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Control and Implementation of a Multifunctional Solar PV-BES-DEGS Based Microgrid

In this project, a Three-Phase Four-Wire (TPFW) microgrid comprising of a solar Photo Voltaic (PV) array- Battery Energy Storage (BES) - a Diesel Engine Generator Set (DEGS) is presented. Here, an Enhanced Adaptive Filter (EAF) control and an Incremental Conductance (INC) Maximum Power Point Tracking (MPPT) algorithm are used to improve the power quality and to extract the maximum power from the PV array. The EAF control provides higher disturbance rejection capability over other controls. The EAF control is applied to the Voltage Source Converter (VSC) to improve the power quality, such as compensation of harmonics, reactive power, and load unbalance. The INC control is used to harvest the PV array maximum power. For controlling the voltage output of the DEGS, an electronic Automatic Voltage Regulator (AVR) is provided at the Synchronous Generator (SG) field winding. The neutral current compensation is achieved by controlling the fourth-leg of VSC.

Domain: Power Systems _ Hybrid Systems
Technology: Electrical