Reasons for resonance in microgrids

What causes small-signal stability in microgrids?
Stability in microgrid [11, 30]. Small-signal stability in MGs can arise from various sources such as continuous fluctuations of the RE-based system, the feedback controller, the small change in load, parameter variations, and a lack of damping due to the low-inertia characteristics of MG [11].

Do Re-based generators have small-signal instability and resonance issues?
Critical reviews of the dynamic characteristics of RE-based generators, their components, small-signal stability performance and interaction in the MG environment have been presented in this paper. It addresses possible small-signal instability and resonance issues within MG, leading to the identification of future research areas.

Why is resonance phenomenon important in MG?
Under an autonomous mode of operation, interaction or resonance phenomenon is very crucial since it can severely affect the quality of supply, worsen distortion, reduce damping, and eventually lead to instability of the whole system [95, 96]. Low-frequency interaction among DG units within MG is presented in [28, 51].

What causes resonance in a power system?
The resonance phenomenon potentially emerges when the modes align both in damping and frequency of oscillation[6]. The number of connected converter-based DG units in a grid influenced the resonance of the power system.

Where can I find information about energy-based microgrid?
Available online: https://0183212399/Influence-of-Renewable-Energy-based-Microgrid.pdf (accessed on 10 October 2022). Jalali, S.G.; Lasseter, R.H. Harmonic interaction of power systems with static switching circuits.

What is a microgrid (MG) system?
School of Electrical,Computer,and Telecommunications,University of Wollongong,Wollongong,NSW 2522,Australia Author to whom correspondence should be addressed. The microgrid (MG) system is a controlled and supervised power systemconsisting of renewable energy (RE)-based distributed generation (DG) units,loads,and energy storage.

Based on the sensitivity analysis, controller gains and DC-link capacitance are identified as the most critical parameters and substantially influence the weak modes leading ...

this study, the propagation of resonance in a microgrid (MG) with inverter-based distributed generators (IBDGs) is investigated. If resonances are not properly damped, then the output ...

In this paper, the frequency domain analysis method and the mode analysis method are combined to analyze the resonance characteristics of the medium-voltage ...

1.1.1 Microgrid Concept. Power generation methods using nonconventional energy resources such as solar photovoltaic (PV) energy, wind energy, fuel cells, hydropower, combined heat and power systems (CHP), biogas, etc. are referred to as distributed generation (DG) [1,2,3].The digital transformation of distributed systems leads to active distribution ...

Multi-microgrids (MMGs) provide an effective solution for further improving the overall economy and ensuring resilience under major disasters, while high penetration level of ...

Most of the prior studies have considered a constant power load for the high-frequency and resonance assessment of DC microgrids. This work has considered the various types of loads in the DC microgrid and their impact on the overall high-frequency oscillations and resonance. ... For this reason, the eigenvalue and participation factor analyses ...

This paper develops useful tools to address resonance phenomena in islanded microgrids (MGs). ... of harmonic voltages along a long feeder and reveals the reasons for the multiple resonances in ...

This reason justifies the trends in the use of microgrids. The growing level of demand for electricity, the lower efficiency of the existing power grid and the reduction in the cost of RES technologies (photoelectric and wind), as well as problems with the regulation of greenhouse gas emissions, encourage people to upgrade the traditional power system to a ...

At the resonance frequency, the LCL filter resonance causes a sharp phase step down of -180° with a high resonance peak. This resonance peak would easily lead to system instability and should ...

This paper firstly presents an equivalent coupling circuit modeling of multi-parallel inverters in microgrid operating in grid-connected mode. By using the model, the coupling resonance phenomena are explicitly ...

In order to reduce greenhouse gases, distributed generators such as wind turbines and photovoltaic facilities have been adopted in many parts of the world. These sources are assumed to be connected to an infinite bus. Thus, if the total capacity of the grid-connected inverters is approximately equal to or greater than that of conventional synchronous ...

The microgrid (MG) system is a controlled and supervised power system consisting of renewable energy (RE)-based distributed generation (DG) units, loads, and energy storage.

Disturbances, including uncertinities are a common phenomenon in power grids, and they can occur in source or load side at different time or simultaneously in both sides. Among the most frequent disturbances, source and load uncertainties are considered as the most catastrophic features. These disturbances can deteriorate the

performances of the associate ...

DOI: 10.1016/J.IJEPES.2018.08.038 Corpus ID: 115519650; Resonance analysis and active damping strategy for shipboard DC zonal distribution network @article{Lin2019ResonanceAA, title={Resonance analysis and active damping strategy for shipboard DC zonal distribution network}, author={Gang Lin and Yong Li and Jiayan Liu and Chang Li}, journal={International ...

It is essential to assess the resonance phenomenon to quantify the strength of resonance and risk of instability and appropriate mitigation or prevention. A lack of understanding of the resonance in the MG environment ...

The CSC control parameters aect the system resonance frequency and resonance center, and when the grid-connected inverter circuit parameters are dierent, the mode of system resonance will also change. The combination of frequency domain analysis and modal analysis is an effective means to study the resonance stability of microgrid cluster systems.

The authors of proposed an active damping controller based on filters to lessen the unwanted resonance in microgrids caused by LCL settings. Another study suggested a shunt active filter for an active damping controller to reduce the LCL filter"s resonance. The paper also presented an additional auxiliary converter, coupled in series with a ...

This paper studies a resonance suppression control based on virtual resistance concept for parallel inverters in islanded microgrids. At the inverter systems with LC output filters, resonances often occur due to various reasons. To suppress the resonances, additional resistances are often used to dampen the system (passive damping). However, ...

For this reason, many researchers have already studied, which enables an inverter to be operated as an SG. Some of them are called virtual SG (VSG) control, and the common point of them is to provide virtual inertia. In this paper, we have derived and analyzed a formula for the dynamic stability of microgrids and shown that the VSG expressed in ...

microgrids, and ultimately improve the reliability, efficiency, and ... electro-mechanical torque imbalance causes rotor speed oscillations. With the increase of inertia of the IM, ... Sub-synchronous (or torsional) resonance (SSR) is an important problem in power system, which was first occurred in south Nevada in 1970 [28]. SSR is a condition ...

The microgrid (MG) system is a controlled and supervised power system consisting of renewable energy (RE)-based distributed generation (DG) units, loads, and energy storage. The MG can be operated ...

Microgrids are local power grids that can be operated independently of the main - and generally much bigger - electricity grid in an area. Microgrids can be used to power a single building, like a hospital or police station, or a collection of buildings, like an industrial park, university campus, military base or neighbourhood. Groups

of ...

A comprehensive analysis is carried out to investigate the high-frequency (HF) oscillations and their leading causes in dc microgrids. The analysis relies on the impedance-based stability criterion. It is shown for the first time that all types of DGs and loads contribute to the HF oscillations in a dc microgrid. This is in contrast with the previous studies that designate ...

The development of distributed generation based microgrids with high penetration of electronically interfaced systems shows great interest in various applications. These ...

A unified autonomous control method based on minimum value competition logic is proposed to coordinate the operation of PV and ESU, and achieve voltage regulation of the common bus in dc MGs. A three-port converter (TPC) as a compact dc/dc energy conversion unit can effectively integrate renewable energy sources (RESs) and energy storage units ...