

Sistemas de Energia Solar

Laboratory Guide: Determination of the IV curve of a photovoltaic module

The aim of this laboratory task is to study different electrical connections between PV modules by tracing the IV curve of:

- One PV module,
- Two PV modules connected in series,
- Two PV modules connected in parallel.

The following parameters should be determined:

- Short circuit current,
- Open circuit voltage,
- Maximum power,
- Fill factor,
- Efficiency,
- Characteristic resistance,
- Series resistance,
- Shunt resistance,

In addition, the shadowing effect for the previous 3 configurations is studied by measuring the short circuit current and the open circuit voltage when:

- A module is shadowed,
- A cell is shadowed,
- Half of a cell is shadowed.

For a single module you should assess the:

- Voltage thermal coefficient,
- Current thermal coefficient.

By taking measurements while the module heats up to a maximum of 50°C.

You would benefit in bringing one personal computer. PV modules with 300 mA of short circuit current and 1.5V of open circuit voltage are available in the laboratory, as well as variable resistors, cables, multimeters, thermocouples, and a solar simulator.

The work should be carried out with the group spread in table, with each one responsible for one of the tasks: (1)taking notes; (2)making the readouts and (3)switching setup configurations.

The report should be written using the template made available in the same Fenix subsection.

The report should be handed at the end of week after the lab session, which means, second Friday after Lab, by 10 AM. (This rule excludes the first work report. Advise

with the professor). These are to be handed in via email (ivocosta@fc.ul.pt), with the reported attached in PDF AND WORD formats.