

Study of Two MPPTs for Photovoltaic Systems Using Controllers Based in Fuzzy Logic and Sliding Mode

Authors : N. Ould cherchali, M. S. Boucherit, L. Barazane, A. Morsli

Abstract : Photovoltaic power is widely used to supply isolated or unpopulated areas (lighting, pumping, etc.). Great advantage is that this source is inexhaustible, it offers great safety in use and it is clean. But the dynamic models used to describe a photovoltaic system are complicated and nonlinear and due to nonlinear I-V and P-V characteristics of photovoltaic generators, a maximum power point tracking technique (MPPT) is required to maximize the output power. In this paper, two online techniques of maximum power point tracking using robust controller for photovoltaic systems are proposed, the first technique use fuzzy logic controller (FLC) and the second use sliding mode controller (SMC) for photovoltaic systems. The two maximum power point tracking controllers receive the partial derivative of power as inputs, and the output is the duty cycle corresponding to maximum power. A Photovoltaic generator with Boost converter is developed using MATLAB/Simulink to verify the preferences of the proposed techniques. SMC technique provides a good tracking speed in fast changing irradiation and when the irradiation changes slowly or is constant the panel power of FLC technique presents a much smoother signal with less fluctuations.

Keywords : fuzzy logic controller, maximum power point, photovoltaic system, tracker, sliding mode controller

Conference Title : ICSR2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020