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# Comparison of Irradiance Decomposition and Energy Production Methods in a Solar Photovoltaic System

**Authors :** Tisciane Perpetuo e Oliveira, Dante Inga Narvaez, Marcelo Gradella Villalva

**Abstract :** Installations of solar photovoltaic systems have increased considerably in the last decade. Therefore, it has been noticed that monitoring of meteorological data (solar irradiance, air temperature, wind velocity, etc.) is important to predict the potential of a given geographical area in solar energy production. In this sense, the present work compares two computational tools that are capable of estimating the energy generation of a photovoltaic system through correlation analyzes of solar radiation data: PVsyst software and an algorithm based on the PVlib package implemented in MATLAB. In order to achieve the objective, it was necessary to obtain solar radiation data (measured and from a solarimetric database), analyze the decomposition of global solar irradiance in direct normal and horizontal diffuse components, as well as analyze the modeling of the devices of a photovoltaic system (solar modules and inverters) for energy production calculations. Simulated results were compared with experimental data in order to evaluate the performance of the studied methods. Errors in estimation of energy production were less than 30% for the MATLAB algorithm and less than 20% for the PVsyst software.

**Keywords :** energy production, meteorological data, irradiance decomposition, solar photovoltaic system
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