عنوان مقاله:

Active Resonance Damping and Unbalanced VoltageCompensation in Renewable Energy Sources based IslandedMirogrids

محل انتشار:

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خلاصه مقاله:

Development of renewable energy sources basedmicrogrids(MG) due to the advancement of power electronicsdevices is increasing. These devices typically use LCL filterswith inherent resonance characteristics that increase the risk ofresonant amplification and propagation in the microgrid. Theresonance amplifies current and voltage harmonics, resulting inpower quality and stability problems. On the other hand,unbalanced voltage in low voltage islanded MGs due toimbalanced loads is one of the major issues of power qualitythat has adverse effects on electrical equipment. In this paper, ahybrid method based on effective active resonance dampingintegrated to unbalanced voltage compensation in MGterminals is proposed. The active damping method uses anexternal control level that avoids control bandwidth limitationsand compensates for undesirable resonant harmonics. Thismethod provides simplicity of design and implementationwithout the need for additional measurements or basicinformation of system parameters, which is more important inMG applications. In unbalanced voltage compensation, there isno need to measure the load current and the MG controllerreduces the voltage imbalance by analyzing its terminal voltage.This can reduce the cost and complexity of the compensationsystem due to the problems of load current measuring. Since theMG inverter can detect voltage unbalance in its terminal, theproposed control algorithm calculates the compensationreference through the decoupled dual synchronous referenceframe (DDSRF). Finally, the resonant damping signal and theMG negative sequence reference voltage are combined and fedinto a two-level sine pulse width modulation block (SPWM) toswitch on the MG converter

کلمات کلیدی:

Islanded Microgrid; Active resonance damping;Unbalanced voltage; hierarchical control; DDSRF

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