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A Novel High Accuracy PV Cell Model Including Self Heating and Parameter Variation

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Abstract

This paper proposes a novel model for a PV cell with parameters variance dependency on temperature and irradiance included. The model relies on commercial available data, calculates the cell parameters for standard conditions and then extrapolates them for the whole operating range. An up-to-date review of the PV modeling is also included with series and parallel parasitic resistance values and dependencies discussed. The parameters variance is analyzed and included in the proposed PV model, where the self-heating phenomenon is also considered. Each parameter variance is compared to the results from different authors. The model includes only standard components and can be run on any SPICE-based simulator. Unlike other approaches that consider the internal temperature as a parameter, our proposal relies on air temperature as an input and computes the actual internal temperature accordingly. Finally, the model is validated via experiments and comparisons to similar approaches are provided. View Full-Text

Keywords: PV cell; model; simulation; SPICE; self heating; parameters variation

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