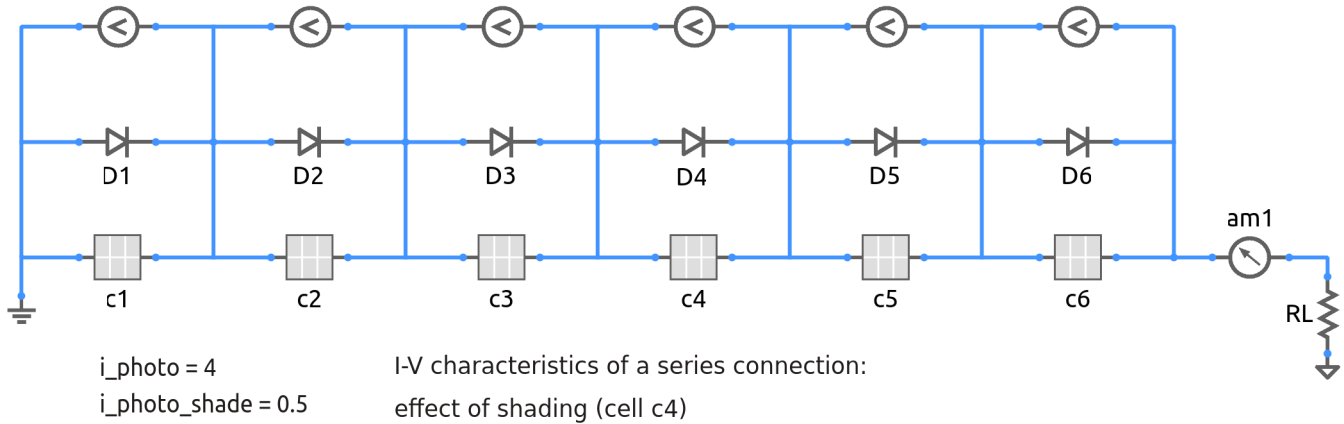


solar_iv_5.sqproj



In the circuit shown in the figure, six solar cells are connected in series along with bypass diodes. One of the cells (C_4) is under shade, and its photocurrent is reduced to $I_{p4} = 0.5$ A. All other cells have a photocurrent of $I_p = 4$ A.

Exercise Set

1. Plot (on paper) the I - V relationship for the array in two cases: (a) The above condition where $I_{p4} = 0.5$ A and all other photocurrents are 4 A, (b) All photocurrents are equal (4 A).

Note: A critical examination of `solar_iv_5a.sqproj` will be helpful.

2. Plot the bypass diode currents (I_{D1}, \dots, I_{D6}) versus the total voltage drop with C_4 under shade.
3. Plot the cell voltages (V_{C1}, \dots, V_{C6}) versus the total voltage drop with C_4 under shade.
4. Compare your plots with simulation results.

References

1. L. Castaner and S. Silvestre, *Modelling Photovoltaic Systems with PSpice*, John Wiley and Sons, 2002.
2. C. S. Solanki, *Solar Photovoltaics: Fundamentals, Technologies, and Applications*, Prentice-Hall India, 2011.