

Data Driven I-V Feature Extraction for PV modules

Paper presentation

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Motivation

- Performance parameter extracted from I-V data set : P_{mp} , V_{oc} , I_{sc} , R_s , R_{sh} , FF are essential for diagnosing degradation of PV modules
- Data driven technique can be applied to a **large amount** of data in a **short time** in contrast with traditional fitting of diode equation
- Applied to 2.2 million real I-V datasets, took 3 hrs to complete
- No requirement of device parameter to be input from the researcher
- Applicable on non standard I-V datasets having **multiple steps**

Method

- ① **Fit smoothing spline** on raw I-V dataset (unequal spacing in voltage) to get 500 equal spaced points in voltage
- ② Regression performed on **moving window** of 5 consecutive I-V points
- ③ **Slope** of each regression line is used to identify either **step or MPPT**
- ④ **Identify the segments (steps)** : Steeper slope on the left than right
- ⑤ If step is found, I-V feature is extracted separately for both the parts