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Integration of Hybrid PV-Wind in Three Phase Grid System Using Fuzzy MPPT without Battery Storage for Remote Area

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Abstract : Access to electricity is now a basic requirement of mankind. Unfortunately, there are still many places around the world which have no access to electricity, such as small islands, where there could potentially be a factory, a plantation, a residential area, or resorts. Many of these places might have substantial potential for energy generation such us Photovoltaic (PV) and Wind turbine (WT), which can be used to generate electricity independently for themselves. Solar energy and wind power are renewable energy sources which are mostly found in nature and also kinds of alternative energy that are still developing in a rapid speed to help and meet the demand of electricity. PV and Wind has a characteristic of power depend on solar irradiation and wind speed based on geographical these areas. This paper presented a control methodology of hybrid small scale PV/Wind energy system that use a fuzzy logic controller (FLC) to extract the maximum power point tracking (MPPT) in different solar irradiation and wind speed. This paper discusses simulation and analysis of the generation process of hybrid resources in MPP and power conditioning unit (PCU) of Photovoltaic (PV) and Wind Turbine (WT) that is connected to the three-phase low voltage electricity grid system (380V) without battery storage. The capacity of the sources used is 2.2 kWp PV and 2.5 kW PMSG (Permanent Magnet Synchronous Generator) -WT power rating. The Modeling of hybrid PV/Wind, as well as integrated power electronics components in grid connected system, are simulated using MATLAB/Simulink.

Keywords : fuzzy MPPT, grid connected inverter, photovoltaic (PV), PMSG wind turbine
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