

عنوان مقاله:

A Fast and Accurate Global Maximum Power Point Tracking Method for Solar Strings under Partial Shading Conditions

محل انتشار:

مجله بهره برداری و اتوماسیون در مهندسی برق، دوره 8، شماره 3 (سال: 1399)

تعداد صفحات اصل مقاله: 12

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خلاصه مقاله:

This paper presents a model-based approach for the global maximum power point (GMPP) tracking of solar strings under partial shading conditions. In the proposed method, the GMPP voltage is estimated without any need to solve numerically the implicit and nonlinear equations of the photovoltaic (PV) string model. In contrast to the existing methods in which first the locations of all the local peaks on the P-V curve are estimated and next the place of the GMPP is selected among them, the suggested method estimates directly the GMPP without any need for the evaluation of the other local peaks. The obtained GMPP voltage is then given as a reference value to the input voltage controller of a DC-DC boost converter to regulate the output voltage of the solar string at the GMPP voltage in various irradiation conditions. Furthermore, the values of the temperature and irradiation level of each PV module within the PV string are estimated, and therefore, the proposed method does not need to thermometers and pyranometers. This makes it as a reliable and low-cost GMPP tracking method. The theoretical aspects on which the proposed GMPP algorithm is established are also discussed. The comparison of the numerical results of the suggested GMPP tracking scheme with the existing methods at different environmental conditions shows the satisfactory operation of the proposed technique from the speed and accuracy point of views.

کلمات کلیدی:

(PV strings, Partial shading, Global maximum power point (GMPP), Model-based GMPP techniques (GMPP)

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