

Integrated Droop Control Strategy for DC Microgrid System with PV System

Prudhvi Kumar G R

Member, IEEE, Department of Electrical and Electronics Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India

Sattianadan Dasarathan

Member, IEEE, Department of Electrical and Electronics Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India

Abstract:

The droop control technique is the most popular and widespread approach in the DC microgrid for managing the power from source to load. An adaptive droop control technique and PV and battery storage systems are developed to overcome the drawbacks of conventional droop controllers. The proposed work develops the combined MPPT-based adaptive droop controller, which maintains energy management between PV and battery in a low-voltage DC microgrid. The battery is considered a backup source to fulfill the load demand when PV output is low. Battery control is crucial to stabilize the DC bus voltage. Considering battery SOC, the controller will work in either MPPT or OFF-MPPT modes. The proposed work deals with the complete design and implementation of a PV-based LVDC microgrid, evaluated using MATLAB/Simulink simulation and validated using real-time simulator experimental studies.

Keywords:

DC microgrid, parallel operation, droop control, dc-dc converter, load sharing, maximum power point tracking(MPPT), energy management.