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Power control strategy of a photovoltaic system with battery storage system

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Abstract: In this paper, an intelligent approach based on fuzzy logic has been developed to ensure operation at the maximum power point of a PV system under dynamic climatic conditions. The current distortion due to the use of static converters in photovoltaic production systems involves the consumption of reactive energy. For this, separate control of active and reactive powers using a proportional-integral controller is applied. Using batteries for energy storage in the photovoltaic system has become an increasingly promising solution to improve energy quality: current and voltage. For this purpose, the energy management of batteries for regulating the charge level under dynamic climatic conditions has been studied. The research presented in this paper provides an important contribution to the application of fuzzy theory to improve the power and performance of a hybrid system comprising a grid-connected PV, battery, and energy management strategy. Therefore, to highlight the advantage of the FL-MPPT studied in this paper, its performance has been compared and analyzed with conventional P&O and NNT algorithms. Simulation results are carried out in MatLab/Simulink tools. According to the analysis of the results, a better energy quality has been proven.

Keywords : Battery storage, Energy management, Energy storage, MPPT control, Performance, photovoltaic System