Electrical Engineering Department
College of Engineering
Salahaddin University -Erbil

Renewable Energy Lab

Experiment No. 1

Photovoltaic Characteristics

Background

The I-V curve (Figure 1) represents all of the possible operating points (current and voltage) of a PV module or string of modules at the existing conditions of sunlight (irradiance) and temperature. The curve starts at the short circuit current and ends at the open circuit voltage. The maximum power point, located at the knee of the I-V curve, is the operating point that delivers the highest output power. It is the job of the inverter to find and operate at that point on the I-V curve and to adapt as the curve changes with irradiance and temperature. The P-V curve (power versus voltage) reads zero at the ends and a maximum at the knee of the I-V curve.

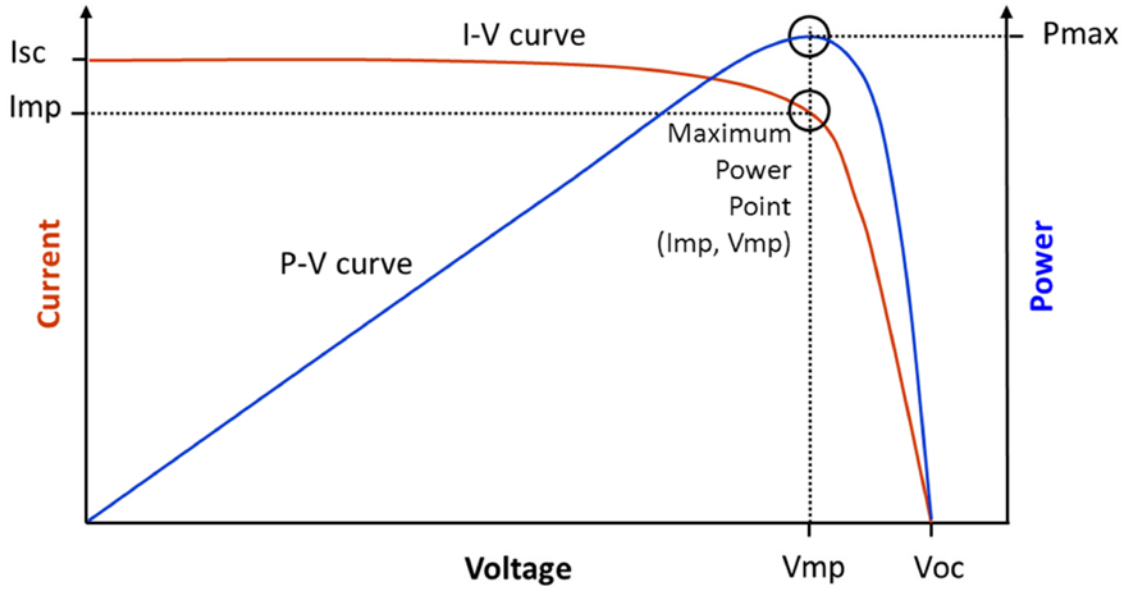

Figure 1 I-V and P-V curves for a PV module or string

Experiment

Connect the terminals of the PV panel with a load, pure resistance load, and change the load from minimum to maximum in steps. In each step record the voltage and the current.

Report

1. Record the time and date of the day of the experiment.
2. Measure azimuth, altitude, and GPS coordinates of the site of PV panels.
3. From your recorded measurements of voltage and current, draw the I-V curve.
4. Repeat step 2 to draw the P-V curve.
5. Count the number of cells in the PV panel.
6. From step 3, find the no-load voltage for each cell and how they are connected to provide the total no-load voltage of the PV panel.
7. From the relations, V-1 and V-P, find MPP, Imp, and Vmp.
8. State your conclusion of the above steps and your experiment.

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