

Abstract: Energy Storage System Control for Enhancing Stability in a Diesel and Wind-Turbine Based Stand-alone Microgrid

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Abstract

An intermittent characteristic of wind turbine can damage power quality. Specially, in stand-alone microgrid, such as island power system, this intermittent characteristic of wind power can lead to severe problems, such as frequency oscillation and system stabilities. This paper presents a control strategy of hybrid electric energy storage system in order to improve power system stability in a diesel and wind-turbine based stand-alone microgrid. This study addresses an AC hybrid energy storage system which is composed of lead acid battery storage and electric double layered capacitor, and presents a unified control algorithm of AC hybrid energy storage for enhancing stability. Usefulness of the proposed control algorithm is verified by experimental test results for system frequency, voltage, power fluctuation of the generator, and system stability. Comparison tests with conventional compensation methods are performed to validate the effectiveness of the proposed control method.