RESEARCH PAPER

Controllability analysis of renewable embedded AC microgrid with multi-band stabilizers

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Abstract : The depletion of conventional energy sources and the increasing demand for electricity due to industrialization and rising global living standards has led to the need for a transformation of the traditional power grid. The microgrid concept has emerged as a solution that integrates renewable energy sources into the main grid. This paper examines an AC microgrid consisting of solar, wind, hydro, and diesel power stations, and investigates the effect of various power system stabilisers (PSSs) on the silent-pole synchronous generator of the diesel and hydro power plant. The effectiveness of different PSSs, including $\Delta\omega$-PSS, ΔPa-PSS, and Multi-band PSS, is compared using a grid-connected AC microgrid. The simulation results show that Multi-band PSS performs better than conventional PSSs in eliminating electromechanical oscillation, even in the presence of Gaussian and colored noise. PSSs are useful in managing the power flow of various DERs and improving power system stability. The simulation is conducted using the MATLAB/SIMULINK software.

Key Words : Microgrid control, Renewable Energy, Multi-band PSS, Stabilizer

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