

A grid connected photovoltaic system using a parallel multilevel inverter: Optimal number of inverter cells

Chabakata MAHAMAT¹ and El hassane Margoum²

¹Université de la Guyane

²Ibn Tofail University Kenitra

November 10, 2020

Abstract

This paper presents a grid connected photovoltaic (PV) system using a parallel multicellular inverter (PMI). We focus on the optimized design of an LCL filter connecting a parallel multicellular inverter by looking for the number which optimizes the losses of the inverter, as well as the energy management by controlling the power produced by the photovoltaic generator (PVG). In order to transfer the power produced by the PVG to the grid, the classical maximum power point tracking (MPPT) algorithm called perturb and observe (P & O) is used to maximize the power produced by the PVG. The active and reactive power control (PQ control) using a Phase-Locked Loop (PLL) for synchronization is applied to the inverter. We present the value of this innovative PV architecture using a PMI compared to the conventional one. We show that this PQ control, although it is classical, is well adapted to the PV architecture using a PMI. We also present and discuss the simulation results obtained by using the Matlab software (simulink and simpowersystems).

Hosted file

Mahamat_Article grid connected PV systems.pdf available at <https://authorea.com/users/374687/articles/492124-a-grid-connected-photovoltaic-system-using-a-parallel-multilevel-inverter-optimal-number-of-inverter-cells>

Hosted file

Graphic abstract image.pdf available at <https://authorea.com/users/374687/articles/492124-a-grid-connected-photovoltaic-system-using-a-parallel-multilevel-inverter-optimal-number-of-inverter-cells>