Abstract:

An extensive experiment has been designed and conducted to measure the magnitude of solar irradiance falling upon a PV solar field. The experimental results show that the second and succeeding rows received less solar irradiance than the first row. In addition, there was a degradation of the solar irradiance along a single row directing towards the centre of that row. Nowadays, all available models are addressing the solar radiation incident on a single surface. However, the nature of multi-rows solar fields is different from that of a single surface, which indicates that these models are not suitable for solar irradiance calculation, and there is no work regarding this topic. The aim of this study is to modify a model so the design parameters are included in one model that estimates the solar irradiance on solar fields. The effect of the design parameters, was demonstrated. In order to state the validity of the proposed model, a comparison between models that were used in literature and the proposed model along with the experimental results has been provided. The impact of solar degradation on the electrical characteristics has been briefly discussed.