Inverter grid-connected oscillation

Do grid-following and grid-forming inverters have a new oscillation phenomenon?
The dynamic equations of FOs in GFM converters are derived analytically. The key parameters influencing FOs in GFM converters and their impact patterns are analyzed. This paper identifies a new oscillation phenomenonin hybrid systems composed of grid-following (GFL) and grid-forming (GFM) inverters.

Do grid-forming inverters improve system stability?
Abstract: Grid-forming inverters (GFMIs) are increasingly being integrated into grid-connected systems dominated by grid-following inverters (GFLIs) to enhance the stability of weak grids. However,the capability of traditional grid-forming control to enhance system stability remains limited.

Do GFL inverters support grid inertia and frequency stability?
The rapid penetration of GFL inverters, however, raises concerns on the grid inertia and frequency stability. Hence, much attentions have been paid to grid forming (GFM) control, which has the ability to support the grid by mimicking the characteristics of synchronous generators (SGs) [2, 3].

Why does a GFM inverter oscillate when MPPT reaches 4 times LFO?
The results indicate that when the frequency of MPPT approaches four times the LFO mode of the GFM inverter,it may lead to severe FO phenomena. Additionally,smaller damping parameters in the GFM control,lower proportions of GFM inverter capacity,and larger grid resistances,contribute to more severe oscillation phenomenon.

In this paper, a ripple-based current model is proposed to describe the special subharmonic oscillation of single-phase grid-connected DC-AC inverter with the One-Cycle ...

This study introduces anactive-reactive power coordination framework with modest inverteroversizing, designed to enhance both steady-state and dynamicperformance of grid ...

This article investigates a novel oscillation phenomenon in systems with grid-forming (GFM) and grid-following (GFL) inverters. Unlike previous studies that primarily focus on small ...

As the primary interface for integrating renewable energy sources such as wind and solar power into the grid, inverters are prone to inducing sub-/super-synchronous or medium ...

Abstract--This paper investigates the dynamic behavior of a grid-connected inverter-based resource (IBR) when connected radially to a series compensated line. Potential ...

However, the digital control delays introduced by sampling and PWM processes can degrade system passivity, limiting the scalability and stability of delayed multi-inverter ...

Grid-forming inverters (GFMIs) are increasingly being integrated into grid-connected systems dominated by grid-following inverters (GFLIs) to enhance the stability of ...

To solve this problem, this study proposes a control strategy for PV grid-connected inverters based on the model predictive control (MPC) algorithm. Based on the MPC algorithm ...

This paper identifies a new oscillation phenomenon in hybrid systems composed of grid-following (GFL) and grid-forming (GFM) inverters. Different from...

This approach ensures stable operation in both islanded and grid-connected modes, providing essential grid support functions such as frequency and voltage regulation. Its ...

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