

Abstract

Mohamed Atef El-Saharty

Equivalent model of a synchronous PV power plant

The continuous integration of renewable energy sources into power systems has led to the construction of large power plants based on power electronics, with power ratings up to hundreds of megawatts, in order to accommodate technologies like solar PV and wind energy. Due to the size of these plants, they must provide support services for the grid and it is necessary to analyze the impact they have on power systems. Oposing to conventional power plants formed by a reduced number of synchronous generators in the range of several hundreds of megawatts, large power plants based on PV and wind energy are usually composed of a high number of individual generating units with power ratings of a few megawatts. Therefore, it is of great importance to develop aggregated models of power plants formed by multiple power converters to be used in the dynamic analysis of large power systems. This paper presents the control system of a 20 MW PV plant, derives an equivalent aggregated model and studies the performance of this model through simulation.