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Power Energy Management For A Grid-Connected PV System Using Rule-Base Fuzzy Logic

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Abstract : Active collaboration among the green energy sources and the load demand leads to serious issues related to power quality and stability. The growing number of green energy resources and Distributed-Generators need newer strategies to be incorporated for their operations to keep the power energy stability among green energy resources and micro-grid/Utility Grid. This paper presents a novel technique for energy power management in Grid-Connected Photovoltaic with energy storage system under set of constraints including weather conditions, Load Shedding Hours, Peak pricing Hours by using rule-based fuzzy smart grid controller to schedule power coming from multiple Power sources (photovoltaic, grid, battery) under the above set of constraints. The technique fuzzifies all the inputs and establishes fuzzify rule set from fuzzy outputs before defuzzification. Simulations are run for 24 hours period and rule base power scheduler is developed. The proposed fuzzy controller control strategy is able to sense the continuous fluctuations in Photovoltaic power generation, Load Demands, Grid (load Shedding patterns) and Battery State of Charge in order to make correct and quick decisions.The suggested Fuzzy Rule-based scheduler can operate well with vague inputs thus doesn’t not require any exact numerical model and can handle nonlinearity. This technique provides a framework for the extension to handle multiple special cases for optimized working of the system.

Keywords : photovoltaic, power, fuzzy logic, distributed generators, state of charge, load shedding, membership functions
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