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RESEARCH ARTICLE

Grid-Tied PV Power Generation System Inertia and Damping Analysis with DC Voltage Droop Control

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ABSTRACT

Since power electronics are required for solar electricity production, it lacks the intrinsic characteristics of natural inertia and damping. In order to contribute the capacitance of the medium scale to the utility, this paper builds the static synchronous generator of the grid-integrated PV system with DC voltage regulation as its research topic. The system's inertia, synchronization, and damping characteristics, as well as the laws driving these factors, are examined using the model. The medium-term energy storage capacity of the capacitor may lead to a system with particular inertia properties. When the coefficient of drooping Dp decreases, the system exhibits a stronger inertia characteristic from the standpoint of the control parameters. The damping consequence of the arrangement is increased when Kp, the DC voltage external circle proportional coefficient, is increased. The system's synchronization ability improves with an increase in the DC voltage external loop fundamental constant Ki. MATLAB/Simulink simulations are also used to ensure that the theoretical analysis findings are valid before they can be implemented

Keywords: consequence, Simulink, System, inertia, natural