since energy limitations are not considered, however, some limitations can be imposed in the form of power or current constraints as shown later in the paper.

This paper provides a new adaptive control approach for DC microgrid applications that satisfies both accurate current sharing and appropriate voltage regulation depending on the loading state. As the load increases in ...

In isolated operation, DC microgrids require multiple distributed energy storage units (DESUs) to accommodate the variability of distributed generation (DG). The traditional control strategy has the problem of uneven allocation of load current when the line impedance is not matched. As the state-of-charge (SOC) balancing proceeds, the SOC difference gradually ...

This article proposes a control strategy for dc MG clusters which combines communication-free control and distributed fixed-time control to simultaneously achieve current sharing and voltage ...

DOI: 10.1016/j.est.2020.101509 Corpus ID: 219769325; Dynamic current sharing, voltage and SOC regulation for HESS based DC microgrid using CPISMC technique @article{Singh2020DynamicCS, title={Dynamic current sharing, voltage and SOC regulation for HESS based DC microgrid using CPISMC technique}, author={Prashant Singh and Jagdeep ...

The isolated dual active bridge DC/DC converter is widely used in power electronic conversion systems due to its security, scalability, and easily realized soft switching. Meanwhile, interleaved technology is also widely used in high current conversion applications due to its low current ripple. Current sharing characteristics are analyzed in detail in this paper ...

In isolated operation, DC microgrids require multiple distributed energy storage units (DESUs) to accommodate the variability of distributed generation (DG). The traditional control strategy has the problem of uneven ...

A multi-objective optimization approach based on reinforcement learning and interactive fuzzy programming is proposed to regulate the system voltage, minimize the total power loss, and ...

Microgrid current sharing

In the DC microgrid, control method is the most crucial factor for power balance and the stable operation of a system [].Parallel DGs are expected to proportionally share load current in accordance with their rated value in the case of overcurrent, overheat, or the unnecessary damage of some converters [10, 11].As a decentralized method, droop control [] ...

An MPC-based consensus algorithm is proposed for current sharing in Direct Current (DC) microgrids. The proposed controller also ensures that both the buck converter output voltages as well as the load voltages remain within an acceptable range. The MPC scheme is designed using the notion of so-called finite-step control Lyapunov functions.

Although the current sharing control of dc microgrids has been widely studied, the high communication bandwidth and global communication network structure information demands hander the renewable ...

The primary focus in multi-bus DC microgrid systems is to achieve simultaneous proportional current sharing and network average voltage regulation. Conventionally, communication-based secondary, along with droop control, is used to achieve these objectives by exchanging both current and voltage information among distributed ...

A DC microgrid is an efficient way to combine diverse sources; conventional droop control is unable to achieve both accurate current sharing and required voltage regulation. This paper provides a new adaptive control approach for DC microgrid applications that satisfies both accurate current sharing and appropriate voltage regulation depending on the loading ...

Index Terms--Current sharing, droop control, DC microgrid, parallel converters, power sharing. I TRODUCTION The global shift toward renewable energy sources such as solar and wind is driven by both environmental necessity and policies around the world [1], [2]. Integrating these resources into power grids, potentially as a microgrid, offers ...

This paper intends to design a distributed and event-triggered secondary control method for current sharing and voltage regulation of a DC microgrid so as to significantly reduce the communication ...

An important issue in DC microgrid operation is to ensure proper current sharing among converters. While this has been addressed through droop control, the resulting voltage deviation in DC bus ...

4 ???· A secondary controller based on cooperative control was proposed in, regulating bus voltage through a voltage observer while improving current-sharing accuracy with a current regulator. In [19], a "virtual voltage drop" was created ...

Distributed dynamic event-triggered control for resilience-oriented current sharing in microgrid. Guoxiu Jing, Junqi Liu, Tianyang Zhao, Bonan Huang, Rui Wang. Department of Electronic & Electrical Engineering;

College of Information Science and Engineering, Northeastern University;

Web: https://www.mzanzipestcontrol.co.za