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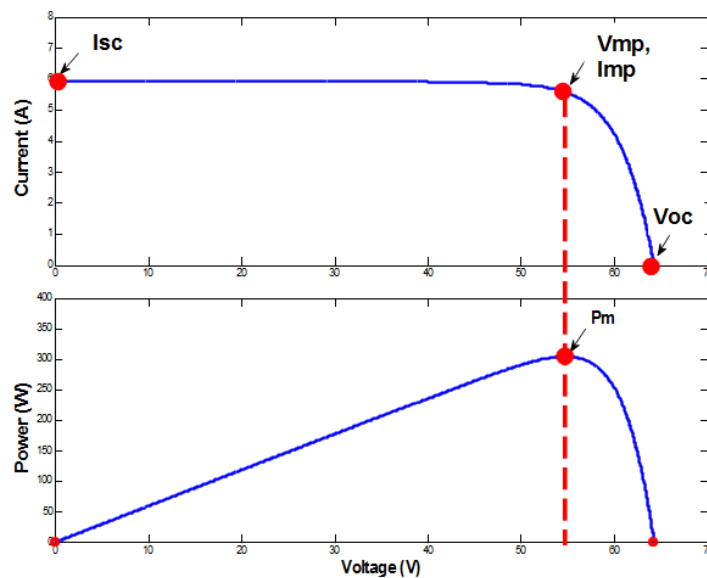
Green CaMMp Workshop
17.12.2021 – online session

The current and voltage (I - V) curve of a photovoltaic cell. Maximum power produced

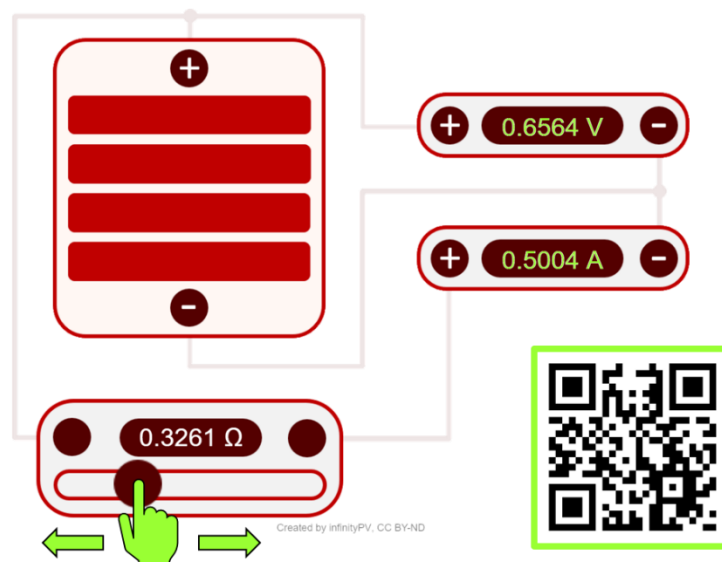
Scope: Record the current and voltage (I - V) curve of a photovoltaic (PV) cell. Determine the maximum power produced by the PV cell

Platform: Virtual tool. Resistive load, <https://infinitypv.com/l/Potentiometer.php>

The **Solar Cell I - V Characteristic Curve** gives a detailed description of its energy conversion efficiency. The maximum power produced P_m by a photovoltaic cell is a key parameter for PV applications design.

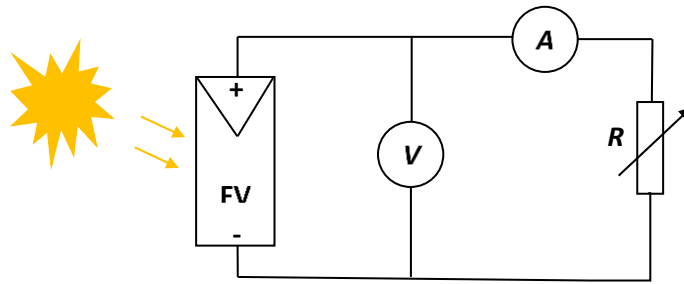


The virtual instrument *Resistive load*, <https://infinitypv.com/l/Potentiometer.php> allows the I - V curve to be recorded for a PV cell using a potentiometer, a voltmeter, and an ammeter. If you have a smartphone, you can open the virtual instrument by scanning the QR barcode.



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Remark: The virtual instrument is realized based on the circuit shown below:



Measure the voltage and current at different resistance of the load.
 With this information the power produced by the photovoltaic cell can be calculated as:

$$P = V \cdot I$$

Use the virtual instrument by sliding the knob and record the highlighted values in the table below:

Resistance R [Ω]											
V [V]											
I [A]											
P [W]											
V_{mp} [V]				I_{mp} [A]				P_m [W]			

Tips: - record as many values of the I - V pair for a more accurate graphical representation, **especially for high resistance values**.
 - use MS Excel to record and graph the resulting data.

Graph the I - V and P - V curves and determine the values of: I_{mp} , V_{mp} and P_m .

Then, validate the correctness of your results using the equation:

$$P_m = V_{mp} \cdot I_{mp}$$

Prepare a short presentation (a pptx file is recommended) about your experiment, results, interpretation, ... to be shared with all participants.

References

- [1] <https://fr.mathworks.com/help/phymod/sps/powersys/ref/pvarray.html>.
- [2] <https://infinitypv.com/learn/virtual-tools/c04>.