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A Universal Controller Under Different Operating States for Parallel Inverters With Seamless Transfer Capability

In this project, to operate parallel inverters in both Grid-Connected (GC) State and Standalone (SA) state and to ensure seamless transfer between them without reconfiguring the control structure, a universal controller is proposed. The universal controller is mainly composed of frequency-locked-loop and three cascaded control loops: a grid current loop, capacitor voltage loop, and inductor current loop. A proportional-integral regulator is adopted in the grid current loop, and a limiter is inserted after the integrator. In the GC state, the proposed controller accurately regulates the grid current of an individual inverter. When islanding occurs, the proposed controller can automatically convert from grid current control to vC–ig-based droop control; critical islanding detection is not needed. The effectiveness of the proposed system is verified by simulation in MATLAB/SIMULINK.

Domain: Power Systems solar Power Generation
Technology: Electrical