Reliability Assessment of Grid Connected Photovoltaic Generation Systems

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Abstract

This paper investigates the reliability of different topologies of grid connected photovoltaic (PV) systems. The topologies considered in this study are centralized topology, string topology and multi-string topology. The reliability of each topology is evaluated by using suitable reliability indices that are based on calculating the probability of different operating states. These states are evaluated using the state enumeration method which is based on computing the failure rate of each component while considering the different environmental conditions. Simulations are performed in MATLAB environment on a 58.3 KW photovoltaic system to compare between the reliability of the three topologies.

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